

Clinical posters

Friday 18th September



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The use of intentional replantation to repair an external cervical resorptive lesion not amenable to conventional surgical repair

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Aim: To describe a case where intentional replantation was used to restore an external cervical resorption (ECR) lesion not amenable to conventional surgical repair.

Introduction: Intentional replantation consists of purposefully extracting a tooth, correcting the defect and replanting the tooth into its original socket. This case report describes how this technique was used to locate and restore the ECR lesion when CBCT revealed the resorption was too extensive to restore using conventional surgical techniques.

Case Presentation: The clinical protocol involved:

- De novo root canal treatment (fig.2)
- Atraumatic extraction
- Debridement of the resorptive area with minimal high speed preparation
- Curretage and removal of the inflammatory tissue from the corresponding socket site (fig.4)
- Tooth held at the CEJ using forceps to avoid handling of the root surface
- Extraoral minimal preparation and restoration of the defect using GIC (fig.5)
- Reimplantation within 12 minutes (fig.6) and confirmation of correct repositioning using LCPC (fig.8)
- Coe-pack dressing for 1 week (fig.7)
- Review at 1 (fig.9), 3, 6 months

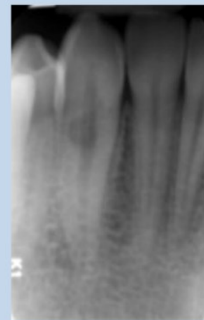


Fig.1



Fig.2



Fig.3

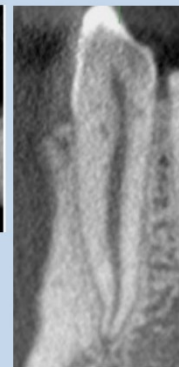


Fig.4

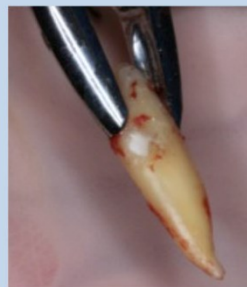


Fig.5



Fig.6



Fig.7

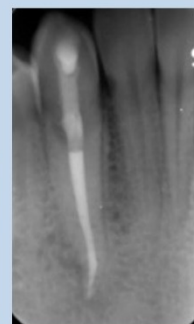


Fig.8



Fig.9

Discussion:

- ECR often has an aggressive and insidious nature resulting in significant loss of tooth structure. CBCT provided crucial information required to formulate the treatment plan. The conventional radiographs provided limited information with regards to ECR location, depth and circumferential spread
- Following atraumatic extraction, the extra-oral dry time can be minimised by having two operators; one operator currettes the alveolar ECR lesion whilst the other repairs the tooth surface defect using microscope magnification and replants the tooth.
- GIC can be used to repair the ECR lesion minimising damage to the adjacent PDL cells
- A periodontal dressing (Coe-Pak) can be used to protect the tooth postoperatively

Conclusion & Clinical relevance: CBCT imaging was invaluable in the diagnosis and management of this case and should be considered during the treatment planning of ECR lesions. Intentional replantation should be considered a viable treatment option when ECR is too extensive to restore using conventional surgical techniques

References: Bender et al, Intentional replantation for endodontically treated teeth, OSOMOP, 75.5 623-630 1993



PERFORATING INTERNAL ROOT RESORPTION – REPORT of TWO CASES

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Aim: To present the method of treatment of perforating internal root resorption (type C) with the use of Biodentine.

Introduction: Traditionally, the treatment of perforating internal resorption involved long-term use of calcium hydroxide materials and multiple appointments which was associated with the risk of infection. Materials such as MTA and Biodentine enabled different approach in the treatment of such defects.

Methodology: The authors describe method of treatment of two cases of perforating internal root resorption. In the first case (a 22-year-old female), tooth 22 was diagnosed with a perforation on the lingual aspect of the root. In the second case (a 24-year-old male), perforation was localized on the labial and extended to both proximal surfaces of the canal of tooth 11. Root canal systems were biomechanically prepared with the aid of an operating microscope. Non-setting calcium hydroxide paste was used temporarily as an intracanal medicament. On the second appointment apical parts of the canals were obturated with lateral compaction of gutta-percha and AH Plus as a sealer. The remaining part of the canals and the resorptive defects were filled with Biodentine. After homogenous obturation was confirmed radiographically, access cavities were filled with resin-based composite material. No signs or symptoms were detected in neither of cases during 4 years of clinical and radiological observation in the former case and 3 years and 3 months in the latter case.

Discussion: Internal resorption is an indication to perform root canal treatment. Due to pathology the morphology of pulp cavity becomes altered. Pulp extirpation, biomechanical preparation and obturation in many cases pose a clinical challenge.

Conclusions: In two presented cases Biodentine proved to be a useful material in the treatment of perforating internal resorption (type C). Cases of perforating internal root resorption require long-term clinical and radiological observation.

References: Dammaschke T.: Biodentine- Eigenschaften und Wirkungsweise. Quintessenz 2012, 63 (10), 1273-1279

Case 1



Fig.1: Initial x-ray

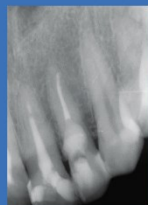


Fig.2: 03.03.2011



Fig.3: 06.03.2012



Fig.4: 04.10.2012



Fig.5: 10.12.2013



Fig.6: 30.09.2014

Case 2

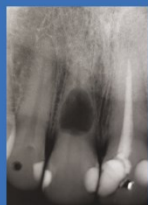


Fig.7: initial x-ray



Fig.8: 20.09.2011



Fig.9: 20.09.2011

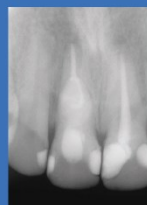


Fig.10: 12.06.2012

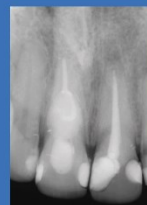


Fig.11: 17.12.2013

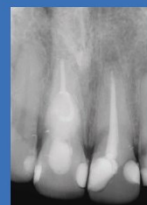


Fig.12: 17.12.2014

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Treatment of apical root resorption caused by impacted tooth using MTA

AIM

To describe the use of mineral trioxide aggregates (MTA) in the treatment of mandibular second molar with distal root resorption caused by impacted mandibular third molar via 3 clinical cases.

SUMMARY

Root resorption is a dental complication that can lead to tooth extraction. Open apices along with apical root resorption may be caused by mechanical or chemical injury to the protective tissues and stimulation by infection or pressure. (Fuss Z. et al., 2003).

In case of a wide open apex, the major concern is to avoid the extrusion of a large amount of filling material into the periodontal tissue. MTA has been shown as an effective root filling material in case of root canals with open apices (Khetarpal A. et al., 2013). Use of MTA as an apical plug could be an alternative option for the treatment of teeth with open apices.

This case report represents the clinical and radiographic outcomes of the treatment using MTA. All three cases are mandibular second molar with open apices caused by impacted third molar.

CASE 1

1. Sex/age: M/26
2. Chief Complaint: spontaneous pain on #37 due to dental caries
3. Past Dental History: before 6 months restoration dislodgement
4. Present Illness: per (+), pal (-), mob (0), cold (+), EPT (-)
5. Impression: irreversible pulpitis with external distal root resorption on #37
6. Treatment: root canal treatment on #37 using MTA
7. Progress: impacted #38 was extracted before starting root canal treatment on #37. Clinical and radiographic examination at 1 month after treatment shows no specific sign.



Initial X-ray



CBCT



Post-operative X-ray



1 month follow-up

CASE 2

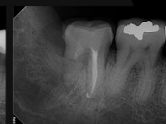
1. Sex/age: F/46
2. Chief Complaint: referred from department of Oral surgery due to discomfort on #47
3. Past Dental History: extraction of impacted #48 about 3 weeks ago
4. Present Illness: per (+), pal (+), mob (0), cold (+), EPT (+)
5. Impression: reversible pulpitis with external distal root resorption on #47
6. Treatment: root canal treatment on #47 using MTA
7. Progress: clinical and radiographic examination at 2 months after treatment shows no specific sign.



Initial X-ray



After treatment



2 months follow-up

CASE 3

1. Sex/age: M/33
2. Chief Complaint: referred from the department of Oral surgery for evaluation of #37
3. Past Dental History: N/S
4. Present Illness: per (-), pal (+), mob (0), cold (-), EPT (-)
5. Impression: pulp necrosis with external distal root resorption on #37
6. Treatment: root canal treatment on #37 using MTA
7. Progress: in the follow up after 9 months, clinical and radiographic examination revealed that patient had no symptom



Initial X-ray



CBCT



Post-operative X-ray



1 month follow-up



5 months follow-up



9 months follow-up

KEY LEARNING POINTS

The use of MTA can be an alternative option for the treatment of teeth with open apices. Therefore, teeth with open apices caused by impacted tooth could be saved.

REFERENCE

1. Khetarpal A, Chaudhry S, Talwar S, Verma M. Endodontic management of open apex using MTA and platelet-rich fibrin membrane barrier: A newer matrix concept. J Clin Exp Dent. 2013;5(5):e291-4
2. Fuss Z, Tsesis I, Lin S. Root resorption – diagnosis, classification and treatment choices based on stimulation factors. Dent Traumatol 2003; 19:175-182



Department of Endodontics



Invasive cervical Resorptions: diagnosis, etiology and treatment. On the subject of several cases.

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Aim

Exposing several cases of invasive cervical resorption, showing the importance of early diagnosis and the treatment difficulties of this pathology.

Introduction

Invasive cervical resorption is a relatively uncommon form of external root resorption. Although its etiology remains unknown, there have been suggested diverse predisposing factors related to its development, between others, occlusal trauma, orthodontic treatment, dentoalveolar surgery or internal bleaching.



Conclusion

Early detection is essential for successful management and outcome of ECR.

The CBCT is a helpful and valuable tool in the assessment of the diagnosis and the treatment plan.

To achieve a successfully treatment result, it is necessary an optimal hemostatic control, an inactivation of the resorption process and the placement of a suitable sealing material in the resorption defect.

Hetihsay G.S. **Invasive cervical resorption.** Endodontic Topics 2004, 7, 73–92.

Patel S., Kanagasingam S, Pitt Ford T. **External cervical resorption: a review.** J Endod. 2009 May;35(5):616-2

Maini A, Durning P, Drage N. **Resorption: within or without? The benefit of cone-beam computed tomography when diagnosing a case of an internal/external resorption defect.** Br Dent J. 2008 Feb 9;204(3):135-7

Hybrid Technique To Treat Perforating Internal Resorption: Report Of Two Cases

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AIM: The aim of this poster is to show the diagnosis and treatment of two clinical cases of internal resorption with palatal perforation.

