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Letter to the Editor

New terms for categorizing the outcome of root canal treatment

Dear Editor

Various terms have been used to categorize the outcomes of root canal treatment. 'Success' and 'failure' are the most popular terms that are used, but 'healing' and 'healed' have been suggested (Friedman & Mor 2004). 'Success' means 'the accomplishment of an aim or purpose' (Oxford Dictionary). According to most endodontic textbooks, the purpose of root canal treatment is to prevent and eliminate apical periodontitis (AP) (Ørstavik & Pitt Ford 1998). Because the outcome of treatment is evaluated using the history provided by the patient at recall along with a thorough clinical examination and with radiographs, 'success' has been defined as the prevention and elimination of a periapical radiolucency and symptoms, with 'failure' being the development or persistence of AP and/or symptoms (European Society of Endodontology 2006).

It has been demonstrated that bacteria cannot be removed completely from the canal system using current techniques in both primary root canal treatment and retreatments (Nair *et al.* 2005, Haapasalo *et al.* 2011). To conform to these limitations, the aim of root canal treatment should be restated as – 'the minimization of the burden of root canal infection and the severity of AP'.

It is well known that several years may be required for complete resolution of periapical radiolucencies (Ørstavik 1996), and thus a long follow-up time period is required, which reduces the recall rate. With a low recall rate, the reported success rates could be over- or under-estimated (Ørstavik *et al.* 2004, Marquis *et al.* 2006, Wu *et al.* 2009). Sixty-three clinical studies (1922–2002) were selected in a review by Ng *et al.* (2007), the median recall rate was 52.7% and the lowest recall rate was 11% (Selden 1974). In the Toronto studies phases I, II and III, data of only 27% of the treated teeth were included in the final analysis in spite of several and various attempts to stimulate the participants to return for recall (Marquis *et al.* 2006). The problems of conducting clinical trials in mobile populations are well documented (Ng *et al.* 2007).

In comparison with 'success' and 'failure', 'effective' and 'ineffective' are reasonable terms that should be considered. 'Effective' treatment is defined as the absence of symptoms and complete or partial resolution of the preoperatively existing periapical radiolucency 1 year following treatment. In cases where no preoperative lesion was present, 'effective' would mean that no lesion or signs/symptoms will develop after 1 year. 'Ineffective' treatment is defined as the development or enlargement of a radiolucency and/or the persistence/emergence of symptoms and signs 1 year following treatment, and a timely retreatment should be suggested to the patient (Wu & Wesselink 2005). Asymptomatic teeth, where the size of the radiolucency does not noticeably change 1 year following treatment, should be placed into an uncertain category and monitored for a further period of one more year.

Friedman & Mor (2004) suggested the use of 'healed/healing/ disease' in place of 'success' and 'failure'. The newly suggested term 'effective' would include the categories 'healed' and 'healing' and will not result in further treatment, whilst the term 'ineffective' at 1 year would mean the emergence or enlargement of the periapical radiolucency and/or symptoms and signs that will require intervention. A 1-year follow-up period is too short to judge a tooth as 'diseased' (Haapasalo *et al.* 2011) and this is why this term is not included in the present suggestion.

The advantages of using 'effective' and 'ineffective' over previous terms to describe the outcome are the following:

1. shorten the follow-up period from 4 year to 1 year and thereby increase the recall rate and reduce the number of appointments and radiographs;

2. reduce the number of unnecessary retreatments indicated by adhering to previous definitions (Figdor 2002); and

3. the terms 'effective' and 'ineffective' relate directly to an indication for treatment and make clinical decisions easier and reproducible.

We wish to initiate an open discussion on the issue of terms used to categorize the outcome of root canal treatment, beginning with this letter.

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