

Revascularization has recently been recommended to treat nonvital immature permanent teeth since 2001. Several case reports and case series studies with different treatment details showed good success. Further case series studies are required to compare with different studies and to build up standardized treatment procedures for revascularization with standard medicines and materials.

Objective

This retrospective study was undertaken to evaluate the efficacy and clinical complications of revascularization in 23 necrotic immature teeth with apical periodontitis or abscesses.

Methods

In this study, clinical data of 23 immature open-apex teeth were collected in Peking University Hospital and School of Stomatology from 2009 to 2012. The inclusion criteria are as follows: (1) clinically, the tooth had pulp necrosis; (2) radiographically, the root had an open apex and a radiolucent apical lesion; (3) conservative revascularization procedures were performed; (4) the follow-up period was longer than 12 months.

Results

The efficacy of revascularization

- 91.3% (21/23) of the teeth showed complete radiographic resolution of periapical radiolucencies during follow up period.
- 69.6% (16/23) of the teeth showed either root canal wall thickening or root length increase. While 34.8% (8/23) of the teeth had both root canal wall thickening and root length increase. (Figure 1)



Figure 1. Tooth 15 showed thickening of the root canal wall and complete root maturation after revascularization. (a) Preoperative radiograph. (b) Three-month follow-up radiograph. (c) Twelve-month follow-up radiograph. (d) Eighteen-month follow-up radiograph.

Conclusions

- Revascularization has a favorable outcome when treating infected immature permanent teeth.
- The clinical complications will be encountered during the treatment. The teeth should be recalled periodically.

Treatment procedures of revascularization

- irrigated with 5.25% NaOCl for 20-30 min
- triple antibiotic mixture as intracanal medication
- created the blood clot in the root canal
- sealed with glass ionomer cement

The clinical complications

- Blood clot was formed in the root canal of 34.8% teeth (8/23). Bleeding could not be induced in the other 15 teeth, though a local anesthetic agent without vasoconstrictor was used and a file was pushed into the periapical tissue for 3-5mm.
- The discoloration of the crown was evident in 80% (4/5) of the maxillary incisors. While the incidence of discoloration in premolar was only 11.1% (2/18).
- Of the 13 teeth with closed root apex, 4 teeth presented with spontaneous pain or sinus tract during follow-up. Traditional root canal treatment was required. (Figure 2)

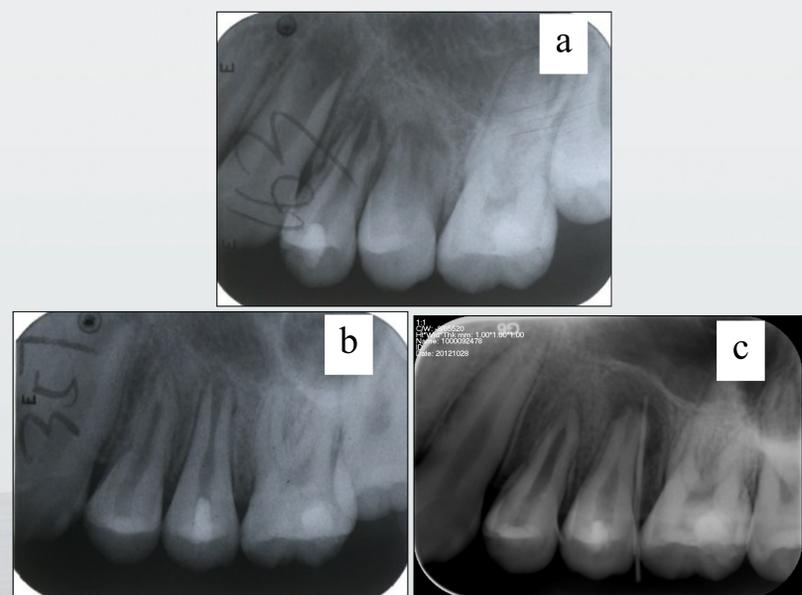


Figure 2. Teeth 24, 25 presented sinus tracts on their buccal gingivae and periapical radiolucency after apices were closed. (a) Preoperative radiograph. (b) Fifteen-month follow-up radiograph. (c) Forty-month follow-up radiograph showed tracing of the sinus tracts with two gutta-percha points.