INTRODUCTION: The resorption represents a challenge for the clinician. Its origin is often unknown, although its etiology is generally related to dental trauma and orthodontic treatment. The diagnosis and management of this pathology is complicated due to the loss of tooth structure which accompanies resorption.

CASES PRESENTATIONS:

- Case 1: a 26-year-old male with a history of trauma. The clinical examination revealed tooth discoloration. The tooth was not tender to percussion, palpation, or biting. Thermal pulp sensibility tests were negative.
- Case 2: a healthy 22-year-old female treated with orthodontics. The clinical examination revealed pain to percussion, palpation, or biting. Thermal pulp sensibility tests were negative.
- In both cases, the periapical radiograph with a CBCT image, revealed evidence of extensive perforating internal root resorptions.
- The teeth were isolated with a rubber dam, and an access cavity were prepared. The working lengths were performed with the electronic apex locator.
- The canals were cleaned and shaped with a Mtwo rotary NiTi file to size 45/0.5. Irrigation was performed with EndoVac System and 5,25% sodium hypochlorite (NaOCl) between instrumentations.
- **Hybrid Technique:** The apical third was obturated with gutta-percha, and the perforated lesion was repaired with mineral trioxide aggregate. The residual canal space was filled by thermoplasticized gutta-percha technique, and the coronal cavity was restored with composite resin. Upon follow-up, there were absence of clinical signs and symptoms. The control radiograph showed no signs of periapical pathosis in both cases.



DISCUSSION: The presence of an external communication difficulties the different phases of the root canal treatment, more directly influencing in the chemical disinfection and the sealing of the resorptive dimensional cavity. The use of CBCT proved an important diagnostic aid in the management of the resorptions, allowing case presentation to the patient and allowing optimal treatment planning by observing the loss of tooth structure in three dimensions. The hybrid technique described in the literature, allowed successful orthograde treatment, avoiding a surgical approach.

CONCLUSION AND CLINICAL RELEVANCE:

- The use of CBCT is an important diagnostic aid in the management of root resorptions.
- The hybrid technique, where the canal apical to the resorption defect is obturated with gutta-percha, and then the resorption defect and associated perforation are sealed with MTA, is a suitable technique to treat perforating resorptions.

REFERENCES:

1. Hsien HC, Cheng YA, Lee YL, Lan WH, Lin CP. Repair of perforating internal resorption with mineral trioxide aggregate: a case report. J Endod 2003;29:538-9.
2. Jacobowitz M, de Lima RK. Treatment of inflammatory internal root resorption with mineral trioxide aggregate: a case report. Int Endod J 2008;41:905-12.
3. Wilson PR, Barnes IE. Treatment of internal root resorption with thermoplasticized gutta-percha: a case report. Int Endod J 1987;20:94-7.
4. Venskutonis T, Plotino G, Juodzbalys G, Mickevičienė L. The importance of cone-beam computed tomography in the management of endodontic problems: a review of the literature. J Endod 2014 Dec;40(12):1895-901.
5. Bendyk-Szeffer M, Łagocka R, Trusewicz M, Lipski M, Buczkowska-Radlińska J. Internal root resorption repaired with mineral trioxide aggregate caused complete resolution of odontogenic sinus mucositis: a case report. J Endod 2015 Feb;41(2):274-8.

ENDODONTIC MANAGEMENT OF A PERFORATING INTERNAL REPLACEMENT RESORPTION: A CASE REPORT

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Aim: This case report presents the management of a case of rarely seen perforating internal replacement resorption using mineral trioxide aggregate (MTA) root canal obturation.

Introduction: Two types of internal resorption were defined on the basis of histological observations: internal inflammatory resorption and internal replacement resorption. In the internal replacement resorption cases, an irregular enlargement of the root canal with the radiological appearances of a fuzzy material resembling bone tissue might be observed (1-3).



Fig.1. (A) Preoperative, (B) Ca(OH)₂ medication, (C) After the coronal restoration. Note the gaps between the MTA and the root walls (arrows).

Fig.2. Postoperative 5 years. Note the healing around the MTA.

Case Presentation: A maxillary central incisor of a 20-year-old woman was showing a sinus track on the mucosa. Radiographically, an irregularly shaped and perforating internal resorption area was seen at the middle third of the root canal. A bone-like material was observed inside the resorption site. The apical part of the canal was obliterated. After the debridement of the canal with copious irrigation of 5% sodium hypochlorite solution, a conservative filling was applied to the canal walls. Following 5 months of Ca(OH)₂ medication, the canal and the perforation were obturated with MTA filling. At 5 years follow-up, the tooth was clinically asymptomatic and showing radiographical evidence of hard tissue repair and periodontal membrane healing around the MTA at the perforation site.

Discussion: Patel et al. (1) concluded that the ultimate treatment modality for the treatment of perforating IR cases remains as the conventional endodontic therapy. Nilsson et al. (2) suggested the surgical approach with the use of MTA or calcium silicate cements for the filling as a second intention in cases in which it is not possible to enter the lesion through the canal.

Conclusion: The long-term successful clinical and radiological results of this case favor nonsurgical endodontic management with MTA filling for the perforating internal resorption cases.

References: 1-Patel S, Ricucci D, Durak C, Tay F. Internal root resorption J Endod 2010; 36: 1107-21.

2-Nilsson E, Bonte E, Bayet F, Lasfargues JJ. Management of internal root resorption on permanent teeth. Int J Dent 2013; 2013: 929486.

3-Ne RF, Witherspoon DE, Gutmann JL. Root resorption. Quintessence Int 1999; 30: 9-25.



ENDODONTIC RE-TREATMENT AND MANAGEMENT OF AN EXTERNAL AND INTERNAL ROOT RESORPTION IN A MAXILLARY LATERAL INCISOR

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AIM: Maxillary lateral incisor re-treatment for an under filled root canal treatment, apical chronic periodontitis, internal and external root resorption.

INTRODUCTION: Endodontic re-treatment is the option when root-canal treatment has failed because a poor obturation of the root canal system. On the other hand, root resorption occurs when osteoclasts resorb the dentin and pulpal walls centrally within the root canal (internal) or peripherally (external) from cementum to the central pulp. In some cases both type of resorption can be observed in the same tooth. The orthograde endodontic re-treatment of a maxillary lateral incisor with persistent apical periodontitis and both external and internal root resorption is described.

CASE PRESENTATION: A 28 year old male patient seeks dental attention because of discoloration in a maxillary lateral incisor. The tooth was asymptomatic, but percussion was positive. Radiographic examination showed a poor obturation of the root canal system, chronic apical periodontitis, and external apical root resorption and internal root resorption in the apical portion of the root canal. In the first treatment session the amalgam which had the seal was removed, as well as gutta-percha point. Working length was determined electronically and confirmed with radiography. Irrigation was carried out with NaClO 4.2%. As intracanal medication, CaOH₂ was mixed with sterile serum during 21 days. In the second session, the Ca₂(OH) was removed with #60K files and Endoactivator, and MTA was used to seal the resorption and the apex. The middle and coronal portions of the canal was sealed with B gun of BL system.



CONCLUSIONS AND CLINICAL RELEVANCE: Poor obturation of root-canal system is a main cause of root-canal treatment failure. Non-surgical endodontic re-treatment, if possible, is the first treatment option in root-filled teeth with persistent apical periodontitis. In some cases, external and internal root resorption can be present in the same tooth.

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C-Shaped Molars: Regarding Several Cases

AIM: Understanding the C-shape anatomic variance, in order to do a successful root canal treatment of this type of teeth.

INTRODUCTION: C-shaped canals have a frequency of 2.7%-8% (Weine et al. 1988, Jafarzadeh & Wu 2007). This anatomy is more frequent in Asians than in other races, and in accordance with the classification of Fan et al. (2004), we have 5 types of C-shaped canals (fig.1). These type of canals, present fins or webs that connect the root canals, and these variations are mostly seen in mandibular second molars.

CASE PRESENTATION: We present 3 cases of mandibular C-shaped molars. Case1 is a mandibular first molar (3.6), diagnosed with symptomatic apical periodontitis and scheduled for endodontic retreatment, (fig.2), Case2 is a mandibular second molar (4.7), diagnosed with symptomatic irreversible pulpitis(fig.3) and Case3 is a mandibular third molar (4.8), diagnosed with symptomatic irreversible pulpitis(fig.4). Both cases have been treated with copious irrigation with sodium hypochlorite, to facilitate tissue removal. Warm vertical obturation was performed, to allow gutta-percha to flow into all the anatomical variants.

DISCUSSION: The root canal treatment outcome depends on the correct interpretation of the dental anatomy, so dentists need to have knowledge about all of these types of root canal configuration, in order to achieve a good prognosis.

CONCLUSIONS AND CLINICAL RELEVANCE : The correct diagnosis of this type of anatomy, allows us to properly choose the best technique of instrumentation, irrigation and obturation. The use of magnification can help us doing the diagnosis. Without knowing how to manage these cases, we harm the prognosis of the treatment.






C1		The shape is an uninterrupted "C" with no separation or division.
C2		The canal shape resembles a semicolon resulting from a discontinuation of the "C" outline, but either angle α or β should be no less than 60°.
C3		Two or three separate canals and both angles, α or β are less than 60°.
C4		Only one round or oval canal in that cross-section.
C5		No canal lumen can be observed (which is usually seen near the apex only).

