

REVIEW

The influence of two reciprocating single-file and two rotary-file systems on the apical extrusion of debris and its biological relationship with symptomatic apical periodontitis. A systematic review and meta-analysis

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Abstract

Caviedes-Bucheli J, Castellanos F, Vasquez N, Ulate E, Munoz HR. The influence of two reciprocating single-file and two rotary-file systems on the apical extrusion of debris and its biological relationship with symptomatic apical periodontitis. A systematic review and meta-analysis. *International Endodontic Journal*.

This systematic review and meta-analysis investigated the influence of the number of files (full-sequence rotary-file versus reciprocating single-file systems) used during root canal preparation on the apical extrusion of debris and its biological relationship with the occurrence of symptomatic apical periodontitis. An extensive literature research was carried out in the Medline, ISI Web of Science and Cochrane databases, for relevant articles with the keyword search strategy. Based on inclusion and exclusion criteria, two reviewers independently rated the quality of each study determining the level of evidence of the articles selected. The primary outcome for the meta-analysis was determined by the amount of debris extruded into the periapical tissue during root canal preparation with multiple- or single-file systems in four laboratory studies. Analysis of *in vivo* release of neuropeptides (SP and CGRP) after root canal preparation

with single- or multiple-file systems was also carried out. Amongst the 128 articles initially found, 113 were excluded for being nonrelevant or not fulfilling the selection criteria. Another four articles were excluded after methodology evaluation. Finally, nine laboratory studies and two *in vivo* studies were included in the systematic review. Four of the laboratory studies were further included for meta-analysis that revealed greater debris extrusion after the use of single-file techniques when compared to multiple-file systems. Analysis of *in vivo* neuropeptide expression in the periodontal ligament suggests that the design of the instrument is more important than the number of files used. Both rotary and reciprocating single-file systems generate apical extrusion of debris in laboratory studies, or expression of neuropeptides *in vivo*. Available evidence is limited, but supports the fact that this inflammatory reaction is not influenced by the number of files but the type of movement and the instrument design.

Keywords: apical debris extrusion, neurogenic inflammation, neuropeptides, rotary files, single-file reciprocating systems, symptomatic apical periodontitis.

Received 8 October 2014; accepted 23 March 2015

Introduction

Symptomatic apical periodontitis is defined as an acute inflammation of the periodontal ligament (Fava 1998). This condition may be a consequence of root

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