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Case Report

A Case of Apical Fenestration Misdiagnosed as Persistent Apical Periodontitis

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Abstract

We report a case of apical fenestration misdiagnosed as persistent apical periodontitis. The patient was a 55-year-old woman who presented with persistent tooth pain at the right maxillary canine, despite repeated root canal treatment by a general practitioner. When the patient visited Tokyo Dental College Suidobashi Hospital, a CT examination was performed and apical fenestration diagnosed. The patient received an apicoectomy after which the symptoms disappeared. This suggests that dentists should consider the possibility of apical fenestration when examining patients with persistent tooth pain after repeated root canal treatment.

Key words: Persistent apical periodontitis—Apical fenestration—Apicoectomy—Clinical symptoms

Introduction

In routine dental practice, persistent apical periodontitis is sometimes diagnosed due to failure of symptoms such as pressure and occlusal or percussion pain to disappear even with repeated root canal treatment. In an earlier study, we reported treatment of persistent apical periodontitis^{4,5}. Differential diagnosis is of some importance in the treatment of teeth with persistent symptoms, the causes of which can include tooth fracture and accessory canal or apical fenestration. Apical fenestration is defined as exposure of the root apex through the alveolar bone due to perforation of cortical bone, known as bone fenestration.

In general practice, there is a tendency to diagnose persistent apical periodontitis even in the absence of convincing pathological evidence in cases where no improvement is seen after repeated endodontic treatment. This is partly because differential diagnosis of teeth in which the symptoms are persistent is difficult, particularly as examination often involves use of two-dimensional X-ray only. To determine the cause of persistent symptoms such as tooth fracture and accessory canal or apical fenestration, three-dimensional computed tomography (CT), including cone-beam CT, has been shown to be useful^{8,11}.

In this report, we present a case of apical fenestration misdiagnosed as persistent apical periodontitis due to sustained apical pressure

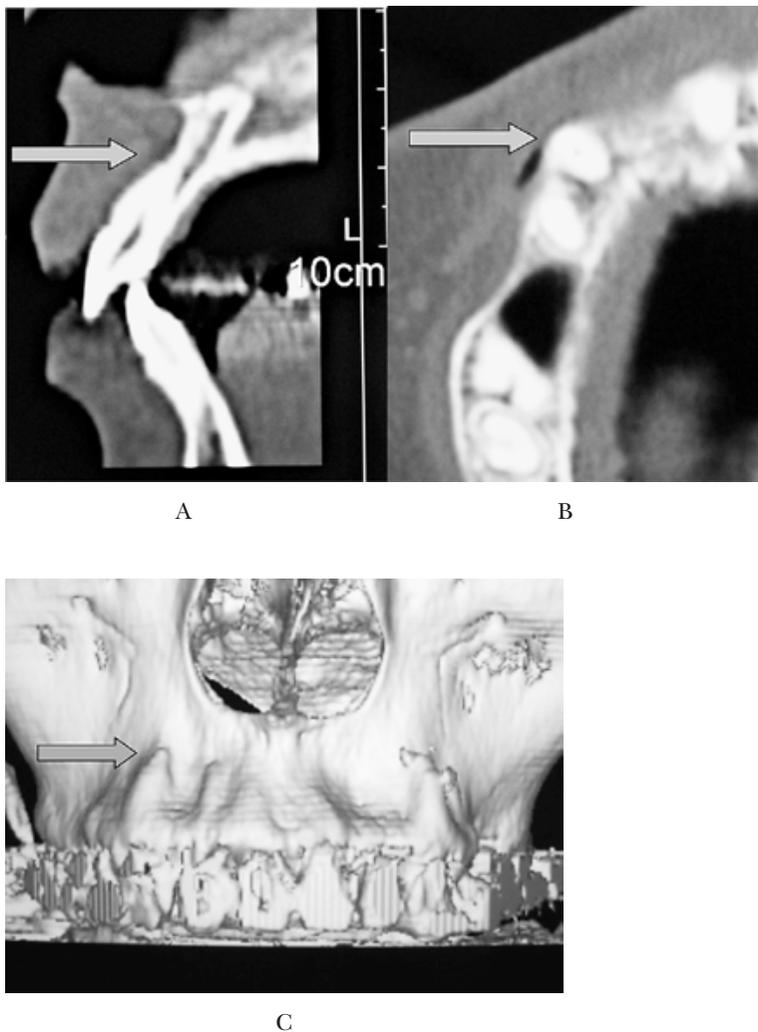


Fig. 1 Perpendicular and horizontal tomodensitometric view of apical region of right maxillary canine (A, B). Fenestration was strongly suspected (A, B, C).

pain and discomfort on percussion at the right maxillary canine, despite repeated root canal treatment. Correct diagnosis and appropriate treatment were achieved by using three-dimensional CT.