Figure 1

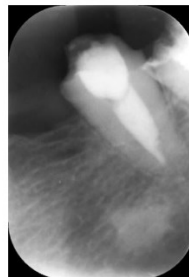


Figure 2



Figure 3



Figure 4

Management of an invasive cervical resorption in a radix paramolaris with an internal approach: a case report

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Aim

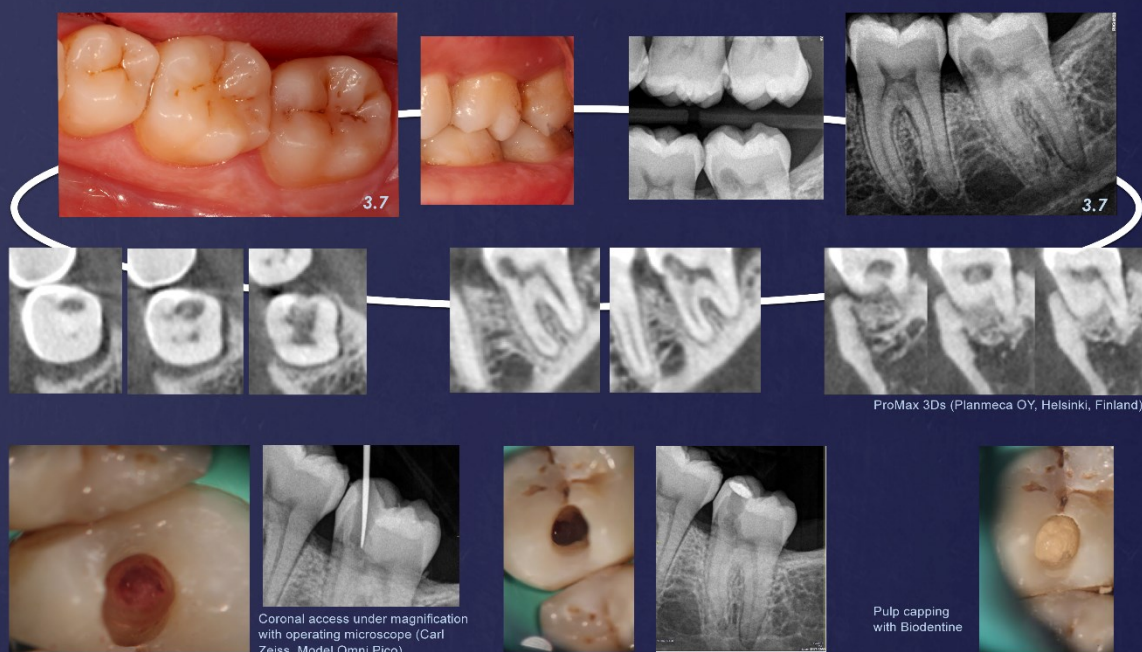
To describe the management of a second left mandibular molar with an internal cervical resorption (ICR) class 2 treated with an internal approach under magnification with the use of cone-beam computed tomography (CBCT)

Introduction

Invasive cervical resorption (ICR) is a relatively uncommon form of external root resorption. It is a localized resorptive process that commences on the surface of the root below the epithelial attachment and the coronal aspect of the supporting alveolar process. The condition is usually painless unless pulpal or periodontal infection occurs.

The aims of treatment are stop the continuation of the resorption and replace the unprotected root surface with a foreign material that classic cells cannot be reattached.

Case Presentation



Discussion

When the gingival attachment was intact, a purely internal approach has been satisfactory in most instances (Heithersay 1999). Perforations and periodontal communication may develop, but these are usually minimal and manageable compared with those produced by the surgical access approach. The classical large surgical access necessary to bur out all the invasive tissue and affected dentin as well often leads to a large periodontal defect. An easier, more predictable approach is to clean out these resorptive pockets through the coronal access to the root canal (Frank 1981).

Conclusion

Successful treatment demands the total removal or inactivation of invading resorptive tissue. The pulpal preservation is secondary to this aim.
 This case demonstrates the usefulness of an internal approach for a precise removal of resorptive tissue under magnification.
 This case shows The CBCT is a useful tool for the treatment of complex endodontic problems.

Clinical relevance reference

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2. Heithersay G. Invasive cervical resorption. Endodontic Topics 2004, 7, 73-92.
3. Heithersay G. Invasive cervical resorption: An analysis of potential predisposing factors. Quintessence Int 1999;30:83-95.
4. Patel S. External Cervical Resorption: A Review. J Endod 2009; 35: 616-625.
5. Patel S, Dawood A. The use of cone beam computed tomography in the management of external cervical resorption lesions. Int Endod J 2007;40:818-30.



Management of Extensive Internal Root Resorption: Two Case Reports

Aim

To illustrate successful management of extensive internal root resorptions in two different cases.

Introduction

Internal root resorption is characterised by progressive destruction of intraradicular dentin along the root canal wall. It is usually asymptomatic and detected during routine radiographic examinations. Cone-beam computed tomography (CBCT) displays the location and extension of resorptive defects. Early diagnosis and management of such defects is essential to maintain the integrity of the tooth.

Case Presentation

Case 1: 53 year-old patient was referred to our clinic for consultation of his maxillary left lateral tooth. In clinical examination the tooth was asymptomatic. The electric and thermal pulp sensibility tests were both negative in the tooth. Radiographic examination revealed indications of internal root resorption. Afterwards, CBCT images ensured the accurate location and extent of resorption. During the management, the root canal of the affected tooth was debrided, irrigated, and calcium hydroxide paste was placed in the root canal for a week. In the second session, root canal was obturated with warm compaction of gutta percha (System B and Obtura). Then the tooth was restored with light-cured composite resin.



Fig 1. Panoramic radiograph of patient before treatment

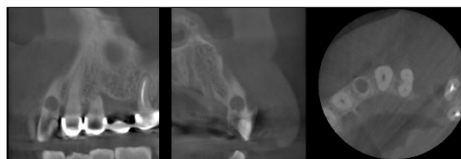


Fig 2. CBCT images of the tooth before treatment

Case 2: 21 year-old patient was referred to our clinic for management of tooth 22 with internal root resorption. The tooth was asymptomatic and sensibility tests were negative in the tooth. Following the cleaning and shaping procedures, the root canal was obturated with lateral and vertical compaction of gutta-percha combined with AH 26 sealer.

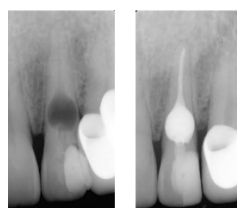


Fig 3. Periapical radiographs of the tooth before and after the treatment

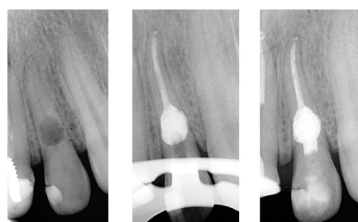


Fig 4. Periapical radiographs of the second case before and after the treatment

In the first case the tooth was functional with satisfactory clinical and radiographic results after 6- month follow-up. The same results have been achieved in the second case with 8-year follow-up period.

Conclusions and Clinical Relevance

Our results show that, although management of internal root resorption is a challenge for practitioners, early diagnosis and proper treatment approaches lead to satisfactory results. On the other hand, follow up is essential to evaluate the long term prognosis.

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Microsurgical Re-Treatment of Endodontically Treated Teeth with Incomplete Vertical Root Fracture: A Clinical Case Report

Aim Simultaneous management of a tooth with an apical lesion and an incomplete vertical root fracture extending from the apical to a medial portion of the root.

Introduction Management of apically located incomplete vertical root fracture is one of the most challenging dental traumatic injuries, which may result in tooth loss. Due to the strategic importance of maxillary anterior teeth, all efforts must be done for tooth saving.

Case presentation 26-years-old patient showing vague signs and symptoms related to maxillary left first incisor was referred for treatment consideration. The patient reported a previous traumatic injury to the maxillary anterior teeth. At the clinical examination, moderate edema and the presence of a sinus tract was found in the labial area at a distance of about 4 mm from gingival margin. No periodontal pockets were observed. Dental anamnesis from the patient, revealed a previous orthograde treatment (fig.1a) and a subsequent endodontic periapical surgery that was performed 6 months later. Radiographic examination revealed a 2mm root-end resection and widening of the periodontal ligament space in mesial and periapical aspect of the root (fig.1b). Following flap elevation, a vertical root fracture involving the apical and partially the medial portion of the root were identified. Fig 2

Conventional root end resection and cavity preparation were done with subsequent the removal of 2/3 of the fractured line. The remaining part of the fracture line was treated by root fracture repair technique that involves preparing a groove following the remaining fracture line using zirconium nitride retro-tips driven by an ultrasonic device unit. The groove along the root fracture line was dried using paper points and MTA was used as a filling material for the retrocavity and the fracture line. Fig 3 Plasma rich growth factor was used to enhance healing.

Prognosis after 6 months follow-up, the tooth was asymptomatic on clinical examination (no signs and symptoms) and the radiographic evaluation showed healing in progress. Fig 4

Conclusions and Clinical Relevance

The results of this technique, combining apicoectomy and fracture line repair, are promising as a treatment alternative for preservation of teeth with apically located vertical root fractures.

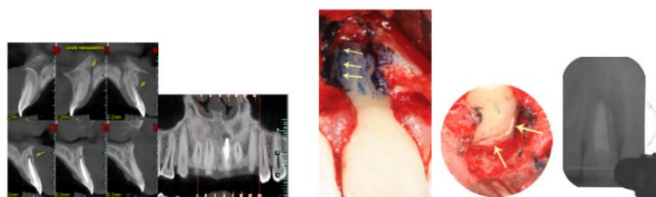


Fig. 1a **Fig.1b** **Fig.2** **Fig.3** **Fig.4**

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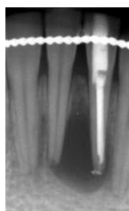
The use of Safescraper™ in collecting bone particles to fill the periapical lesion after endomicrosurgery

Aim: to show a method of harvesting autologous bone particles using the Safescraper™ in endomicrosurgery.

Methodology: at the end of an endomicrosurgery treatment, after placing the root end filling, the Safescraper (META, Italy) can be used to collect bone particles to fill the bone cavity, thereby supporting a membrane. This collecting can be done in a scraping motion with the instrument, preferably vertical between roots, in this way using a small collecting surface. Adjusting pressure and angle of the instrument results in different consistency and size of the graft particles.



The container of the instrument can be filled with a maximum of 3 cc bone particles.



Case presentation :

Element 31 of a nineteen year old boy was treated endodontically after a hockey trauma. Control x-rays after two years showed a large periapical lesion.

Decision was made to treat the 31 surgically.



After raising the flap, large bone loss was visible. After performing root resection, apical preparation and obturation with MTA,



the lesion was filled with autologous bone, harvested near the operation site using the Safe-scraper™



The site then was covered by a resorbable membrane (Ace, USA) and sutured with Prolene 7-0. (Ethicon, J&J, USA)



Standard antibiotics were given for five days.

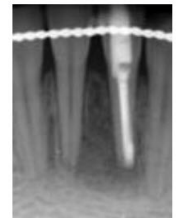
Sutures were removed after four days, and after three weeks a control visit was scheduled.



After three weeks



After six months healing proved to be successful.



Discussion: in some cases with large periapical bone defects and a missing root covering bone plate the healing after surgery is negatively influenced due to loss of gingival attachment. In these cases it is recommended to fill the bone cavity with (artificial or natural) bone chips. Autologous mineralized cortical bone, being osteogenic, osteoinductive and osteoconductive, is well accepted by the body. To prevent the ingrowth of epithelial cells and to favour the attachment of the gingival flap it is necessary to place a (resorbable) membrane sustaining the gingival tissue.

Conclusion and clinical relevance:

The Safescraper™ can collect cortical bone chips from different intraoral sites. The procedure is effective in treating alveolar defects, provides good healing and easy handling of blood-soaked bone particles, collected in a simple scraping action.

