



Preservation of Vital Pulp in Young Permanent Teeth with Periapical Disease: A Case Report

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Abstract

The key to clinical treatment of periapical disease of young permanent teeth is to control inflammation and promote the further development of root, so as to achieve the purpose of retaining the affected teeth. This paper reports a young permanent tooth with acute attack of chronic periapical periodontitis and maxillofacial space infection. After vital pulp preservation treatment, the periapical disease completely healed, the root continued to grow, and the affected tooth was successfully preserved.

Keywords: Periapical diseases; Young permanent teeth; Preservation of vital pulp

Introduction

Periapical diseases of young permanent teeth mostly develop from pulpitis or pulp necrosis. At this time, pulp infection can cause inflammation or pathological changes of periapical tissues through wide apical foramen [1]. Since the roots of young permanent teeth are not yet fully developed, the principle of treatment is first of all to preserve the living pulp to promote the continued development of the root of the teeth [2,3]. At present, the clinical treatment methods for periapical diseases of young permanent teeth include root tip induction shaping, root tip barrier and pulp vascular regeneration [1], but these three methods have some shortcomings [2]. The existing research shows that there are still living tissues in the root canals of young permanent teeth with periapical infection, and these living pulp tissues should be preserved as much as possible in clinic to promote the continued development of the roots [4]. This paper reports a young permanent tooth with acute attack of chronic periapical periodontitis and space infection. After vital pulp preservation treatment, the periapical disease completely healed, the root continued to grow, and the affected tooth was successfully preserved.

Case Presentation

Clinical data: Child, male, 10 years old, was first diagnosed on November 14th, 2019.

Chief complaint: The lower right posterior teeth have toothache for 2 days and the lower right part is swollen for 1 day.

Current medical history: Two years ago, the right lower posterior tooth underwent resin repair after indirect pulp capping by grinding the deformed central point at one time in our hospital. Two days ago, the right lower posterior tooth had a pain at night, paroxysmal and spontaneous pain. One day ago, the right lower part was swollen, so I came to see a doctor.

Past history: past physical health, denying the history of drug allergy, systemic diseases and infectious diseases.

General physical examination: The child is in good health, normal in growth and development, slightly depressed in mental state, showing extreme fear of dental treatment.

Oral specialist examination: The lower right part is swollen, the surface skin is red, and tenderness is obvious. Oral hygiene is average. 45 occlusal fillings are in good condition, knocking pain (++) , loosening III^o, no obvious periodontal pockets are found, buccal gums are diffuse red and swollen, fluctuating (+), and the gingival sulcus overflows when touched.

X-ray: 45 roots developed to Nolla 8 stage, with low density shadow around the root tip and widened periapical membrane (Figure 1).

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Figure 1: November 14, 2019.



Figure 2: December 3, 2019.

Diagnosis: 45 cases of periapical periodontitis with space infection.

Treatment plan: (1) 45 cases of pulp regeneration after infection control; (2) Root tip induction and plastic surgery was performed 45 times after infection control. Explain the illness, treatment plan, expenses, etc. to the parents of the child, and the parents will give informed consent and choose the treatment plan (1).

Treatment Process

1. First visit (November 14th, 2019): The child was extremely uncooperative. After communicating with the parents of the child, it was decided to control the infection first, not remove the dental pulp, and observe after sealing the medicine. 0.2 g lidocaine hydrochloride plus 0.3 ml local anesthesia with 4% articaine, under the condition of rubber barrier, 45, the original fillings were removed, the pulp was opened, the top was uncovered, and the pulp cavity was repeatedly washed with 2% chloramine and 1% sodium hypochlorite, and the cotton ball was opened. 3% hydrogen peroxide and 0.9% normal saline were used to wash buccal gingival sulcus alternately, and iodine glycerin was applied. Ask the child to take anti-inflammatory drugs orally for 3 days before returning to the clinic.

2. Second visit (November 18th, 2019): The chief complaint was that the swelling and pain of the lower right part was relieved, and the tooth pain was relieved. Examination: The swelling of the lower right part subsided, the 45-piece opening was intact, loose I°, and the gum swelling was relieved. Treatment: 45. Remove the open material, remove the crown pulp, not uproot the pulp, rinse the pulp cavity repeatedly with 2% oxymethylene and 1% sodium hypoxide, dry, lightly cover the pulp with calcium hydroxide paste, and temporarily seal with glass ions.