Case Report

The patient was a 55-year-old woman who presented with persistent tooth pain at the right maxillary canine, despite repeated root

canal treatment by a general practitioner. When the patient visited Tokyo Dental College Suidobashi Hospital, a CT examination was performed. A diagnosis of apical fenestration at that tooth was strongly suspected based on a three-dimensional analysis. As a result, the patient received an apicoectomy and the post-operative course was observed on a regular basis. Two years after surgery, the patient had no symptoms of discomfort (Figs. 1, 2).

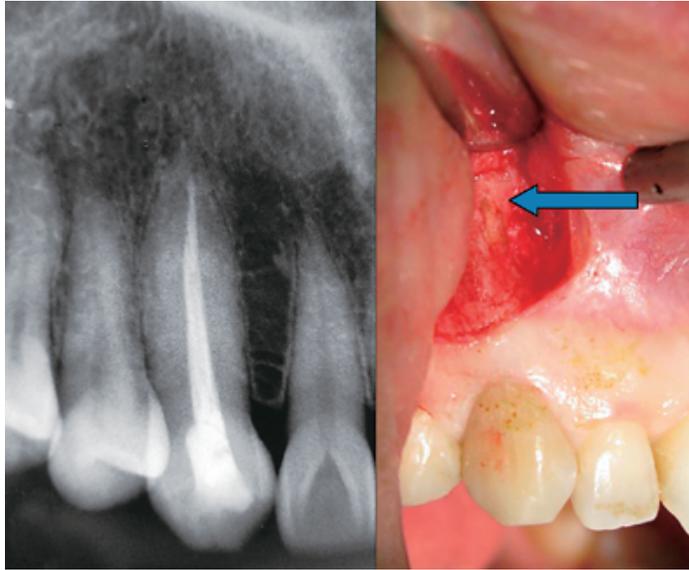


Fig. 2 Preoperative diagnostic radiograph
Apical fenestration.

Discussion

The incidence of apical fenestration is between 7.5% and 20%, and is higher in the maxillary than in the mandibular teeth^{2,3,6-9,13}. It has also been reported that the incidence is higher in the anterior than in the posterior teeth^{2,3,11}. The most commonly observed regions are the canine root and the mesio-buccal root of the maxillary first molar⁷. Although the cause of apical fenestration is still unclear, it has been suggested that anatomical factors such as age-related changes and the positional relationship between the tooth and the alveolar bone might be involved. In addition, occlusal dysfunction should also be considered.

The present patient visited a dental office and received routine root canal treatment. The symptoms, however, showed no sign of abating and persistent apical periodontitis at the right maxillary canine was diagnosed due to no specific findings on routine dental X-rays. In contrast, three-dimensional CT analysis at our hospital clearly revealed apical fenestra-

tion. A number of earlier studies have also suggested the usefulness of three-dimensional CT analysis^{8,11}. Although the popularity of CT has been predicted to increase, it has yet to become standard in general practice due to its high cost. Therefore, differential diagnosis of apical fenestration at present is more likely to be performed at a university or general hospital. Therefore, dentists should consider the possibility of apical fenestration when examining patients with persistent tooth pain after repeated root canal treatment and refer the patient to an appropriate hospital.

In this patient, the root apex at bone fenestration was removed. Removing the cause and appropriate root canal filling may allow regeneration of alveolar bone and relief of symptoms. However, some reports have suggested that fenestration does not always cause persistent apical periodontitis¹ and that this pathological condition may occur after root canal filling^{10,12,14}. Therefore, further investigation is required.

Conclusion

We report a case of apical fenestration at the right maxillary canine that had been misdiagnosed as persistent apical periodontitis. Dentists should consider the possibility of apical fenestration when examining patients with persistent tooth pain after repeated root canal treatment.

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