Multidisciplinary approach to treatment of complicated crown root fractures – a case report

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Aim: Presentation of successfully performed therapy of complicated crown-root fractures, chisel-type, and demonstration of the importance of multidisciplinary approach to the treatment of traumatic dental injuries.

Introduction: The dental trauma management should be based on a detailed taken history of the patient, and careful clinical and radiological examination.

Case presentation: Patient came to the Dental Clinic due to traumatic dental injury of maxillary incisors. Clinical and radiographic examinations have found crown-root fractures of upper maxillary incisors, extending deeply subgingivally on palate, with exposed pulp tissue (fig. 1). The fractured fragments were temporarily repositioned and splinted in order to perform root canal treatments (fig. 2). After access cavity preparation (fig. 3) and placing a rubber dam, instrumentation was performed using engine driven ProTaper instruments (Dentsply Maillefer, Ballaigues, Switzerland) followed by copious irrigation with 1% sodium hypochlorite. Medication was performed using a calcium-hydroxide paste for seven days. Final obturation was carried out with gutta-percha points and AH Plus paste (Dentsply Maillefer, Switzerland) (fig. 4). A rubber dam was removed during the X-ray.



Fig. 1



Fig. 2



Fig. 3

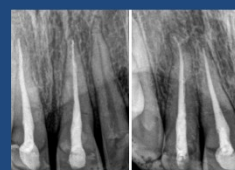


Fig. 4

A full-thickness gingival flap was raised by oral surgeon and endodontist, in order to expose the fracture lines, control the bleeding and ensure precise fragment repositioning. Reattachment procedure was performed and fractured fragments were fixed by fiber-reinforced composite posts (fig.5,6). Composite resin veneers were made in order to additionally strengthen and aesthetically reconstruct the teeth (fig.7,8).



Fig. 5



Fig. 6



Fig. 7



Fig. 8

Discussion: Different treatment modalities are presented in therapy of complicated crown root fractures: conventional prosthetic restoration, fragment reattachment, crown lengthening (gingivectomy and osteotomy), orthodontic extrusion, surgical extrusion, tooth extraction followed by implants or fixed partial denture. The advantages of reattachment procedure are: less time-consuming; aesthetic properties of the tooth, contour, color and translucency remain the same; the emotional and social response from the patient is highly positive.

Conclusions and Clinical Relevance: Constant development of adhesive materials and restorative techniques allows the dentist to achieve functionally and aesthetically satisfying restorations. Individual approach to each case is essential, and multidisciplinary cooperation during treatment provides the rehabilitation of teeth at the least traumatic way.

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MANAGEMENT OF A PALATO-RADICULAR GROOVE: INTENTIONAL REPLANTATION



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Universitat Internacional de Catalunya, Dept. of Endodontics

AIM: To present the treatment of a palato-radicular groove by intentional tooth replantation.

INTRODUCTION: The palato-radicular groove is a morphologic anomaly that can induce a self-sustaining localized periodontal pocket to develop along the length of the groove.

Many treatments have been described for the management of this entity. The intentional replantation is an accepted endodontic treatment procedure in which a tooth is extracted and treated outside the oral cavity and then inserted into its socket.

CASE PRESENTATION: A 13 year-old male patient was referred to the endodontics department, presenting the upper left lateral incisor without caries or history of trauma, with negative vitality testing, asymptomatic to percussion and with a 7-mm pocket associated with a radicular groove on the distopalatal aspect of the tooth. A diagnosis of endodontic periodontal lesion with palatogingival groove and pulpal necrosis was inferred.



After the root canal treatment had been done, the intentional replantation was performed; the tooth was extracted as atraumatically as possible, while taking care not to damage the periodontal ligament cells.

The odontoplasty was carried out and the defect was sealed with flowable resin. It was then carefully positioned into its alveolar socket and splinted with a crossed stitch for 10 days.



The resolution of the periapical image was evident at one-year follow-up. Also, a 5-mm gain of clinical attachment was achieved.

DISCUSSION: The rationale behind the selected treatment plan was the odontoplasty of the groove to remove bacterial plaque, to prevent bacterial recolonization and the regeneration of periodontal attachment and bone.

CONCLUSIONS AND CLINICAL RELEVANCE: The palatogingival groove acts as a "plaque trap," facilitating the development of a combined endodontic-periodontal lesion.

The intentional replantation is a reliable and predictable procedure for the treatment of the radicular groove.

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 Torabinejad M et al. Survival of intentional replanted teeth and implant-supported single crowns: A systematic review. *JOE Article* in press, 2015



Treatment of a Large Periapical Cyst Perforating Pallatine Bone

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Aim: Healing of a large periapical cyst perforating palatine bone is reported. Following both the root canal treatment and retreatment with a total enucleation of cyst was performed.

Introduction: Radicular cysts are the most common inflammatory jaw cysts which originate from epithelial remnants stimulated to proliferate by an inflammatory process originating from pulpal necrosis of a non-vital tooth. The resulting cysts commonly involve the apex of the affected tooth (1). Most radicular cysts develop slowly and do not become very large (2). The lesions are not usually clinically detectable when small but most often are discovered as incidental findings on radiographic survey.



Fig. 1 Orthopantomogram showing the large lesion of the related teeth remarked by the circle

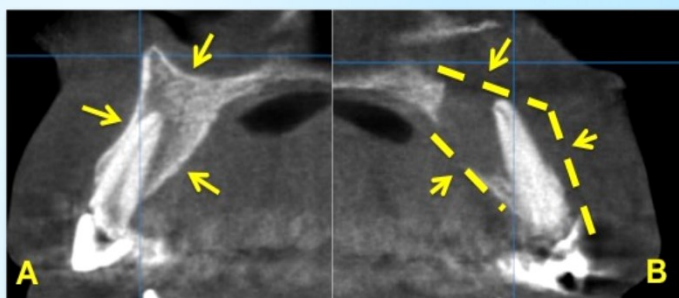


Fig. 2 A) Intact form of nasal spine, hard palate, and buccal cortical bone indicated with arrows B) Arrows point the destruction of nasal spine, hard palate, and buccal cortical bone

Case Presentation: A 30 years male patient referred to the clinics of Endodontics with a complain of swelling and colourless nasal flow just after eating or drinking. Extraoral examination was within normal limits however there was swelling on the vestibular gingiva, in relation to the upper left central and lateral incisors with fistula on the gingiva of left lateral incisor.

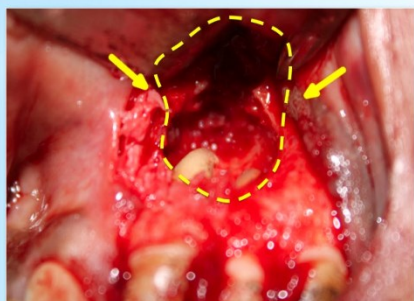


Fig. 3 Area of resorbed bone with a deep resorption area buccolingually and mesiodistally.



Fig. 4 Radiographic image after root canal treatment of #22 and retreatment of # 21



Fig. 5 Operation area after suturing

A large periapical radiolucency in relation to central and lateral incisors were evident (Fig. 1). Periodontal probing showed an extensive bone loss in relation to the same teeth. A 31 mm × 38 mm × 51 mm unilocular, expansile lesion in the anterior aspect of the maxilla was detected after CBCT imaging (Fig. 2). The lesion extended superiorly and inferiorly with cortical breakdown of the hard palate and loss of bony support to the maxillary incisors (Fig. 3). The lesion was directly communicated with the nasal cavity (Fig. 4). Root canals were treated and cyst was excised under local anesthesia by infraorbital block injection using 2% lidocaine containing 1:100000 epinephrine. The patient was prescribed a chlorhexidine digluconate mouth rinse and 3x500 mg amoxicillin plus 2x 550 mg naproxen daily for 1 week. The histopathology report confirmed the diagnosis of an infected radicular cyst with an intact cyst epithelial and fibrotic wall containing collagen. One week later, patient was asymptomatic and nasal flow was totally over (Fig. 5).

Discussion: Several treatment options are available for a radicular cyst such as conservative endodontic treatment, surgical endodontic treatment, extraction of the offending tooth, enucleation with primary closure, and marsupialization followed by enucleation (3). In this case, root canal treatment and surgical enucleation combination was preferred and was performed uneventfully.

Conclusions and Clinical Relevance: A radicular cyst is a common condition however, it usually goes unnoticed and rarely exceeds the palpable dimension. This case illustrates the successful management of a radicular cyst with enucleation following endodontic treatment and retreatment.

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Use of hyaluronic acid to enhance augmentation after large periradicular cyst removal

Boris Pažin, Dental Polyclinic Zagreb, Department Of Endodontics

AIM:

Our aim was to evaluate the effects of hyaluronic acid on the healing of soft and hard tissues following the surgical enucleation of a large radicular cyst.

INTRODUCTION:

A 30-year old male attended the dental Polyclinic complaining of the swelling in the region of his mandibular incisors. Radiographic examination (Fig.1) revealed a periapical radiolucency associated with the mandibular anterior teeth extending from the lower right canine to the lower left canine. The characteristics of the radiolucency were suggestive of potential radicular cyst. Tooth 41 was extracted 15 years previously as part of orthodontic treatment.

CASE PRESENTATION:

Clinical examination revealed that tooth 31 was discoloured. Teeth 31, 32 and 42 did not respond to pulpal sensitivity testing, and tooth 42 exhibited grade (2/3) mobility. Teeth 31,32,42 were splinted with Ribbond and endodontically treated. A full thickness muco-periosteal flap was raised to gain access to the periapical tissues, the periaradicular inflammatory tissue was curetted and a suspected cyst was enucleated. The boney defect was covered with hyaluronic acid gel and subsequently filled with mixture of spongy bovine bone substitute, hyaluronic acid gel and blood to enhance boney healing. The boney defect was covered with a resorbable collagen bilayer membrane, wound area was dressed with hyaluronic acid gel. The flap was repositioned and secured with 5.0 polypropylene sutures (Figs. 2, 3, 4, 6, 7.) The curetted periradicular soft tissue was submitted for histological examination, which diagnosed the lesion as a radicular cyst.

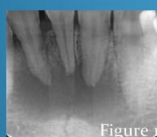


Figure 1.



Figure 2.



Figure 3.



Figure 4.

DISCUSSION:

Hyaluronic acid gel showed good properties regarding soft and hard tissue healing after surgical procedure.

RESULTS:

Excellent soft tissue healing was found during the follow-up period. Review radiographs taken after 3 months (Fig.5) showed good boney healing with new bone formation, despite overextension of the root filling.

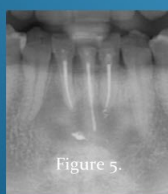


Figure 5.



Figure 6.

