HIGH RISK IN ROOT CANAL NEGOCIATION IN ELDERLY PATIENTS: CLINICAL CASE SERIES

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Abstract

Several clinical cases outline the difficulties of root canal treatment, due to the morphological changes of the endodontic space in elderly patients. The changes in the shape of pulp chamber and root canal make the treatment more difficult. It is also shown that the pulp chamber diminishes, due to reparative dentin. Calcification of the pulp space makes more difficult the access to the cavity. The obliterated canals lead to a challenging negotiation of the root canals. To avoid errors in the appreciation of the general health condition of the patient, the specialists should have an accurate preoperative radiograph or cone beam computing tomography (CBCT), use magnification (dental operative microscope), safe-ended burs, consider carefully any morphological changes, and apply the most proper techniques.

Keywords: endodontic morphology, elderly patients, root canal treatment

1. INTRODUCTION

Endodontic therapy in older adults is nowadays a rather challenging procedure. The percentage of elderly people in the population is rising. Patients require preservation of teeth for aesthetic and functional purposes. The benefits of retaining teeth are obvious [1-3].

Teeth morphology in elderly patients is modified, due to the apposition of secondary and reparative dentin. This phenomenon occurs due to minor trauma and wear, or as a result of caries or dental treatments. The pulp chamber diminishes its volume, the pulp horns are disappearing, the pulp floor and the roof are approaching each other and the shape can develop into a flat disc, which makes difficult the access to the cavity [4].

Traversing the pulp chamber without noticing is a major problem for realizing a correct access cavity without perforating the pulp chamber floor. Pulp scale can also restrict the path for identifying the root canal orifices.

Pulp is considered sclerosed or calcified. Sometimes, in anterior teeth, there is no soft tissue left in the coronal part [5].

Pulp fibrosis and a thick dentin layer make difficult the diagnosis, while the vitality tests are inconclusive. The thermal test gives more reliable results than the electrical one. Even test cavities can be made into dentin without edifying conclusion [6-9].

The root canal is becoming narrow especially in the coronal third, because of dentin deposition. Most of the middle and apical third of the root canal is still patent, even in very old patients [10], which has a special clinical importance, because it directs the clinicians to approaching the root canal. Even though it is difficult to negotiate the coronal third, the apical portion can remain patent throughout the years. Because of the concentric deposition of dentin, the root canal is maintaining its position in the middle of the axial section of root dentin.

Dedicated entry files with cutting tip and higher rigidity may be useful, along with lubricants, like EDTA. Even half-sized files used as reamer or Golden Medium (Maillefer,
Dentsply, Switzerland) files - such as 12.5 and 17.5 - may be useful. Establishing the glide path is the most important step in the cleaning and shaping procedure in calcified canals.

Copious irrigation should be done. Once the correct working length is established, the root canal treatment follows the general rules. One should also consider that the distance between the cemento-dentinal junction and the radiological apex is increasing in older adults [11].

Also, tipping and rotation of teeth makes the root canal treatment in elderly patients more challenging. Sometimes, the access to the cavity is often made through large restorations or crowns, which adds to the difficulty of the procedure [12].

2. CASE REPORTS

Case report 1

A 91 year-old patient attended our clinic for evaluation and treatment of 22. The two x-ray radiographies provided by the patient revealed an obliterated canal, due both to age and to dental attrition (Fig. 1). The dentist could not identify the canal and the attempt of accessing the cavity led to 2 consecutive, large perforations of the root (Fig. 2). Because of the unsuitable approach of this clinical case, the tooth had to be extracted.

Case report 2

A 72 year-old patient visited our clinic for evaluation of 41. The 2 conventional periapical radiographs presented by the patient revealed a perforation caused by the missing pulp chamber and the obliterated canal (Figs. 3, 4).

These two clinical cases demonstrate the difficulties in negotiating the root canal system in elderly patients, because of the deposition of secondary dentin.
Case report 3

Although 47 had a large coronal destruction, and narrow root canals, a complete endodontic treatment was successfully realized in this 67 year-old patient, to avoid a free end saddle. Because of the diminished pulp space and missing distal pulp horn, the endodontic treatment became challenging (Fig. 5). Finally, correct preoperative radiographs, dental operative microscopy and the use of safe end burs made the treatment successful (Fig. 6).

