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CASE REPORT/CASO CLINICO

Endodontic retreatment of a lower canine associated with a periapical lesion: case report of an unusual anatomy

Ritrattamento canalare di un canino inferiore affetto da lesione periapicale: caso clinico relativo ad una anatomia inusuale

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KEYWORDS
Root canal anatomy;
Two roots;
Lower canine;
Retreatment;
Periapical lesion;
Operating microscope.

Abstract
Objectives: To describe the endodontic orthograde retreatment of a lower canine with a rare anatomy, affected by a symptomatic periapical lesion.
Materials and methods: A 30-year-old Caucasian woman came to our office reporting severe pain and swelling located at the right mandible. A two-roots/two-canals configuration was discovered for the lower canine which sustained the periapical infection; a missed lingual canal was not recognized and treated at the previous primary endodontic therapy.

A full pre-operative examination and diagnosis, the application of modern endodontic strategies along with the use of magnification technologies (like the Surgical Operating Microscope - SOM) and proper disinfection protocols were employed for endodontic re-treatment.
Result and conclusions: Healing of the periapical infection was clinically and radiographically confirmed at a 9-month follow-up. Endodontists should know the anatomical variations of human teeth and be vigilant about them when approaching treatments. More than a single radiographic projection is recommended in the diagnostic phase.

Careful procedures related to instrumentation, cleaning and filling of the entire root canal system enhance the potential for healing of apical lesions.

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PAROLE CHIAVE
Anatomia canalare radicolare;
Canino inferiore;
Due radici;
Ritrattamento;
Lesione periapicale;
Microscopio operatorio.

Riassunto
Obiettivi: Descrivere il ritrattamento endodontico ortogrado di un canino mandibolare caratterizzato da una anatomia inusuale, affetto da lesione periapicale sintomatica.
Materiali e metodi: Una donna caucasica di 30 anni si è presentata all'osservazione a causa di un dolore severo, associato a gonfiore, localizzato all'emimandibola destra. Il canino inferiore (n.43) è stato individuato quale dente responsabile dell'infezione apicale; per lo stesso elemento è stata riscontrata una anatomia rara caratterizzata da due radici e due canali. Le procedure diagnostiche hanno evidenziato la presenza del canale linguale non trattato nella precedente terapia endodontica primaria. Il ritrattamento per via ortograda è stato intrapreso attenendosi ai protocolli dell'endodonzia contemporanea, per mezzo di strumenti ingranditori (microscopio operatorio) ed accurate procedure di disinfezione del sistema canalare.
Risultati e Conclusioni: E' stata ottenuta la completa risoluzione della lesione apicale, confermata dalle indagini cliniche e radiografiche del follow-up a 9 mesi. Gli endodonzisti dovrebbero conoscere le possibili variazioni anatomiche del sistema canalare dei denti umani, e vigilare sulla loro eventuale presenza al momento del trattamento. Molteplici proiezioni radiografiche sono raccomandate e possono agevolare la fase diagnostica.
Procedure endodontiche attente relative alla strumentazione, disinfezione ed otturazione del sistema canalare possono favorire la guarigione delle lesione periapicali.

Introduction

The aim of the root canal treatment is to achieve a correct shaping, cleaning and three-dimensional filling of the root canal system.[1,2] The ultimate goal is to eliminate the infected tissue, bacteria and to fill the complex anatomy of the root canal system, in order to allow the healing of a periapical lesion or to prevent the infection of periradicular tissues.[3,4]

Rare or complex anatomical variations may lead to inappropriate endodontic treatment, often associated with an incomplete elimination of the infected tissue, resulting in a treatment failure.[5,6] Moreover, some unusual root canal systems may be undetected at all by the clinician. In order to minimize the above-mentioned challenges, a careful clinical and radiological examination of the tooth to be treated is recommended. It is not advisable to approach a root canal treatment giving as granted that a specific tooth has a predetermined number of roots or canals. The lower canine anatomy usually presents just one wide canal associated with a single root[7]; a variation in such a morphological pattern might complicate the treatment. In a sample of 830 extracted human mandibular canines studied using a clearing technique, 98.3% of these teeth exhibited a single root, with 92.2% presenting one canal and one foramen.[7] According to Vertucci, in single-rooted mandibular canines, type II and type III configurations may be found in 14% and 3% of the cases, respectively.[8] The type II Vertucci configuration identifies two canals which start with independent orifices and then merge together (usually at or near the apical third of the root) into a single canal with its unique foramen; in the type III configuration a single main canal is split by a dentinal island, along its way to the apex, into two canals; finally, these two canals merge together at or near the apex forming just one foramen. Other researchers have performed in-vitro studies using sectioning[9] or radiographic[10] techniques: they also reported that about 15% of single-rooted lower canines show two canals with one or two foramina.

The presence of two-roots and two-canals in mandibular canines is a more unusual condition. In a study conducted by Ouellet,[11] the presence of the second root appeared in proportion of 5% of all teeth included; other authors have reported a considerably lower percentage, with a rate of 1.7% of mandibular canines with two roots featuring two canals.[7] A recent study assessed the anatomy of two-rooted mandibular canines by using high-resolution micro-computed tomography[12]: the findings revealed that root bifurcation occurred in the apical and middle thirds; moreover, lateral and furcation canals were observed in 29% and 65% of the samples, respectively.

From a clinical point of view, periapical radiographs performed at different angulations may be of great help to discover anatomical variations of teeth.

The objective of this article is to describe a case report about the endodontic retreatment of a lower canine with a rare two-roots/two-canals configuration. The previous primary therapy didn't detect the entire canal system: a symptomatic periapical lesion developed and led patient to our dental office.

Case report

A 30-year-old woman came to our hospital reporting severe pain and swelling located at the right mandible. After taking proper medical and dental history, the intra-oral examination was performed and a mucosal edema corresponding to the apex of teeth 4.2 and 4.3 was discovered. However, clinical tests highlighted the absence of endodontic disease on the lower lateral incisor: vitality tests were normal, no pain at percussion was discovered and physiological periodontal probing was present. On the other hand, tooth 4.3 showed a post-endodontic restoration carried out with a metallic screw-type post associated with a secondary decay and marginal leakage. The canine was painful at vertical and bucco-lingual percussion tests. The first orthogonal X-ray examination of the right lower canine showed an apparently correct endodontic treatment: despite the filling of the canal seemed adequate in relation to the root length, a wide periapical bone rarefaction was present (Fig. 1a).