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Case Report

Intra Oral Camera - Additional Simple Tool in Diagnosis of Infracted and Fractured Tooth Roots

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Abstract

In everyday dental practice, teeth are devitalized for various reasons. Such teeth are more prone to fracture due to the loss of organic matter, compared with vital and intact teeth, even supplied with post and core upgrades. Fracture or infraction of the non-vital tooth with or without upgrades in today's clinical practice is therefore relatively frequent and in mild increase. The paper presents use of the intra oral camera followed by the clinical examination in diagnosis of root fractures supplied with casted post and cores. Intra oral camera can show very well the shape, direction and size of the root fracture. Therefore, it is recommended to use in dental surgeries as an additional diagnostic tool for root fracture detection, because it is simple, fast and inexpensive.

Keywords: *Root Fracture; Non-Vital Teeth; Post and Core; Intra Oral Camera*

Introduction

Vertical root fracture (VRF) is one of the prognostically most difficult conditions in dental practice. In the perpendicularly oriented fractures, the fracture cracks are positioned apically, while in the horizontal plane, they extend horizontally from the root canal diameter to the periodontal borderline, within the entire thickness of the root structure. The only possible therapeutic treatment is surgical. Extraction of the tooth or hemisection in cases of the multirooted tooth is undertaken. The frequency of 4 - 5% of the teeth removed due to VRF in the second half of the 20th century, in the second decade of this century has already increased by more than 30% [1]. The causes of this increase are likely to be advances in the increased treatment of tooth disease and dental pulp resulting in a smaller number of tooth extractions and root channel inadequate preparation and correct procedures for upgrading heavily damaged crowns of endodontically threated teeth, which in some cases results with root fracture and consequent extraction [2].

Diagnosis

Diagnosis of VRF are sometimes very simple to set. It includes a typical intraoral finding of acute inflammation with all the signs: pain, swelling and redness of the gingiva, and often, but not always, a chewing problem associated with biting on the affected tooth [3-5]. The diagnosis is completed with retro alveolar x-ray images with clearly visible cracks, specific for the complete fracture of the root with fragments. Some of the fragments can be even movable on palpation In some cases, previously endodontically threated roots supplied with readymade or individual upgrades, whose "dropping" from the root canal, can also cause the fracture of the root or "root ferrule" loss. The therapy is clear: urgent and uncompromising removal of all fragments of the fractured tooth. The urgency stems from the fact that the diffuse inflammatory process can lead later in chronic stage, significantly altering the quality and quantity of surrounding bone which later jeopardize implanto prosthetic treatment (Figure 1 and 2).

Figure 1: *Patient with typical outer signs of upper frontal tooth root fracture.*

Figure 2: *X-ray of the same patient with confirmed vertical root fracture.*

Diagnosis of fractures without shift of fragments, incomplete fractures and infractions is even more complicated. Sometimes established only after tooth extraction or after a series of unsuccessful revision endodontic treatment or apicoectomies. Endodontic treatment or repetition of treatment can result in greater loss of dentin tissue or its weakening by chemical agents (chelators, hypochlorite, etc.). In the case of incomplete fractures, the moment of segments often goes unnoticed, without pain or some other symptom. The development of a clinical image without clear signs lasts several days to several years, and the symptoms usually intensify after cementing fixed prosthetic appliance [6].

Cone Beam Computer Tomography (CBCT) represents a newer way of x- ray diagnostic tools, but does not significantly raise the confidence to set the differential diagnosis between incomplete or complete VRF without shifting of the fragments and is not a part of common procedure during endodontic treatment in everyday dental practice. An intraoral microscope can also register crown and root cracks, and in the clinical everyday dental practice will not be a standard equipment for a sometime, because of high costs [7,8].

Intra oral camera (IO) is used to explore the visually accessible surface of each root of the damaged tooth needed for prosthetic reconstruction. Photo resolution of IO cameras plays important role in diagnostic use, increasing the ability to focus on the susceptible surface of the examined tooth (Figure 3).

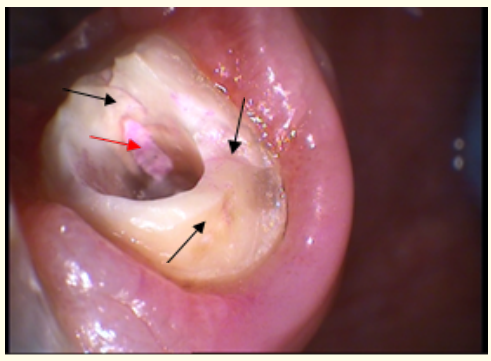

Figure 3: *Multiple tooth cracks enlarged by intra oral camera (black arrows) and oral part of the root channel tinned and probably perforated (red arrow).*

Photographic records of the internal part of dentine are also helpful. They helps to detect or exclude fracture lines (cracking of the hard dental tissues). The inner surfaces of the teeth, in the cervical part of the tooth, gives insight of the internal dentin root condition. The cervical part of the tooth is biomechanically the most heavily loaded part of the tooth, so the fracture lines are most noticeable here [9-11]. Broken lines of fracture cracks are clearly outlined, painted with a colors for caries detection or methylene blue on dentin and cement surfaces, taken with an intraoral camera. The intra oral cameras are able to increase 10 to 20 times observed part of the susceptible tooth surface.

The case of repeatedly falled out and re cemented readymade post and core from the root channel od the first upper incisor is demonstrated in figure 4 and 5. Without visible x-ray signs vestibular fistula persisted for three-year and root fracture was clarified with intra oral photograph after tooth extraction (Figure 4 and 5).

Figure 4: *Extracted tooth with casted post and core and visible root fracture (black arrow).*

Figure 5: *The same tooth after post and core removal and visible root fracture (black arrow).*

Conclusion

Intra oral camera is a relatively inexpensive auxiliary diagnostic device in determination of susceptible crown and root surfaces on fracture in compare with intra oral microscope or CBTC for everyday prosthetic dental practice. Accessible internal tooth or root surfaces for this purpose can be adequately examine and enlarged up to 20 times. In some clinical cases fracture diagnosed with IO prior to the beginning of the prosthetic rehabilitation can reduce additional costs.

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