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Case Report

A case of high density abnormality in x-ray findings of mandible caused by leakage of root canal filling paste

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ABSTRACT

Background: Calcium hydroxide paste is widely used for endodontic treatment as a root canal filling material. However, appropriate filling with that paste at the root apex is difficult because of the properties of the material and tooth root condition.

Case report: Here, we report a 4-year clinical follow-up of leakage of calcium hydroxide paste into the mandible during endodontic treatment. The remaining material observed radiologically for 4 years. During that period, 2 adjacent permanent teeth, the first molar and premolar, erupted normally, while radiopaque findings in the mandible bone shown by panoramic x-ray imaging slowly decreased without signs of inflammation.

1. Introduction

The shape of the root apex of a primary tooth shows many variations, such as fenestrated and tortuous, and root resorption can occur with inflammation and natural replacement with a permanent tooth. As a result, it is difficult to correctly measure the root apex for endodontic treatment of primary teeth. Calcium hydroxide paste is generally used as a root canal medicament or filling material for primary teeth, as

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it is absorbed without suppressing physiological root resorption and disinfects the root canal due to its alkaline characteristic [1,2]. When calcium hydroxide paste is directly injected into a root canal using a dedicated syringe, the ideal amount of obturation or application pressure is dependent on the sense and experience of the practitioner.

There have been reports of paste leakage in cases in which it could not be absorbed without remarkable inflammation. However, when such leakage occurs from the root of a primary tooth, enamel hypoplasia, malposition, dilaceration, or a dentigerous cyst of the permanent tooth germ may induced [3,4]. Furthermore, irreversible inferior alveolar nerve damage because of calcium paste leakage into the maxillary sinus or greater palatine canal has been reported [5–8].

Here, we report findings obtained during 4 years of follow-up examinations of a patient in whom a wide impermeable area in the mandible was caused by leakage of calcium hydroxide paste.

2. Case report

A 9-year-3-month-old boy was referred to our pediatric dental clinic from a private clinic with the chief complaint of buccal gingiva swelling in the region of the lower left second primary molar. The root canal of that molar had been previously treated without spontaneous percussion or pain (Fig. 1A, B). Slight tooth mobility of buccolingual direction (Miller Classification 1) was observed and abscess formation was seen in the buccal gingival area. A periodontal pocket sized 8 mm was found to exist in the buccal center (Fig. 1C, arrow).

Dental x-ray photographic image showed root resorption of the lower left second primary molar, enhancement of x-ray permeability of the root periphery, expansion of the periodontal ligament space, loss of lamina dura of the alveolar bone, and furcation lesions. Moreover, the succeeding permanent second premolar tooth was congenitally missing (Fig. 2A). In panoramic x-ray photographic images, a disseminated radiopaque appearance was noted around the roots of the lower left second primary molar, including under the proximal region of the developing root of the first premolar and distal region of the first molar (Fig. 2B). In three-dimensional reconstruction computed tomography (CT) images, the abnormal high-density region ranged extensively close to the lingual cortical bone mesio-distally from the apical portion of the first premolar to that of the first molar in the left mandible (Fig. 2C, D, arrow). CT values of the high-density region were extremely elevated (2950-3071 HU). Based on these findings, we speculated leakage of some root canal filler into the mandible. The CT values of Calcipex® (Nippon Shika Yakuhin Co., Ltd, Japan) and Vitapex® (NEO DENTAL CHEMICAL PRODUCTS Co., Ltd, Japan), root canal filling agents for primary teeth, are known to be 2773–3071 HU and more than 3071 HU, respectively (maximum CT value; 3071 HU). Our diagnosis for the patient was apical periodontitis, chronic alveolitis of the lower left second primary molar, and presence of a foreign substance in the fitting region of the left second premolar of mandible, as well as a congenitally missing lower left second premolar.

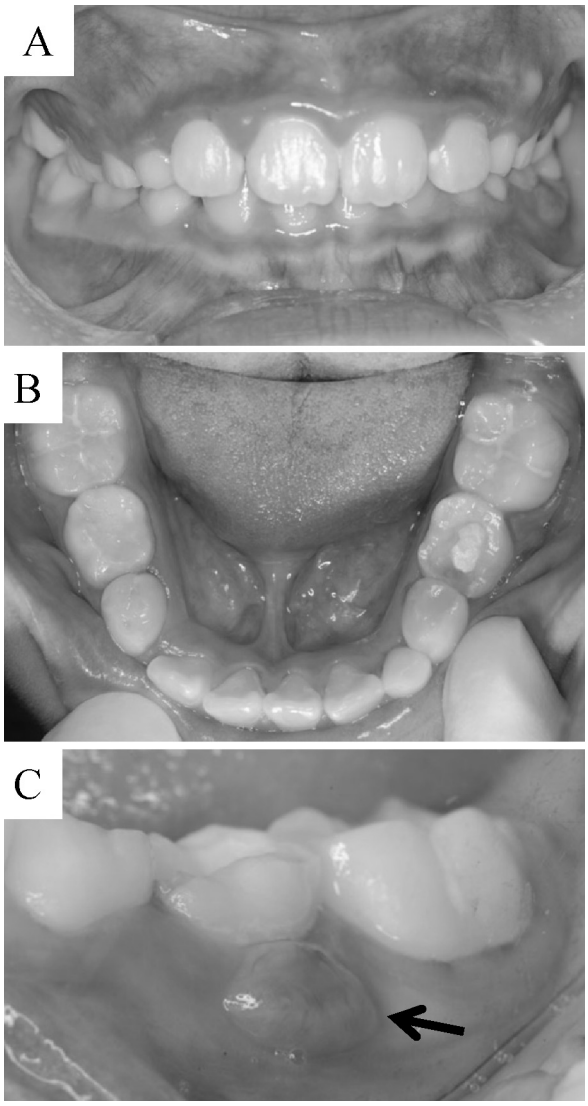

Fig. 1 – Intraoral images. (9 years 3 months old). A. Frontal view of occlusion. B. Occlusal view of lower jaw. C. Buccal view of lower left second primary molar with abscess. Arrow indicates the abscess.

As treatment, we performed extraction of the lower left second primary molar (Fig. 3A), though some white-colored solid materials remained in the extraction socket (Fig. 3B arrows, C). Granulation tissue along with the solid material was removed, then a pathological examination was performed. In HE-stained sections, the granulation tissue showed lymphocytic and plasmocytic infiltration with a large deposition of black fine granules, as well as macrophages containing phagocytosed black granules (Fig. 3E, F), while the surface was focally covered by stratified squamous epithelium (Fig. 3D). The histopathological diagnosis was inflammatory granulation tissue. According to both radiographic and pathological findings, we concluded that the radiopaque region seen in panoramic radiographic images was from leakage of Calcipex® paste, which induced chronic suppurative apical periodontitis. After extracting the second primary molar teeth, a

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