Case report 4

In this 85 year-old man, 35 was considered as a strategic abutment. The second premolar had a particular morphology, with 2 roots. The root canal system could not be visualized (Fig. 7). Both canals could be negotiated by means of Ni Ti rotary files and dental operative microscopy (Fig. 8). The root pulp was vital, although the vital tests were inconclusive, a quite frequent situation in elderly patients, caused by pulp sclerosis.
 Increased sugar consumption for compensating the loss of taste and xerostomia in elderly patients is an important factor, increasing susceptibility to decay. Because of gingival recession, cementum is exposed and root caries are very often found. Also, the root canal system is difficult to negotiate because of the deposition of reparative dentin.

In a 78 year-old patient, 42 revealed a root decay favored by marginal periodontitis (Fig. 9). The tooth showed multiple root defects, endodontic and periodontal lesions, typical for elderly people. The endodontic treatment raised many problems due to the missing pulp chamber, calcified canals and modified endodontic morphology caused by root decay (Fig. 10).

The main complain of an 88 year-old patient was acute pain at 28 (Fig. 11). The periapical radiography revealed extremely calcified root canals, which could be negotiated using very small hand files (#06) and lubricants (EDTA). The tooth was preserved because of the occlusal contact with 38 (Fig. 12).
A 71 year-old patient was referred to our endodontic department for root canal treatment of 32 and 36. CBCT provided information on the missing pulp chamber and presence of two narrow canals which are dividing in the middle third of the root of 32 (Fig. 13).

According to the CBCT image (Fig. 14), 36 showed a retracted pulp chamber and two calcified merging canals in the mesial root. These morphological particularities favoured a correct estimation of the difficulty of the endodontic procedures.

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According to the CBCT image (Fig. 14), 36 showed a retracted pulp chamber and two calcified merging canals in the mesial root. These morphological particularities favoured a correct estimation of the difficulty of the endodontic procedures.
According to the above-illustrated clinical cases, the present study outlines the difficulties of root canal treatment due to the morphological changes of the endodontic space in elderly patients [1]. Changes in the shape of the pulp chamber and root canal make the treatment more difficult.

The clinical cases show that the pulp chamber diminishes due to reparative dentin. Calcification of the pulp space makes more difficult the access cavity. In elderly patients, the access cavity of the teeth is placed more cervically. Safe-ended, slow-speed burs have to be used for not damaging the pulp chamber floor [5].

The obliterated canals lead to a challenging negotiation of the root canals. The patients were referred to our clinic because their general dentists failed to find the root canals or to negotiate the entire canal path. The root canals were treated with rotary ProTaper files and filled with warm gutta-percha, continuous wave of the condensation technique. In some clinical cases, the teeth were extracted due to severe iatrogenic damages.

In cases of periapical periodontitis, even if the radiography evidences no sign of pulpal space, the specialist can attempt at negotiating the canal, with the written consent of the patient [6, 7]. There are obviously microorganisms in the remaining root canal space, and the direct visualization using dental operative microscope can contribute to a successful treatment.

To avoid errors in the geriatric endodontic treatment, the general health condition of the patient should be known, based on an accurate preoperative periapical radiography or CBCT, magnification (dental operative microscope), good light, ultrasonic, safe-ended burs, knowledge of the morphological changes and application of proper cleaning and shaping techniques [4].

The parallel and additional ex-centric views of the radiographs must guide the clinician for a correct appreciation of root canal morphology. CBCT is even more accurate, providing 3D images in any plan and at any level [8, 9].
4. CONCLUSIONS

The aging process is leading to progressive morphological changes in both pulp chamber and root canals. Pulp tissue calcification, frequently associated to chronic marginal periodontal disease and irreversible pulps, jeopardizes a proper access and negotiation of the root canals. Operative microscopy and the written consent of the patient are highly recommended. Sometimes, an additional cone-beam computed tomography (CBCT) is extremely helpful for a safe management of the root canal treatment.

References