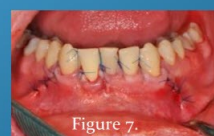


Figure 7.

CONCLUSION/CLINICAL RELEVANCE:

The potential benefits of hyaluronic acid gel used in guided tissue regeneration/guided bone regeneration (GTR/GBR) are improved wound healing, reduced risk of infection, stabilization of bone granules by the viscous gel and formation of a protective barrier preventing penetration of connective tissue.

REFERENCES:

Bansal Jyoti et al. Hyaluronic acid: A promising mediator for periodontal regeneration IJDR 21, 575-578 2010



Multidisciplinary management of an endodontic-periodontal lesion: a case report

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UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO
Graduate School of Dentistry, Endodontics

Aim:

The purpose of this case report was to assess the steps to get the adequate diagnosis of endodontic-periodontic defects in order to receive the best multidisciplinary treatment plan.

Introduction:

Endo-periodontal lesions represent a challenge to clinicians in the diagnosis and prognosis of involved teeth. There are different treatments options and modalities; the prognosis mostly depends of the right diagnosis. There are combined pathologies due to the relationship between periodontal and endodontic diseases, which require an interdisciplinary management.

Case presentation

Female, 20 years old patient with no systemic diseases. She mentioned severe spontaneous pain in the mandibular left quadrant. On pulp sensitivity testing there was a persistent irradiated response. A 15mm radiolucent lesion involved the mesial root of tooth 36 which was diagnosed with: a symptomatic irreversible pulpitis with chronic apical periodontitis and periodontal abscess with grade III mobility based on vitality tests and probing (Fig. A, B).

One week after root canal treatment the patient reported less pain. The periodontal component of treatment consisted of scaling, root planning and periodontal surgery (Fig E – H). Scaling and root planning was performed one week after root canal treatment leading to a reduction of mobility (grade II). 3 mo. later there was less mobility (grade I) and no pain at all. Guided tissue regeneration con alo-injerto was performed at that time with complete disappearance of mobility 3 mo. after surgery.

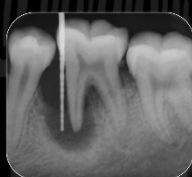


Fig. A



Fig. B

Treatment plan was: root canal treatment (bio-pulpectomy) (Fig C,D)



Fig. C



Fig. D



Fig. E



Fig. F



Fig. G



Fig. H

Postoperative immediate (Fig. I) and control radiograph after 4mo. (Fig. J).



Fig. I



Fig. J

Discussion:

Some authors consider that the pulp is not affected as long as the periodontal disease does not involve the apex (Czarnecki, 1979) while other mention that when the dental pulp is affected, the patient frequently reports the appearance of severe pain and clinical signs of pulpal affection (Karl, 2011).

Conclusion and Clinical Relevance:

There are different treatments options and modalities for the best resolution of a case that involves both endodontic and periodontal disciplines, requiring multidisciplinary treatment. It is necessary to explore these and verify the diagnosis to avoid the extraction of dental organs with a reserved prognosis.

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A radicular cyst with a calculus-like deposit on the root surfaces of tooth 46

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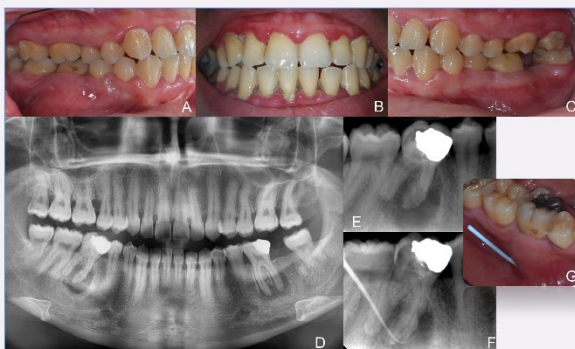
A radicular cyst with a calculus-like deposit on the root surfaces of tooth 46

Aim

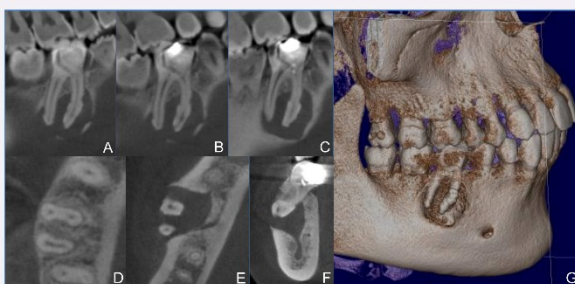
The aim of this case report is to determine the origin of the calcium disposition noticed on the roots of element 46 and to show the correlation between conventional radiography, CBCT, echography, nano-CT and histology.

Case presentation

A thirty-year-old woman presented with necrotising ulcerative gingivitis and two large cystic lesions on elements 36 and 46. A fistulous tract was present on the buccal mucosa of element 46.



Clinical and conventional radiographic examination. (A-C) Intraoral pictures. Picture B was made at intake, a necrotising ulcerative gingivitis was seen. A and C were made three months later. A slight improvement of oral hygiene was noticed. (D) The panoramic image shows two large apical radiolucencies on elements 36 and 46. Notice the amount of interdental calculus and the radiopaque deposit on the roots of element 46. (E) Intraoral x-ray. (F-G) The fistulography points at the mesial root of element 46. Pus was coming out of the sinus tract. Tooth 36 and 46 responded negative on cold and were tender to percussion. Periodontal pockets were less than 5 mm in depth.



Cone-beam computed tomography (CBCT). (A-C) Sagittal slices through element 46 show a radiopaque deposit around the mesial and distal root. (D-E) Axial slices. (D) shows complete bony attachment. (F) Coronal slice. The apical lesion forms a connection with the mandibular canal. (G) 3D reconstruction of the jaws. 3D Accutomo® CBCT (Morita). Volume 10 cm x 10 cm, slice interval 0.5 mm, slice thickness 1 mm.



Echographic evaluation. Through the broken buccal plate ultrasound imaging was possible. (A-B) Apices of the roots covered with an hyperechoic deposit. Flex Focus Ultrasound systems type 1202 (BK Medical).



Extraction of tooth 46. (A) Buccal, (B) lingual, (C) mesial and (D) apical view. A black calculus-like deposit is seen on the mesial and distal root. Part of the buccal and interradicular bone is attached. No attachment loss in the cervical area.



Nano-CT after extraction. (A) Sagittal slice. Internal resorption is seen in the apical third of the mesial root canal. (B) Magnification of the area indicated in (A). (D-E) Axial slices as indicated in (C). (E) shows the internal resorption. Nanotom® nano-ct system (GE Measurement and Control).

Hard and soft tissue histology coming soon...

Histology. The apical lesion was classified as a radicular cyst lined by stratified squamous epithelium with fibrosis in the stroma and a dense chronic inflammatory infiltrate.

Conclusions

All investigation methods showed an extensive calculus-like deposit on the external root surfaces of tooth 46. Calculus formation needs extraradicular biofilm and minerals. These minerals could be provided by the sinus tract serving as a portal of entry for oral fluids or by periapical inflammatory exudates. Some bacteria have also the ability to form calcifications themselves.

Key learning points

- The data obtained from conventional radiography, CBCT, echography, nano-CT (and histology?) are well correlating.
- Calculus-like material was found on the external root surfaces of a tooth with an associated radicular cyst and with a sinus tract as the only communication with the oral cavity.

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Autotransplantation of a mandibular third molar to the site of an extracted mandibular first molar, lost due to extensive caries: a 16-year follow-up.

Crespo-Gallardo I., Martín-González J., Sánchez-Domínguez B.,
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AIM: To report the 16 year follow-up of a case of successful autotransplantation of an immature mandibular third molar.

CASE PRESENTATION: A 20 year-old woman lost her mandibular right first molar due to dental caries (Fig. 1). The mandibular right third molar (Nolla's stage 6) was extracted and transplanted into the socket of the mandibular first molar (Fig. 2). Recall examination, 16 years after transplantation revealed that the transplanted tooth responded positively to electric pulp testing and showed no clinical or radiographic signs of infection, but exhibited grade III mobility (Figs. 4 and 5). The tooth was functional and asymptomatic.



Fig. 1



Fig. 2



Fig. 3

DISCUSSION: According to studies Moorrees et al. (1963) and Andreasen et al. (1999), the stages of root development at which teeth are suitable for autotransplantation are Nolla stages 7 and 8. In the case presented, although the stage of development of the donor tooth was not ideal, we opted for this treatment to prevent loss of alveolar bone. In the absence of complications, the post-surgical risk of pulp necrosis or root resorption in transplanted teeth should be monitored by successive clinical and radiographic examinations.



Fig. 4

KEY LEARNING POINTS:

- 1- autotrasplante es una opción viable en pacientes jóvenes para el tratamiento de un diente perdido, perdido debido a la caries dental y la enfermedad de endodoncia, cuando un diente de donantes está disponible.
- 2- autotrasplante puede prevenir o retrasar la necesidad de la rehabilitación protésica y preservadores hueso alveolar



ENDODONTIC RETREATMENT AS AN ALTERNATIVE TO SURGICAL THERAPY IN PATIENTS TREATED WITH BIPHOSPHONATES: A CASE REPORT

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Aim • To describe a complex endodontic retreatment in a patient receiving bisphosphonate drugs (BPs).

Introduction • Paget's disease of bone, described in 1877 by Sir James Paget under the term of "osteitis deformans", is a chronic metabolic bone disorder, characterized by an increase of resorbing activity of osteoclasts, followed by a disorganized and imperfect osteoblast-mediated bone repair.

The etiology is uncertain, although both genetic and environmental factors seem to play an important role in the pathogenesis of this disease. It can affect a single bone (monostotic) or multiple bones (polyostotic) and typical sites include pelvis, femur, lumbar spine, skull and tibia. This disease is often asymptomatic and commonly manifests after middle age. Clinical signs and symptoms depend on the extension of lesions and include pain, deformity and fracture. Craniofacial bones may be affected and lead to evident facial deformities. In these cases, radiologic features include cotton wool appearance, focal radiolucency, loss of lamina dura, pulpal radio-opacity, root resorption and hypercementosis.

Biphosphonates (BPs), such as alendronate, risendronate and zoledronic acid, are considered among the first choice drugs to control bone disorder activity of Paget's disease.

BPs-related Osteonecrosis of the Jaws (BRONJ) is one of adverse events associated with the use of these medications. According to several studies dental extractions or invasive surgical procedures play an important role in the development of BRONJ. To prevent this complication, nonsurgical endodontic treatment must be the first choice in patients medicated with systemic BPs.