3. The third visit (December 3rd, 2019): The chief complaint was no discomfort. Examination: 45. Temporary seals are intact, knocking pain (+) are not loose, and there is no obvious abnormality in buccal gums. X-ray showed that the periapical low density shadow was reduced at 45 (Figure 2). Treatment: 45 h to remove the original, 2% oxymethylene and 1% sodium hypochlorite repeatedly wash the dental pulp section, dry, lightly cover the dental pulp with calcium hydroxide paste, and temporarily seal with glass ions.

4. Fourth visit (December 22nd, 2019): No discomfort was complained. Examination: 45 temporary seals are in good condition, knocking pain (-) is not loose, and there is no obvious abnormality in buccal gums. Treatment: 45 h, the pulp was removed intact, 2%

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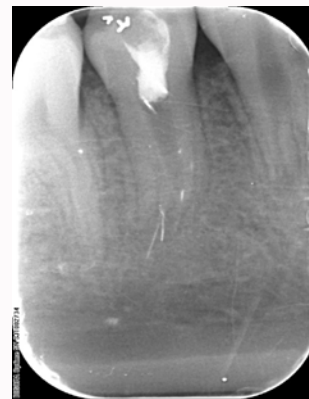


Figure 3: January 12, 2020.



Figure 4: August 16, 2020.

chlorpheniramine and 1% sodium hyposulfite were repeatedly and alternately washed, dried, Vitapex was lightly covered on the pulp, and glass ions were temporarily sealed.

5. The fifth visit (January 12th, 2020): The chief complaint was no discomfort. Examination: 45 temporary seals are in good condition, knocking pain (1) is not loose, and there is no obvious abnormality in buccal gums. X-ray showed that the low density shadow around the root tip disappeared at 45 (Figure 3), and the periapical membrane was normal. Treatment: 45 h, partially intact, light-sensitive resin beautifully filled, occlusal adjustment and polishing.

6. Sixth visit (August 16th, 2020): I complained of no discomfort and continued to treat other teeth. Examination: 45 temporary seals are in good condition, knocking pain (-) is not loose, and there is no obvious abnormality in buccal gums. 16, 26, 36, 46 erupted normally, with deep and narrow pit and fissure. X-ray showed that the root tip continued to grow at 45 h, and there was no abnormality around the root tip (Figure 4). Treatment: on 16th, 26th, 36th and 46th, the pit and fissure were cleaned and the pit and fissure were closed [5]. If there is no discomfort, visit again every 6 months.

Discussion

Studies have shown that the incidence of pulp involvement of young permanent teeth is as high as 35.8% to 36.9% among 6 to 18 year-old school children [5]. Periapical diseases of young permanent teeth mostly develop from pulpitis or pulp necrosis. At this time, pulp infection can cause inflammation or pathological changes of periapical tissues through wide apical foramen. At present, the treatment methods for periapical diseases of young permanent teeth include apical induction shaping, apical barrier and pulp angiogenesis therapy [1]. However, apexification has a long treatment cycle, many visits, and easily leads to root fracture. Apical barrier technique is sensitive to technology, which easily leads to material overcharge; the technique of pulp regeneration is still in the immature stage [1,2,6]. In addition, the above-mentioned first two treatments need to thoroughly remove dental pulp tissue, which will hinder the formation of root, and make the root length insufficient or the apical foramen unable to be completely closed. Keeping the vitality of dental pulp is essential for young permanent teeth; otherwise the incomplete root may lead to the fragility of teeth [3].

The root tip of young permanent teeth is in the shape of a big bell mouth, and the pulp tissue in the root tip is papillary and migrates to the lower periodontal tissue, and there is a rich local blood microcirculation system, which provides a physiological basis for young permanent teeth to preserve vital pulp as much as possible. Preserving vital pulp, especially the living dental papilla, is the key to the root development [1].

This 11-year-old child is very resistant to dental treatment because of severe toothache. In order to alleviate the fear and pain of the child, instead of completely removing the dental pulp, a large

amount of drug root canal irrigation and disinfection were used first. After a large amount of irrigation with 2% oxydamine and 1% sodium hypochlorite and twice four-week root canal disinfection with calcium hydroxide paste, the root apex inflammation was effectively controlled, and the root continued to develop depending on its own tissue. After 10 months' observation, the root inflammation was basically eliminated.

Conclusion

To sum up, because the pulp and periapical tissues of young permanent teeth are loose and rich in blood, if inflammation is treated in time and effectively, it is easy to control and recover, and the root can continue to develop depending on its own tissues. This treatment method of simply controlling infection provides a new idea for the treatment of acute periapical periodontitis of young permanent teeth.

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