

Conservative treatment of apical external resorption in a high-risk patient

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This report details the case of a male patient who was diagnosed with resorption of the distal root on tooth 36 by means of an x-ray examination. Root treatment was carried out on this tooth 20 years ago and, since then, the patient has not suffered any symptoms. Following assessment of this resorption type, the activity of the process and the options available for a repeat endodontic intervention and reconstruction, a conservative treatment approach was opted for.

Key words: Root resorption, repeat endodontic intervention, reconstruction

Introduction

Root resorption is a pulp-periapical disease. It can have different causes and be the result of cell activity in various tissues, i.e., either from the inside of the pulp (internal resorption¹) or from outside in the root element (external resorption) due to the activity of osteoclastic cells. Resorption can be either temporary in nature, this is then a self-limiting process which can barely be detected in x-rays², or progressive which often results in the loss of the tooth³. External resorption can be due to a variety of clinical problems⁴⁻⁷: Jaw tumours and cysts, poor control of orthodontic forces, dental traumatology⁸, periodontal

diseases, pulp diseases, cracks in the tooth, systemic diseases⁹ and, occasionally, diseases which are idiopathic in origin.¹⁰ These are mostly linked to the accretion of bone tissue which replaces the resorbed root.¹¹ In other cases, external cervical resorption may be initiated.¹² In the former case, these are not normally associated with symptoms and are in very different destructive states at the time of diagnosis.^{13,14}

It is sometimes not possible to preserve the tooth yet, occasionally, the process can be stopped and the tooth can be restored. In this case, a personal biological disposition for the development of root resorption was proven,¹⁵ assumedly due to a genetic predisposition. Based on studies involving twins, Harris et. al.¹⁶ concluded heredity of approx. 70% and did not identify any gender- or age-related differences. Moreover, preventative treatments involving hormones, antibiotics and anti-inflammatory drugs^{17,18} were administered to sensitive patients undergoing orthodontic procedures, these resulted in extremely promising results in terms of the prevention of this pathology.

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Figure 1: Oral orthopantomography for assessment.

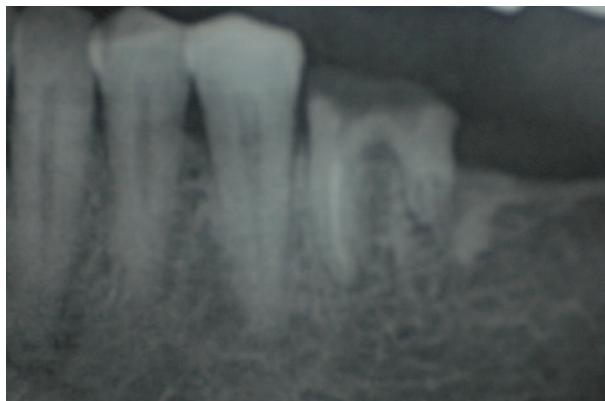


Figure 2: Diagnostic x-ray.

Clinical case

A 70-year-old male patient came to our practice for a general dental examination and requested restoration of the third quadrant. This was a high-risk patient who was undergoing treatment for an adenocarcinoma in the colon.

During the dental examination, various previous restorations, full crowns in the first, second and fourth quadrants and severe damage to tooth 36 were detected. There were neither active caries lesions nor increased tooth mobility or injury to the mucous membranes. In order to get a better understanding of this case, an oral orthopantomography was performed (Fig. 1). This showed earlier prosthetic treatments and no current disease, root treatments on teeth 13 and 16 without radiolucent root lesions or periapical lesions as well as a root canal treatment on tooth 36 with minor radiological findings on the mesial root and apical resorption of the distal root with bone

apposition in its place.

Based on the x-ray of root resorption on tooth 36, a clinical interview was conducted. The patient stated that root treatment and reconstruction had been performed on this tooth more than 20 years ago. The tooth subsequently became increasingly cracked without this resulting in pain or inflammation. In light of this clinical situation (given the patient's medical condition, restoration with tooth implants was not recommended) and its significance, after all we were dealing here with the last molar in the third quadrant, we decided to opt for another endodontic intervention, a dental reconstruction with a glass-fibre post and a prosthetic cover.

The periapical x-ray diagnosis (Fig. 2) showed overfilling of the mesial canals and severe damage to the distal root. Neither cement nor gutta-percha residue was detected outside of the canals. The clinical picture (Fig. 3 and 4)



Figure 3: Occlusal view of tooth 36.