Case presentation • A 65 year old female patient was referred to the Endodontic Department of the University of Cagliari with a chief complaint of masticatory pain in the area of tooth 1.6 (Fig. 1A). The patient's medical history included Paget's disease and BP treatment begun 9 years earlier and consisting of a monthly intramuscular injection of 75 mg Risedronate. Orthopantomogram (OPT) showed a periapical lesion on tooth #1.6 (Fig. 1B).

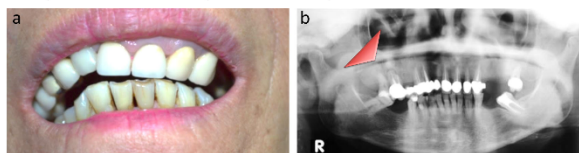
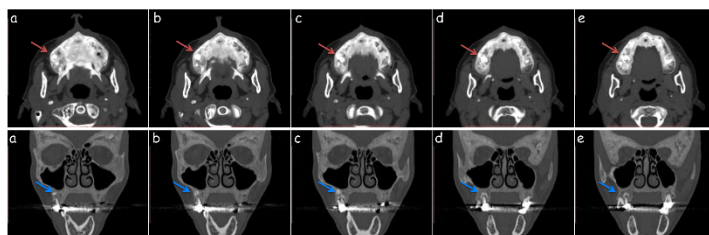


Fig. 1



Computer tomography (CT) images (Fig. 2 upper and lower panels) confirmed both the presence of a "cotton wool" appearance and a radiolucent periapical lesion in the area of tooth #1.6, as indicated by arrows.

Intraoral periapical radiographs (Fig. 3a) revealed a pre-existing nonsurgical endodontic treatment of tooth #1.6 complicated by the presence of a broken instrument and a root perforation.

Fig. 2

A conservative approach was chosen; endodontic retreatment of tooth #1.6 (Fig. 3a-b) was started and completed after five appointments. Signs and symptoms were recorded at the time of first presentation and re-evaluated after each appointment. During all the phases of treatment, root canal system was medicated with calcium hydroxide, and antibiotic therapy was prescribed to prevent BPs Related Osteonecrosis of the Jaws (BRONJ). Guttapercha removal and canal instrumentation were made carefully to avoid further damaging periapical tissues. At the end of endodontic retreatment, the tooth was filled with guttapercha and a zinc-oxide eugenol cement and MTA was used to repair root perforation. After completion, improvement of symptoms was recorded. At the 18 month follow-up, the patient remained asymptomatic and the lesion completely healed (Fig. 3 c-e).

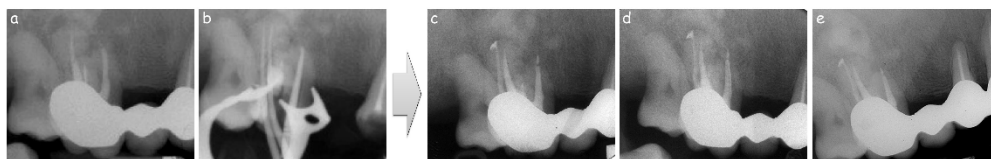


Fig. 3

Discussion • To minimize risks of BRONJ, nonsurgical endodontic therapy should be considered as a safe alternative to extraction or surgical endodontic treatment. Current evidence supports that particular care should be given during endodontic procedures in all patients treated with BPs.

Conclusions and Clinical Relevance • Patients treated with BPs are at higher risk of developing BRONJ, thus nonsurgical endodontic therapy should be considered as an alternative to surgical treatments to prevent BRONJ complications in these patients.

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Four canals in the mesial root of a mandibular first molar: a case report

Aim To describe the treatment of a mandibular first molar with an unusual variation in root morphology.

Introduction

The mesial root of a mandibular first molar usually contains two canals. In 1 to 15% of these roots, a third, middle mesial canal is present. Only very few cases presenting four canals in the mesial root of a mandibular first molar were reported in scientific literature.

Summary



fig.1

A 32-year-old caucasian male presented with a painful pulpitis.(fig.1) Endodontic treatment was started using dental microscope, exploration was done by using a C+ file 010 (Maillefer, Switzerland), a sticky feeling was noticed in the developmental groove between the MB and ML canal. After opening of the mesial developmental groove with a #8 LN bur (Maillefer, Switzerland), four independent mesial root canal orifices were detected(fig.3) Canals were prepared by Reciproc 25 and MTwo 35.04 instruments (VDW, Germany). During instrumentation copious irrigation was performed with 3%

NaOCl.

After completion of the preparation, passive ultrasonic irrigation (Satelec, France) with 3% NaOCl and 17% EDTA (Diadent, Korea) was executed. Final irrigation was carried out with 3% NaOCl and activation with Endo Activator (Maillefer, Switzerland). The root canal system was obturated with a warm vertical condensation technique and 2Seal (VDW, Germany) as sealer.



fig.2



fig.3

On the final radiograph the MBI appears to converge apically with the MBII, and the MLI with the MLII (fig4). The distal root has two canals converging apically.(fig.2)



fig.4

Key Learning Points

- Be aware of possible complex anatomic configurations. Presence of a middle mesial canal should always be considered.
- In order not to miss supernumerary canals, the use of magnification and illumination are mandatory.
- The developmental groove should always be attentively searched and felt around for supplementary orificia, particularly between the mesiobuccal and mesiolingual canal of a mandibular first molar.

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Endodontic treatment of a mandibular first molar with three mesial and three distal canals: A case report.

AIM:

To describe the clinical management of a mandibular first molar with 3 mesial and 3 distal canals.

INTRODUCTION:

The first mandibular molar shows a complex range of anatomical variations concerning the number of roots and root canals. This case describes the clinical management of a first molar with a Sert and Bayirli type XVIII canal configuration in the distal root and a Sert and Bayirli type XV canal configuration in the mesial root. In mandibular first molars, the incidence of a third mesial canal is between 1 and 15%, that of a third distal canal is between 0.2 and 3%. The combination of both configurations in the same tooth is rare .

SUMMARY:

A 14-yr-old black girl was referred to the practice by her general dentist for a root canal treatment of tooth 46. A dental operating microscope (Carl Zeiss, Germany) was used throughout the procedure. After caries curettage exploration was performed with C+ files 8 and 10. For the root canal preparation a Reciproc R25 instrument (VDW, Germany) was used with subsequent apical gauging with MTwo 35 rotary instrument (VDW). The irrigation protocol consisted of NaOCl 3% during instrumentation, ultrasonic activation (Satelec, France), EDTA 17% (Diadent, Korea) and finally subsonic activation of NaOCl 3% with Endoactivator (Dentsply Maillefer, Switzerland). The treatment was carried out in two visits and a calcium hydroxide dressing was applied. During the second visit irrigation was repeated and warm vertical condensation technique was used for the obturation with calibrated GP-points 35/.04 (VDW) and 2Seal (VDW) as sealer.



KEY LEARNING POINTS:

1. Clinicians should be aware of a possible variable root canal anatomy in the mesial and the distal root of mandibular first molars.
2. The use of magnification is mandatory in the identification and location of additional root canals.

Non-surgical root canal treatment of a maxillary lateral incisor with triple dens in dente and five canals

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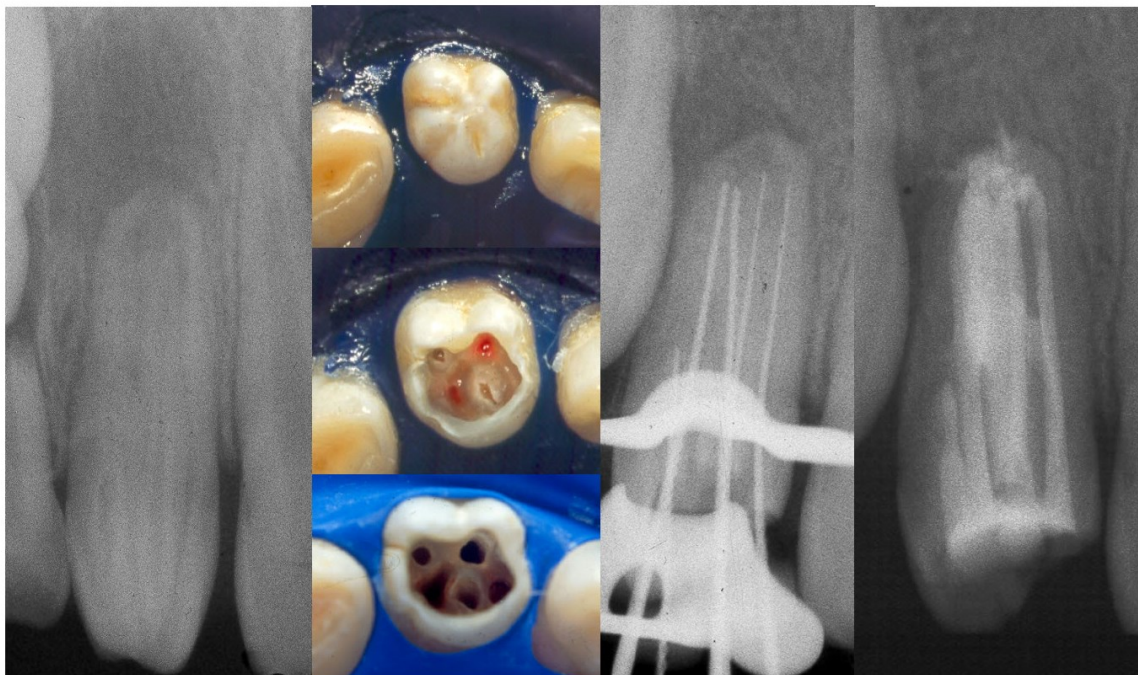
Non-surgical root canal treatment of a maxillary lateral incisor with triple *dens in dente* and five canals

Aim To describe the clinical management of a maxillary lateral incisor with *dens in dente*, five canals and apical periodontitis.

Summary A case of a triple *dens invaginatus* in a maxillary lateral incisor with five root canals and apical periodontitis is presented. Five root canals were located which were named mesiobuccal MB, distobuccal DB, mesiopalatine MP, centropalatine CP, and distopalatine DP. The DB, CP and MP canals were necrotic, and MB and DP vital. Four canals converged to what seemed to be an “apical chamber”. The canals were enlarged using hand files, irrigated with 1% sodium hypochlorite and PUI. Calcium hydroxide was placed into the canals. The patient missed his second appointment and did not re-scheduled. Eight months after the initial appointment the patient showed up, and presented an enamel fracture in the mesial-incisal angle. Once again the canals were hand filed, PUI with 1% sodium hypochlorite and calcium hydroxide filled. Three weeks later the canals were obturated with thermoplasticized gutta-percha by continuous wave technique. *Dens invaginatus* is a development anomaly presented with a complex anatomy. It's incidence goes from .04 % to 10%. To achieve success in each particular case when root canal therapy is needed in such teeth, the clinician should be aware of the diverse techniques available in order to diagnose, clean, shape, use intracanal dressing and filling.

