

A rare presentation of Internal Tunnelling Resorption

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ABSTRACT

Internal root resorption (IRR) is rare. The absence of symptoms at early and intermediate IRR stages makes timely diagnosis difficult and late presentation can compromise long-term prognosis. This case report describes the incidental finding of a maxillary central incisor with internal tunnelling root resorption, a variant of IRR. The investigations and management to halt resorption and preserve the tooth are discussed.

INTRODUCTION

IRR is the progressive destruction of intraradicular dentine and dentinal tubules along the middle and apical thirds of the canal walls from clastic activity. (1) This relatively rare pathology, its aetiology and pathogenesis have not been completely elucidated. (2) IRR can present with different histologic manifestations such as internal inflammatory resorption or internal replacement resorption.(3) The latter has a variant reported as “internal tunnelling resorption”. The resorption process tunnels into the dentine, adjacent to the root canal, with concomitant deposition of cancellous bone-like tissues. (4) Despite a lack of clear aetiology, an external stimulus inducing an inflammatory process, such as traumatic dental injury (DTI), or orthodontic treatment forces could lead to IRR developing. (5)

This case report discusses diagnosis and management of internal tunnelling resorption in a young adult.

CASE DETAILS

History:

- 25-year-old female referred by her General Dental Practitioner in 2021 regarding an incidental finding of root resorption associated with tooth 21. (Figure 1)
- No health problems.
- Lifelong non-smoker with alcohol consumption kept within recommended limits.

- No problems from tooth 21 or prior trauma reported by patient.
- Fixed orthodontic appliance therapy undertaken and completed 8 years' previously.

Examination:

- Soft tissues appeared healthy, good oral hygiene and no removable appliances worn. An intact, unrestored dentition and Class I incisal relationship was recorded. BPE scores of 0 in each sextant recorded. The patient demonstrated a thin periodontal phenotype and relatively high lip line. (Figure 9)
- Tooth 21 had no swellings or sinuses present; was a functional, sound/unrestored tooth with buccal infractions, no mobility or aesthetic problems. No periodontal pockets were present, the gingival cuff being healthy and tight. A possible defect was queried subgingivally on palatal periodontal probing. Tooth 21 was not tender to percussion or buccal palpation.

Special investigations:

- Cold (Endofrost) sensibility testing: Tooth 21 positive
- Paralleling peri-apical radiograph taken at initial assessment highlighted tooth 21 root end blunting and an appearance of tunnelling and internal root resorption in the mid third which may have perforated palatally where a cervical defect was queried clinically. (Figure 2) A subsequent review peri-apical radiograph was taken to evaluate progress of the lesion over time (Figure 5)
- Cone Beam CT of the anterior maxilla was taken to gain information on the lesion extent for treatment planning. This revealed a root canal system with irregular enlargements, notably palatally, and extending into the clinical crown. Perforation of the resorption on the palatal aspect is suggested in the mid-root region. (Figure 3,4)
- Pre-treatment photographs taken from the buccal and palatal aspects of tooth 21. (Figure 9,10)

Commented [JK1]: maybe move endofrost info into this bit??

Diagnosis:

Correlating clinical findings, special tests and radiographic investigation led to a diagnosis of internal tunnelling root resorption tooth 21.

Treatment options discussed:

Options	Benefits	Risks	Patient decision
No treatment, monitoring only	No iatrogenic damage	Tooth may become unrestorable	
Extraction and replace tooth	Predictable, multiple restorative options	May change aesthetics and need replaced in future	
Non-surgical endodontic treatment	Tooth retained; IRR process stopped	Discolouration of tooth, RCT failure, further treatment required	X
Surgical and non-surgical endodontics	Tooth retained, repair of palatal defect	Surgical risks. Treatment may fail.	

Table 1: Treatment options discussed with patient

Treatment:

Tooth 21 was endodontically treated, under local anaesthetic, dental dam isolation and magnification (Dental Operating Microscope) over two appointments.

The first appointment involved extirpation and canal preparation. During canal shaping bleeding occurred and haemostasis was achieved using gentle irrigation (3% sodium hypochlorite) and dried using sterile paper points. Non-setting Calcium Hydroxide was injected as an intraradicular dressing and a peri-apical radiograph taken to ensure this was contained within the root canal confines. (Figure 6)

The second appointment involved completing canal shaping to a F3 Protaper Gold and a master cone radiograph (figure 7) taken. Final irrigation was using 40% citric acid and 3% sodium hypochlorite. The dried root canal was obturated using using calcium silicate-based sealer (CSBS) (FKG™ Totalfill BC sealer HiFlow) with warm vertical compaction and the access restored using Smart Dentine Replacement and composite. (Figure 8)

Follow-up:

The patient will return in 3 months for review to assess clinical signs, symptoms, and aesthetics. Further radiographic reviews will be carried out after one year or if the tooth is symptomatic. (6)

DISCUSSION

This case raises many questions including the unknown aetiology (lack of TDI) from the patient's history, however publications highlight root resorption can occur in 19-31.4% of all patients undergoing orthodontic treatment. (7) Most orthodontically induced root resorption affects the external root end surface but intracanal changes cannot be excluded. A 15-month period elapsed between initial referral and completion of treatment due to COVID-19 pandemic delays and restrictions, however the different peri-apical radiographs did not suggest resorption progression. Due to the possible palatal perforation, active treatment was the preferred patient option to try and increase the longevity of tooth 21.