Figure 4: Vestibular view of tooth 36.

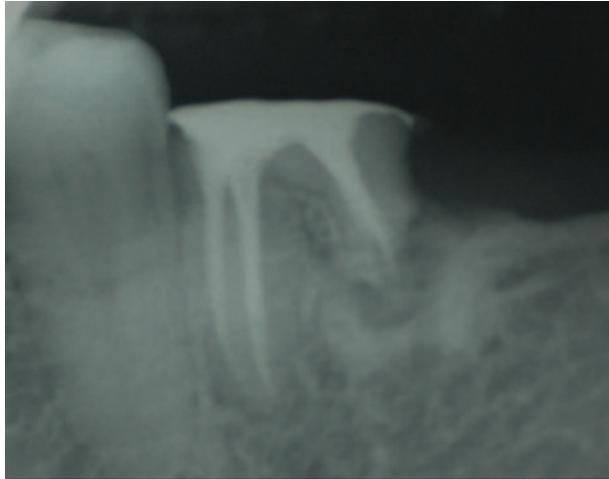


Figure 5: Direct x-ray control.



Figure 6: Temporary filling of tooth 36.



Figure 7: Rebilda Post System (core build-up system).



Figure 8: Drills used for placement of the glass fibre post.

showed the destroyed crown with the exposed root canals up to the oral cavity.

The repeat intervention was performed in one treatment session using a combination of a manual technique and rotation technique with K3 files (SybronEndo). The motor TCM Endo III (Nouvag AG) was used with a rotating speed of 300 rpm and a torque of 30 Nmm. The clinical treatment was initiated with the removal of the restorative material from the canals using Gates-Glidden drills and by determining the working length with K files (no. 20). 2.5% NaOCl was used for rinsing. Mechanical instrumentation was performed from the crown downwards using the files of conicity 06 and 04 and ISO 40, 35, 30 and 25. This was

repeated until the correct working length was reached. In the mesial canals a master file ISO 30 was used, in the distal canals ISO 40.

The canals were continuously rinsed with 2.5% sodium hypochlorite. After the final rinse, the canals were dried and filled with the sealer AH plus (Dentsply DeTrey), gutta-percha tips and lateral condensation (Fig. 5). The crown was filled with temporary cement until final reconstruction (Fig. 6). In a second treatment session and given the absence of clinical symptoms, the coronal reconstruction was completed. Rebilda Post System (VOCO) (Fig. 7) was chosen for the core build-up and a glass fibre post with a coronal diameter of 1.2 mm was placed in the mesial root (Fig. 8).



Figure 9: Cleaning of the cavity and isolation of tooth 36.

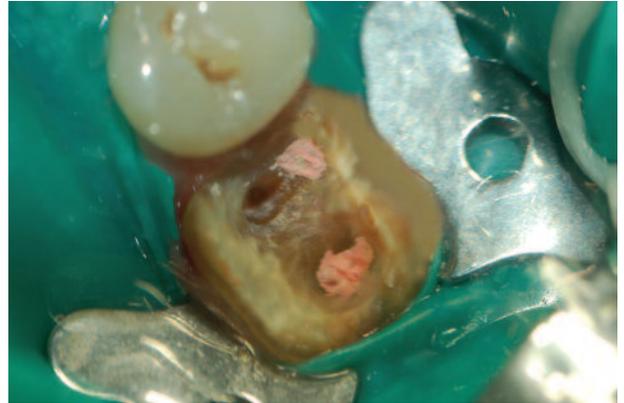


Figure 10: Preparation of the mesiolingual canal.



Figure 11: Checking of the fit of the glass fibre post.



Figure 12: Shortening and cementing of the glass fibre post.



Figure 13: Filling of the cavity.



Figure 14: Removal of the isolation.

After cleaning the cavity and isolation (Fig. 9), the restorative material in the mesiolingual canal was removed in order to insert the post (Fig. 10). The fit of the post in the intraradicular preparation (Fig. 11) was checked, a circular AutoMatrix matrix (Dentsply DeTrey) was attached and the post was shortened to the correct height and cemented (Fig. 12). Prior to the cementing of the post, this was wetted with Ceramic Bond (VOCO) in order to ensure better adhesion.

