

# Healing of Apical Periodontitis after Nonsurgical Root Canal Treatment: The Role of Statin Intake

Maha Alghofaily, BDS, MS, FRCD(C),<sup>\*†</sup> Patricia Tordik, DMD, FICD,<sup>\*</sup> Elaine Romberg, PhD,<sup>\*</sup> Frederico Martinho, DDS, MS, PhD,<sup>\*</sup> and Ashraf F. Fouad, DDS, MS<sup>‡</sup>

## Abstract

**Introduction:** Numerous previously undocumented factors may influence the healing of apical periodontitis (AP). The aim of this cohort study was to analyze the association between statin medication intake during the follow-up period and healing of AP. **Methods:** Patients who self-reported being on statins during nonsurgical root canal treatment or retreatment and patients who reported never taking statins were included. All patients who received treatment on a tooth with periapical radiolucency in the postgraduate endodontics clinic at the University of Maryland School of Dentistry (2011–2014) were invited for follow-up 2 to 5 years after treatment. Healing was determined using the periapical index (PAI). Two calibrated endodontists assessed outcomes blinded to the statin intake. The association of statin intake and healing of endodontic treatment (ie, healed [PAI 1–2]/not healed [PAI 3–5]) was analyzed using the Fisher exact test. Logistic regression analysis was used to explore the association between statin intake and treatment outcome, controlling for the following confounding variables: diabetes mellitus, cardiovascular disease, and smoking, with confidence intervals set at 95%. **Results:** A total of 60 cases were involved in the final analysis, including 30 patients taking statins and 30 patients not taking statins as the control. The Fisher exact test showed significantly higher healing at the 2-year or greater follow-up in patients taking statins compared with controls (93.0% vs 70%; Fisher exact test,  $P = .02$ ). **Conclusions:** The results of this study show a significant association between long-term statin intake and healing of AP after nonsurgical root canal treatment. (*J Endod* 2018; ■:1–6)

## Key Words

Apical periodontitis, endodontic treatment, healing, nonsurgical root canal treatment, outcomes, statins

Many endodontic patients are placed on statins (3-hydroxy-3-methylglutaryl-coenzyme A reductase inhibitors) for long periods of time to reduce cholesterol production and increase its rate of elimination. Studies have shown compelling evidence that statins stimulate the expression of bone anabolic factors such as vascular endothelial growth factor and bone morphogenetic protein 2 (1) and promote osteoblast differentiation and mineralization in MC3T3-E1 cells (2, 3). Statins also exert an effect on RANKL-induced nuclear factor kappa B activation pathway that can lead to the inhibition of osteoclastogenesis (4).

There has been considerable interest in the clinical effects of statins on the outcomes of periodontal treatment. A recent systematic review concluded that local statins may offer supplemental clinical benefits to scaling and root planing, even in smokers and diabetics (5).

Some studies have investigated the effect of statins on the pathogenesis of periapical lesions in animal models. The role of statins in bone formation is, in part, related to its anti-inflammatory and immunomodulatory properties, as shown in these studies. The administration of simvastatin before inducing periapical lesions in rats significantly attenuated periapical bone resorption compared with the control group by diminishing CD-68–positive macrophages as well as protecting osteoblast cells from degradations at the cellular level (6, 7).

Previous studies have shown that statins may enhance odontoblastic differentiation and mineralization of dental pulp cells or stem cells (8–10). It was recently demonstrated that patients on statins have significantly increased mineralization within the pulp chamber of mandibular molars (11). However, it is not known if statins can influence the healing and periapical bone deposition after endodontic treatment.

Successful endodontic treatment involves the elimination of infection in the root canal space as well as providing an environment favorable to periapical healing and repair. As repeatedly shown in the endodontic literature, failure to achieve these goals may result in persistence of the infection. This may result in pain, reduced quality of life, increased cost because of additional procedures, and tooth loss (12). Epidemiologic studies from different countries have shown that the prevalence of apical periodontitis

## Significance

There is an increasing body of evidence that statins have a positive therapeutic effect in bone diseases. This preliminary cohort study examined the association between statin intake and healing of apical periodontitis after nonsurgical root canal treatment. The results of this study show a significant association between long-term statin intake and healing of apical periodontitis after nonsurgical root canal treatment.

From the \*Department of Advanced Oral Sciences and Therapeutics, School of Dentistry, University of Maryland, Baltimore, Baltimore, Maryland; †Department of Restorative Dental Science, College of Dentistry, King Saud University, Riyadh, Saudi Arabia; and ‡Department of Endodontics, School of Dentistry, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Address requests for reprints to Dr Ashraf F. Fouad, Department of Endodontics, School of Dentistry, University of North Carolina at Chapel Hill, 1098 First Dental Building, CB# 7450, Chapel Hill, NC 27599-7450. E-mail address: [afouad@unc.edu](mailto:afouad@unc.edu)  
0099-2399/\$ - see front matter

Copyright © 2018 American Association of Endodontists.

<https://doi.org/10.1016/j.joen.2018.06.013>

## Clinical Research

(AP) is relatively high in endodontically treated teeth (13–16). In the endodontic literature, there is a consensus that teeth with preoperative periapical lesions have a reduced healing outcome compared with teeth without periapical lesions (17–19). Although the etiology of persistent disease is related to the microbiology of the root canal system and the periapical region, the delay in healing of cases that are destined to heal may be ameliorated by an agent that enhances bone deposition, such as a statin. Therefore, the purpose of this cohort study was to analyze the association between statin intake and the healing of preoperative AP after nonsurgical root canal treatment. We hypothesized that statins were associated with increased healing of AP.