A possible subgingival palatal cervical defect identified clinically on tooth 21, lead to an initial provisional diagnosis of external cervical resorption (ECR). The CBCT clarified the diagnosis as the defect and periodontal tissues in this area did not correlate with ECR.

A hybrid technique using CSBS and warm vertical compaction was chosen as to try and seal all aspects of the resorption. Conflicting published evidence highlights heated obturation techniques may deteriorate properties of CSBS, however warm vertical compaction achieves a better obturation of complex root canal anatomy. (8-10)

The challenge of this technique was the lack of visibility after injecting the sealer, potentially leading to voids between the apical gutta percha down pack and injected backfill. The limited experience of the operator could be accounted for this.

CONCLUSION AND CLINICAL IMPLICATIONS

The management of this rare internal tunnelling resorption case aimed to preserve tooth 21 with no clinical signs or symptoms and satisfactory aesthetics. 3D imaging aided diagnosis and treatment planning while treatment using CBCS and heated obturation aimed to prevent resorption progression and long-term tooth retention.

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Figures (1-10):



Figure 1: Pre-operative peri-apical radiograph tooth 21: 16/03/2021



Figure 2: Pre-operative peri-apical radiograph 21: 11/05/2021

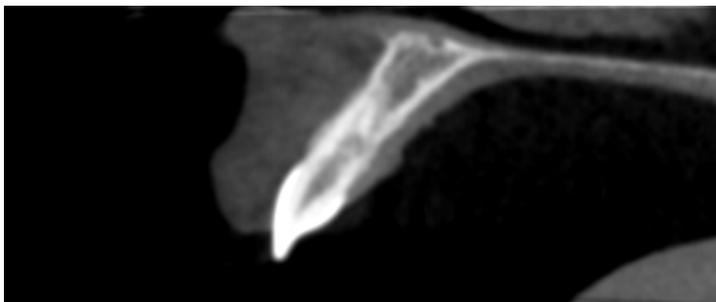


Figure 3: Pre-operative sagittal view of resorption tooth 21 : 02/06/21



Figure 4: Pre-operative transverse view of resorption at middle third of root, tooth 21: 02/06/21



Figure 5: Pre-operative peri-apical radiograph 21: 11/04/2022



Figure 6: Peri-operative peri-apical radiograph following access and extirpation with non-setting CAO_H in canal: 06/06/2022

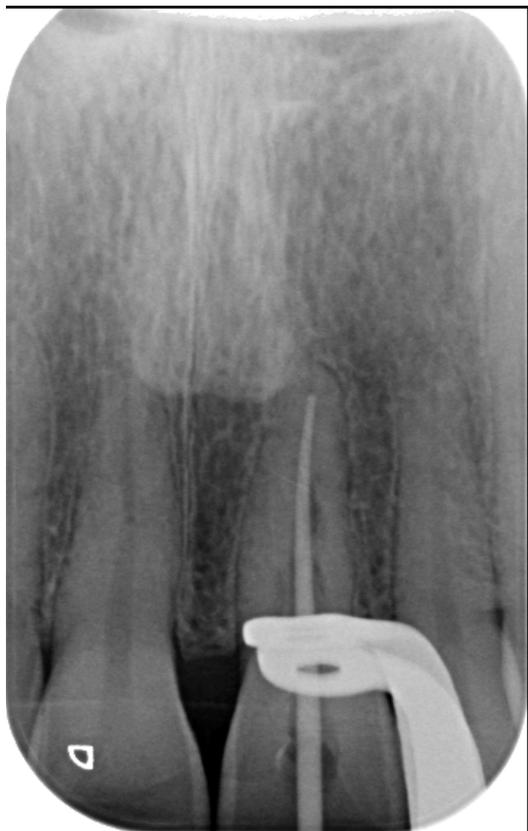


Figure 7: GP mastercone trial peri-apical radiograph 27/06/2022



Figure 8: Post-operative peri-apical radiograph: 27/06/2022



Figure 9: Smile anterior maxillary segment and tooth 21



Figure 10: Palatal view of tooth 21 and anterior maxillary segment