Rebilda DC dentine (VOCO) in combination with the dual-

curing self-etch adhesive Futurabond DC SingleDose (VOCO) was used as the post fixation and core build-up material. To build up the core, Rebilda DC dentin was applied layer for layer, light-cured each time and polymerisation in the hard-to-reach areas was ensured via the chemical curing of Rebilda DC. The matrix was removed (Fig. 13) and the build-up was light-cured again. After this, the isolation was removed and the core was shortened and polished (Fig. 14). In the periapical x-ray the correct fit of the post and

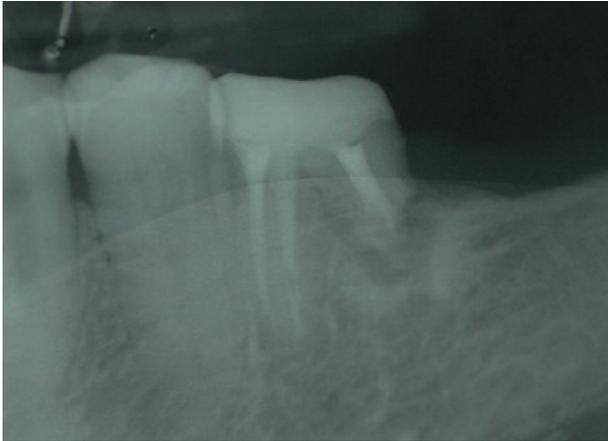


Figure 15: Periapical x-ray of the post cementing and the marginal seal.

reconstruction margins can be checked (Fig. 15).

In a further clinical session, the core was prepared (Fig. 16) and the impression was made using the silicone Fit Test C & B (VOCO) to produce a full crown which was subsequently placed and then cemented using Bifix SE (VOCO), a dual-curing self-adhesive composite-based luting system. This resulted in the complete restoration of the functionality of tooth 36 (Fig. 17). The patient suffered no symptoms whatsoever after the treatment. Three months (Fig. 18) and one year (Fig. 19) after completion of treatment x-rays were taken, these showed no signs of periradicular inflammation.

Discussion

Early detection is the best treatment measure⁽¹⁹⁾. For this, both intraoral dental x-rays with various projections and scanners can be used. The latter deliver better diagnosis data,²⁰⁻²² particularly in the initial phase. In order to avoid apical root resorption caused by orthodontic treatments, some authors suggest carrying out x-ray examinations every three or six months after the start of treatment. Anti-inflammatory drugs could also reduce resorption.²³

In this clinical case, resorption was very far advanced. The diagnosis was made by means of an x-ray. A variety of materials and technique are available²⁴ in cases in which the resorption process can be stopped and the necrotic tissue can be removed. Sometimes endodontic interventions are necessary.²⁵ This results in clinical success in a considerable number of cases. When choosing the conservative treatment method, it is important to make an assessment of the periodontal state of and reconstruction options for the tooth.²⁶ In this case, we opted for restorative treatment in light of the patient's overall condition. The chosen treatment was indicated in particular as the problem here was apical external resorption with bone tissue apposition and,



Figure 16: Vestibular view of the prepared tooth stump.

consequently, increased tooth mobility was not evident. Furthermore, sufficient supragingival hard dental tissue was also available. This guaranteed a suitable basis for a prosthetic restoration.

Conclusion

In many cases root resorption is diagnosed by means of x-rays or on the basis of symptoms of an extremely advanced pathological nature which results in the loss of the tooth. Given this pathology which is due to a great variety of reasons, it is expedient to firstly consider the options available for stopping this process and restoring the tooth.

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Figure 17: View of the fit of the prosthetic crown.



Figure 18: X-ray check-up after three months.

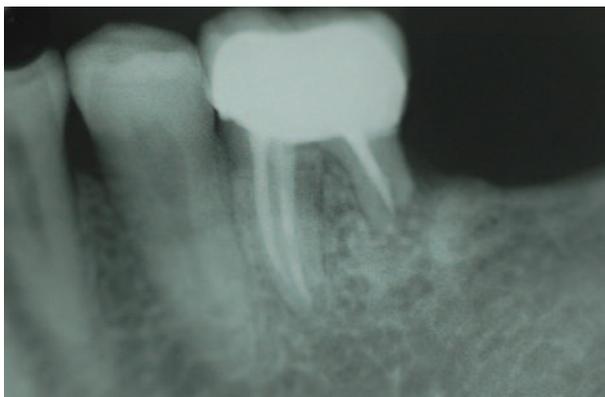


Figure 19: X-ray check-up after one year.

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