Key Learning Points

- Despite it's complex internal anatomy *dens in dente* can be successfully treated with non-surgical root canal treatment.
- Because of bactericidal effect of calcium hydroxide it is a helpful intracanal dressing.



TWO CASES OF NECROTIC DENS INVAGINATUS MANAGEMENT AND 6 MONTHS FOLLOW-UP

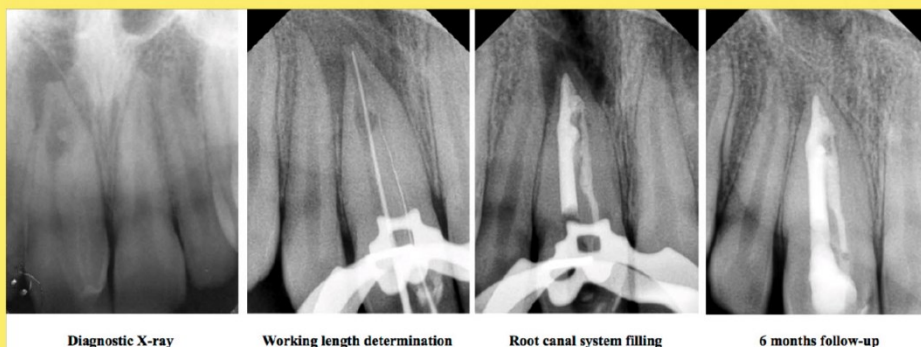
AIM: to present two clinical cases of type II and type III dens invaginatus management and 6 months follow-up results.

INTRODUCTION: dens invaginatus (also known as dens in dente) is a developmental anomaly of the tooth formation resulting from invaginations of amelodental structure within pulp. According to the length of the tooth tissue invagination, Oehlers classified dens invaginatus into three types.

Even though this condition is not common (the prevalence varies between 0.04% and 10%), its endodontic management is always challenging because of complex root morphology. Conventional conservative endodontic therapy shows good results in dens invaginatus treatment, but surgical procedures or even extraction should be considered in certain cases.

CASE 1: A 13-year-old patient was referred to our clinic to continue the treatment of maxillary right permanent central incisor because of its complex root system. The chief complaint was a severe throbbing pain in the upper anterior region and extreme sensitivity to touch of maxillary right central incisor. Clinical examination of tooth 11 determined a pronounced accessory cusp on its mesial side of the palatal surface. The tooth did not respond to pulp sensitivity test (cold), vertical percussion - positive. Upon radiographic examination, tooth 11 demonstrated type II dens invagination, and an extensive diffuse periapical bone lesion. Following local anaesthesia, isolation of the tooth with a rubber dam, two endodontic cavities were prepared. Working length was determined using apex locator (Root ZX II, J. Morita USA, Inc.) and radiographically. Chemomechanical preparation of the canal and the invagination was carried out with SAF system (ReDent Nova, Israel). Calcium hydroxide dressing was placed into the root canal system and the tooth 11 was temporarily sealed with IRM (Dentsply). 2 weeks later the apical part of the main canal

was filled using MTA (Angelus) and after 1 more week the canal system was filled with thermoplastic gutta percha. The access cavities were restored with a composite resin. 6 months later the patient was free of clinical symptoms and X-ray showed a significant reduction of the periapical lesion.



CASE 2: A 14-year-old girl arrived to our clinic with the complaint of swelling in the upper anterior region and a constant pain of maxillary left lateral incisor. Tooth 22 was extremely sensitive to vertical percussion, thermal test showed negative results. X-ray revealed tooth 22 invagination (type III according to Oehlers) and a large radiolucent periapical lesion. After local anaesthetic injection and rubber dam isolation two access cavities were formed and simultaneous preparation of the invagination and the main canal was performed using hand instruments (Dentsply). Calcium hydroxide was used as an intracanal medication and IRM (Dentsply) as a temporary filling. Incision was made in gingiva and drainage of the abscess achieved. After two weeks the canal and the invagination were both filled with gutta percha and sealer AH-Plus (Dentsply) using lateral condensation, crown was restored with a composite resin. On the 6 months follow-up the patient had no complaints, X-ray demonstrated good periapical healing.



CONCLUSIONS:

1. Conventional endodontic therapy showed good results of periapical lesions healing after 6 month in both cases.
2. Treatment technique should be based on knowledge of anatomical variations and accurate diagnosis of invagination type.
3. Dental operating microscope, modern materials and instruments allow to perform endodontic treatment of dens invaginatus in more precise and predictable way.

Root Canal Treatment of Mandibular First Premolars with Type IV Configuration

AIM

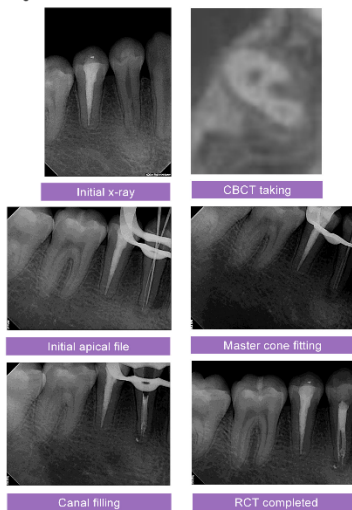
The aim of this case report is to describe 3 clinical cases of mandibular first premolars with type IV configuration.

SUMMARY

Root canal therapy requires a thorough knowledge of root canal morphology to adequately clean and shape the canal. The internal anatomy of a canal system may demonstrate fins, isthmuses, lateral and accessory canals, or diverse canal shapes which can complicate the cleaning and shaping procedures. The mandibular premolars from endodontic perspective exhibit higher failure rates, which to a large extent can be attributed to the highly variable root morphology and inability to access extra canals. The incidence of 2 root canals in mandibular first premolars varies between 14% and 25%. As for type IV configuration showing 24% prevalence, root canal bifurcates in the apical third region and thus has two foramina.

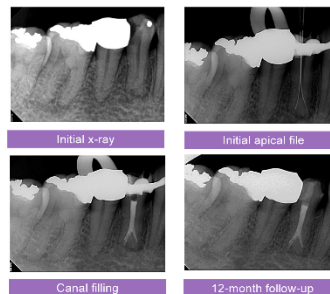
CASE 1

1. Sex/age: M/17
2. Chief Complaint: Dull pain on #44 area
3. Past Dental History: Discomfort from cold, hot stimuli since 3 months ago
4. Present Illness: per (+) pal (-) mob (1) cold (-) EPT inf./64 probing depth (322/322)
5. Impression: Necrosis of pulp / Symptomatic chronic apical periodontitis
6. Treatment: Root canal treatment on #44
7. Progress



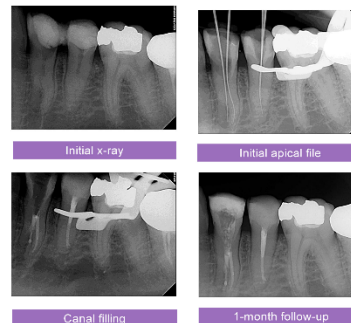
CASE 2

1. Sex/age: F/42
2. Chief Complaint: Spontaneous pain on #44 area
3. Past Dental History: Discomfort on #44, started several months ago
4. Present Illness: per (+) pal (-) mob (1) cold (-) EPT inf./64 probing depth (333/333)
5. Impression: Necrosis of pulp / Symptomatic chronic apical periodontitis
6. Treatment: Root canal treatment on #44
7. Progress



CASE 3

1. Sex/age: M/30
2. Chief Complaint: Referred from local dental clinic due to difficulty in negotiating root canals on #34
3. Past Dental History: Initiated RCT on #34,35 1 week ago due to pain.
4. Present Illness: per (+,+) pal (-,-) mob (0,0) probing depth (333/333,433/333)
5. Impression: Previously initiated RCT on #34,35 Symptomatic chronic apical periodontitis
6. Treatment: Root Canal Treatments on #34,35
7. Progress



Endodontic Management of 3 cases

- ✓ Extend the lingual wall of the access cavity farther lingually; this makes the lingual canal easier to locate.
- ✓ Every procedure was done under the microscope.
- ✓ Canal filling with lateral compaction in the apical third region and vertical compaction in the middle region.

KEY LEARNING POINTS

The root canal morphology of mandibular first premolar can be complex and requires careful evaluation prior to root canal therapy. Clinicians should be aware of anatomical variations in mandibular first premolars and apply this knowledge in radiographic interpretations and clinical procedures. Also special attention to correct access cavity preparation, careful exploration of the canal, particularly with magnification, ultrasonic irrigation and a modified filling technique are recommended.

Endodontic management of two distobuccal canals in maxillary first molars

Manrique de Lara, C; Casas, A; Sierra, A; Estévez, R; Cisneros, R.

Aim: The aim of this poster is to investigate the diagnosis and treatment of maxillary first molars with two distobuccal canals, showing some case reports.

Introduction: The knowledge of dental root internal morphology is an important issue regarding the planning and execution of endodontic therapy. Anatomic variations in the root canal system contributed frequently to treatment failure ⁽¹⁾. The MB root of maxillary first molar has generated more research and clinical investigation than any other root. The incidence of second MB canal has been reported to be between 18 - 96.1% ⁽²⁾. The occurrence of two canals in DB roots has been less frequent, about 1 - 3.6% ^(3,4).

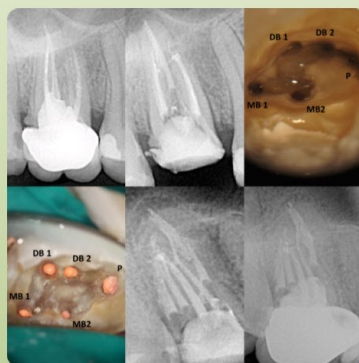
Case 1:

Retreatment of maxillary first molar (16). Modified opening access was achieved and a second DB canal was found.



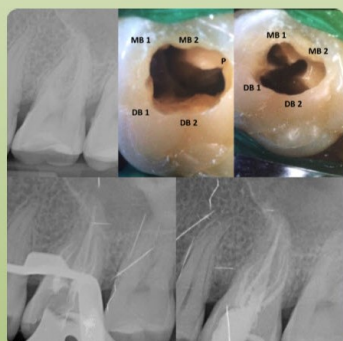
Case 2:

Maxillary first molar (16), retreatment because a second DB canal was missing. Notice the importance of magnification.



Case 3:

Biopulpectomy of a maxillary first molar (26) with two DB canals. Different x-ray angulations needed to deal with it.