### Materials and Methods

This study was approved by the institutional review board at the University of Maryland, Baltimore. The study subjects were selected from a patient pool in the Maryland Endodontics Record based on inclusion and exclusion criteria.

### Inclusion and Exclusion Criteria

The study included patients who received well-performed initial nonsurgical root canal treatment or retreatment (evaluated radiographically as dense, obturated canals between 0.5 and 1.0 mm of the radiographic apex, and all visible canals were treated with a coronal restoration that was clinically and radiographically determined to have well-sealed margins). All teeth had preoperative radiographic evidence of a periapical lesion at least 3 mm in diameter. The treatment was performed by endodontic residents at the University of Maryland School of Dentistry from 2011 to 2014. Teeth must have had a favorable periodontal prognosis (not >5 mm loss of attachment). Only the first treated tooth that met the criteria per patient was included.

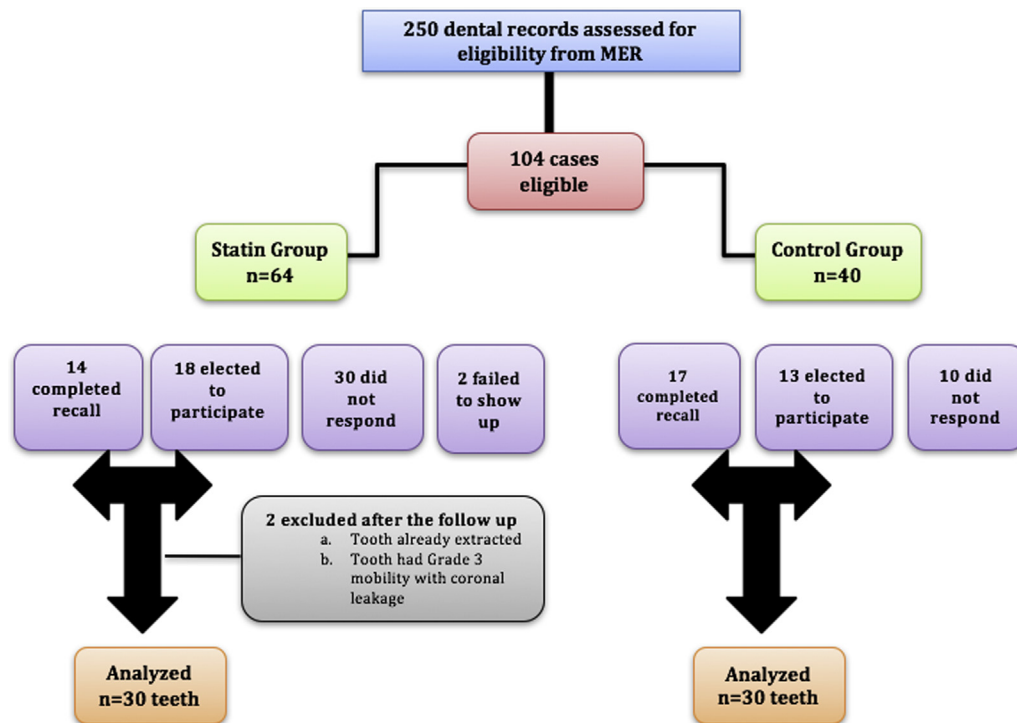
Patients were excluded if they were taking any medications known to alter bone metabolism such as hormone replacement therapy, immunosuppressive drugs, corticosteroids, selective serotonin reuptake inhibitors, tumor necrosis factor blockers, intravenous bisphosphonates, and/or antiresorptive treatment or if they discontinued their statin medications more than 1 year before the follow-up examination.

Two hundred fifty endodontic records fulfilled these inclusion and exclusion criteria for patients on statin medications and patients who were not on statins. A total of 64 patients who were on statin medications met the inclusion criteria. The control cases included 40 patients who were randomly selected using a random sequence list generator (<https://www.random.org>) that met the inclusion criteria but were not taking statins. For patients who met the study's inclusion criteria and completed a follow-up examination 2 to 5 years posttreatment, data were collected from the Maryland Endodontics Record, and a Health Insurance Portability and Accountability Act of 1996 waiver and waiver of consent were applied to them. Patients who had not yet completed a follow-up examination 2 to 5 years posttreatment were contacted through mail and then phone (if needed) and were invited to schedule an appointment for a follow-up examination.

A standard recall examination was performed, including radiographic examination, as well as updating of the medical history and the list of medications. For the tooth treated, a clinical examination including percussion, palpation, and periodontal probing was performed. Also recorded were the patient's age, sex, number of months since completion of the endodontic treatment, type of treatment (whether initial or retreatment), and type of tooth (single rooted or multirrooted). Information recorded from dental records and office visits was reconciled to ensure that all required data were collected.

### Analysis of Images

Two experienced board-certified endodontists, both with over 20 years of experience, underwent a calibration exercise by assessing



**Figure 1.** The flowchart for patient recruitment and treatment.

Download English Version:

<https://daneshyari.com/en/article/8951544>

Download Persian Version:

<https://daneshyari.com/article/8951544>

[Daneshyari.com](https://daneshyari.com)