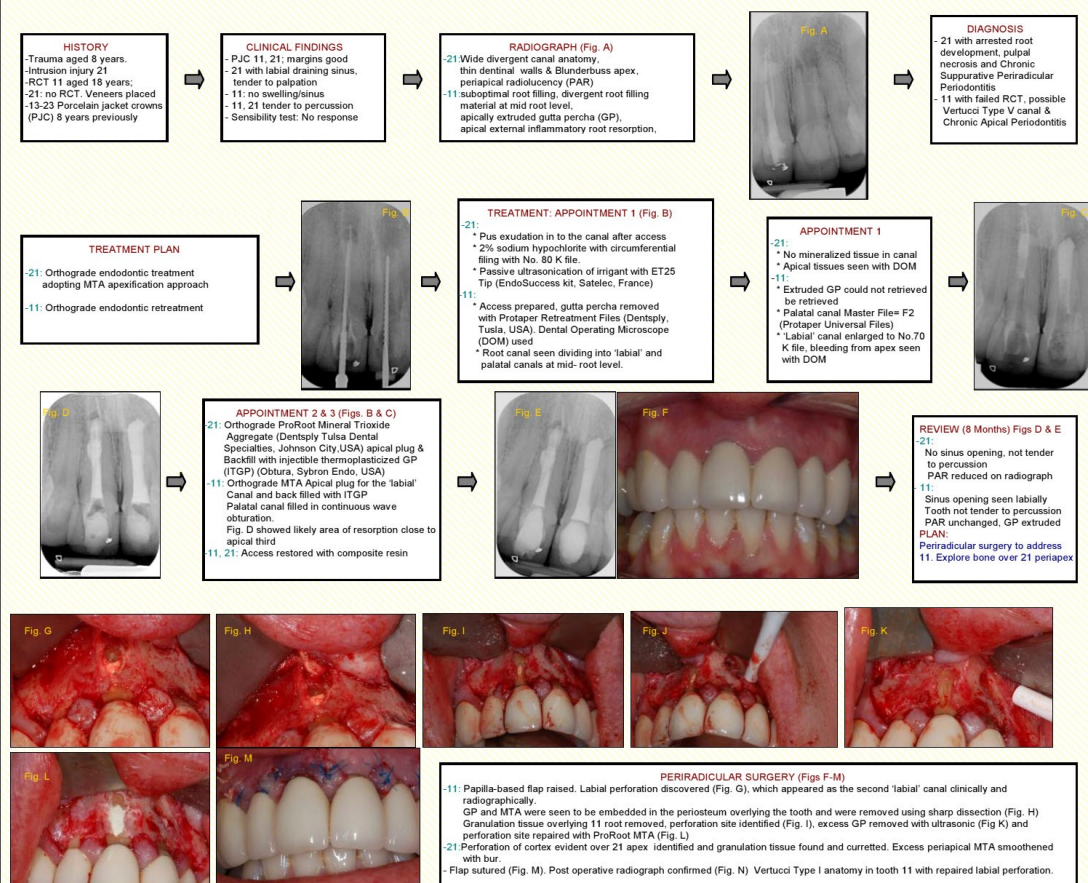


Conclusions: Multiple canals and more than one apical foramen variation does exist in 1 - 3.6 % on the distobuccal roots of the maxillary first molars ^(1,3). In all cases, magnification, modified opening access and different x-ray angulation were required to find the second distobuccal canal ^(1,4); it is also a useful tool using CBCT ⁽³⁾.

MANAGEMENT OF AN OPEN APEX AND SUSPECTED VERTUCCI TYPE V CANAL IN MAXILLARY CENTRAL INCISORS: A CASE REPORT

Aim: Discuss the non-surgical (MTA Apexification) and surgical management of maxillary central incisors with complex root canal anatomy

Case Presentation: 35-year old lady with history of recurrent infection associated with tooth 21 referred for specialist management in a hospital setting



Discussion:

Maxillary central incisors (MCI) generally present with one canal (1). However deviations to that anatomy have also been reported (2-5). The radiographic and initial clinical presentation of the existing root filling appeared to suggest a Vertucci Type V anatomy in tooth 11. Subsequent surgical exploration of the site revealed a labial perforation which was repaired and the patient remained asymptomatic on review, exhibiting no signs of infection or inflammation clinically. The limitations of radiographs are apparent in this situation and CBCT imaging of such cases should be considered.

The patient's tooth 21 was traumatised when she was a child and resulted in arrested root development.

Apexification using MTA was chosen to manage the open apex (7) as opposed to adopting a regenerative approach. The latter has been successfully reported (8) but the protocol currently lacks high levels of evidence (10). Concern regarding the presence of suppuration over a protracted time, and hence the survival of stem cells of the apical papilla, precluded this approach in this instance, although favourable outcomes in this clinical situation have admittedly been reported.

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Endodontic Treatment of a Mandibular Second Premolar with Type IV Weine's Root Canal Configuration



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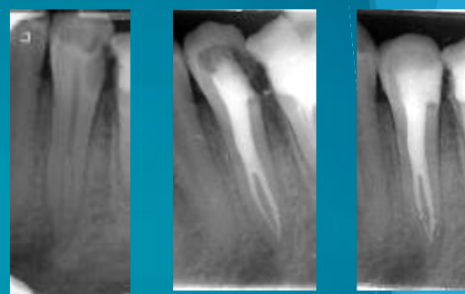
The aim of this case report is to describe a successful treatment of a mandibular second premolar with a Type IV Weine's configuration.

Introduction

Understanding of root canal anatomy and morphology is necessary for successful endodontic treatment. The clinician must have known normal and common variations of tooth and prepared, cleaned and obturated the canal system in 3D dimensions. Vertucci reported the occurrence of two canals in mandibular second premolars as only 2.5% (1). According to Weine, a root canal can be present in four types: Type I- single canal from pulp chamber to apex; Type II- two canals leaving the chamber and merging to form a single canal short of apex; Type III- two separate and distinct canals from chamber to apex; Type IV- one canal leaving the chamber and dividing into two separate apical foramina (2).

Case report

A 32-year-old man with a noncontributory medical history was referred to the Endodontics Department of Atatürk University for endodontic treatment of the left mandibular second premolar. The patient complained of pain in his tooth. The second premolar was tender to vertical percussion and vitality tests led to a diagnosis of acute apical periodontitis. Radiographic evaluation of the involved tooth indicated an unusual anatomy of canal system. The tooth was anesthetized and isolated using rubber dam. The access cavity was prepared and pulp chamber floor was examined. There was only one canal orifices and canal patency was checked with 10 K-file. Lateral walls were prepared with endodontic peeso reamers no 4-5 and 6 positioned parallel to the long axis of the tooth. The divergence of the cavity walls was provided by the peeso reamer burs. Then mesial and distal canals located with 10 K file. Working length was determined using an electronic apex locator. Biomechanical preparation was accomplished with the Reciproc R25 NiTi system. The canals were irrigated with 1% sodium hypochlorite and were filled by lateral condensation of gutta percha cones.



Discussion

Careful evaluation of two or more periapical radiographs is important. Martinez-Lozano *et al.* examined the effect of X-ray tube inclination on accurately determining the root canal system present in premolars. They found that by varying the horizontal angle 20° and 40°, the number of root canals observed in the maxillary and mandibular premolars coincided with the actual number of canals present (3). The crucial step in finding the split canal was tactile examination of main canal with a small, precurved K-file tip (4). Microscopes are commonly used to explore the pulp chamber in order to find orifices. The advantages of using a microscope for conventional endodontics include better visualization of the pulp chamber floor and walls that prevents inadvertent missing of orifices (5).

Conclusion & Clinical Relevance

It is important to locate and treat the entire root canal system. Careful interpretation of angled radiographs, proper access preparation and a detailed exploration of the interior of the tooth, are essential for successful endodontic treatment.

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THIRD ROOT CANAL IN THE MAXILLARY PREMOLAR: AN ENDODONTIC CHALLENGE

TOUFALI LOPEZ PATRICIA ; DE LA COLINA TISERO ELONA
CASAS RIVERA ANA ; MARRIQUE DE LARA CARLOTA.

AIM

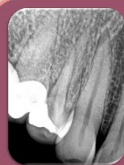
The aim of this poster is to show the anatomic variability of the upper premolars, for its correct diagnostic and treatment.

INTRODUCTION

The presence of accessory canals, bifurcations of the main canal or / and extra roots should be known by the professional for proper treatment. The presence of a third root in the upper premolars is an unusual anatomy variation which presents a clinical challenge. In most cases they have two canals but in 3.3% of cases they have 3 canals: two buccal canals and one palatal canal, although there are variations in which there are two palatal canals and one buccal canal.

CASE 1

Biopulpectomy 24. Three separate canals.
VIII Vertucci's classification.



CASE 2

Biopulpectomy 14. Detail of magnification to show the two buccal canals.

CASE 3

Necropulpectomy 25. Different X-ray angulations show two palate canals.



CASE 4

Necropulpectomy 24. Presence of three separate canals.

CONCLUSIONS

Root morphology can be a complex challenge for professionals. It requires good diagnosis skills to achieve success.

Variations on the access is needed to find additional canals.

The presence of a third root can have difficulty implications on the case.

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*Root canal treatment of a mandibular molar
with complex anatomy:*
THE CHALLENGE OF THE MESIO-BUCCAL CANAL



AIM

The configuration of the root canal system of mandibular first molar is very complex. A root-canal treatment in a mandibular molar with five root canals is reported



CASE PRESENTATION

A 19-year-old patient attended the query derived for root-canal treatment in the right first mandibular molar.

After clinical and radiographic examination, diagnosis of pulp necrosis with asymptomatic apical periodontitis was established. The pre-operative radiograph did not evidence an apparent complex anatomy.

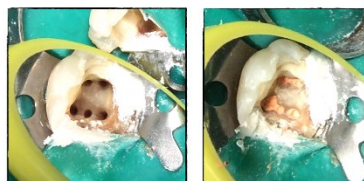
However, after a correct cavity access preparation using operator microscope, two distal and three mesial canals were identified. The five root-canals were negotiated and thoroughly disinfected with 4.2% sodium hypochlorite. Then, canals were sealed using continuous heat wave with the units Alpha/Beta B & L. Six months follow-up radiograph shows apical healing.

DISCUSSION

Operator microscope and CBCT are essential in the management of teeth with complex anatomy, allowing detecting isthmuses as well as accessory and lateral root-canals. A correct irrigation protocol of root-canal system is essential to obtain the success in cases of root-canal treatment of teeth with complex anatomy.

CONCLUSION AND CLINICAL RELEVANCE

The configuration of the root canal system of mandibular first molar is very complex. Recently, the presence of a mesio-buccal canal has been reported to be very frequent.



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