Prevalence of Periapical Rarefying Osteitis in Patients with Rheumatoid Arthritis

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Abstract

Introduction: The effect of rheumatoid arthritis (RA) on the healing and pathophyisiology of apical periodontitis is unknown because there is no study in the literature evaluating the association of RA with the prevalence of periapical rarefying osteitis (PAR) and endodontic treatment. Therefore, the goal of this cross-sectional study was to evaluate the prevalence of PAR and root canal treatment in RA patients when compared with controlled individuals. **Methods:** Full-mouth radiographs of 131 individuals with RA were examined and compared with 131 controls that were sex and age matched exactly with the diseased group. The total number of teeth, presence or absence of root canal filling, quality of root canal filling, quality of restoration, and periapical status were recorded. **Results:** Overall, the prevalence of teeth with PAR was 3.96% in the diseased group and 3.53% in the control group ($P > .5$). The prevalence of root canal–treated teeth was 6.2% in the RA group and 5.6% in the control group ($P > .5$). Controls have significantly more teeth than those with RA ($P = .027$). **Conclusions:** The prevalence of PAR and endodontic treatment was not significantly different in individuals with RA compared with control patients. *(J Endod 2017;■:1–4)*

Key Words

Apical periodontitis, periapical rarefying osteitis, rheumatoid arthritis, root canal treatment

Significance

This is the first study in the literature that has evaluated the possible link between rheumatoid arthritis and the prevalence of periapical rarefying osteitis.

Rheumatoid arthritis (RA) is an autoimmune disease characterized by chronic inflammation and joint destruction. It affects 1%–2% of the population, and it is more prevalent in women than in men by a 3:1 ratio (1). The exact cause of the disease is still undetermined; however, it is believed to be caused by a combination of genetics, autoimmunity, and infectious agents (2).

Suppressed wound healing and increased infection rates are known complications of RA (3), and although controversial, vasculitis has been suggested as a possible cause for the delayed healing (4). In some clinical studies, an association has been suggested between RA and periodontitis (5–9). Dissick et al (8) and Käber et al (5) found a higher frequency of periodontal disease in RA patients compared with controls, and Mercado et al (6) reported a very high prevalence (62.5%) of advanced periodontitis in patients with RA. Dysregulation of the inflammatory mechanism has been proposed as a possible link between the 2 conditions (10).

Periodontal and endodontic diseases share similarities regarding their pathogenesis (11). They also have an intimate relationship considering the similar embryologic origin of pulp and periodontal ligament and their anatomic contact (12). However, the effect of RA on the healing and pathophysiology of apical periodontitis is unknown because there is no study in the literature evaluating the association of RA with the prevalence of periapical rarefying osteitis (PAR) and endodontic treatment. Therefore, the goal of this cross-sectional study was to evaluate the prevalence of PAR and root canal treatment in RA patients when compared with control individuals.

Materials and Methods

This retrospective study was approved by the Institutional Review Board of the Texas A&M University College of Dentistry, Dallas, TX (#2016-0463). Electronic patient records were used, and the study subjects were selected from a patient pool who presented for routine dental care to Texas A&M College of Dentistry. A comprehensive electronic search was performed to select the test and control patients. Inclusion criteria for the test group were as follows:

1. Patients with self-reported RA
2. Patients at least 18 years old
3. Patients with digital panoramic and a full-mouth series of periapical radiographs.

Controls were sex and age matched exactly with the test group so that the same numbers of individuals without RA were included in the control group for each decade

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of life. Patients with self-reported diabetes type I or type II and/or a history of smoking were excluded from both the test and control groups.

Radiographic analysis was performed by 2 endodontists; the following data were recorded and evaluated for each patient: age, sex, total number of teeth, presence or absence of root canal filling, quality of root canal fillings, quality of restoration, and periapical status. Digital periapical radiographs were viewed on a 23-inch Optiplex 9010 monitor (Dell, Round Rock, TX) with a resolution of 1920 × 1080 in a darkroom. The 2 examiners were calibrated based on the criteria and variants established before their evaluation. All radiographs were analyzed simultaneously to reach a consensus for the interpretation of the radiographic findings.

Periapical status was evaluated according to the periapical index (PAI) scoring system (13). PAI scores were dichotomized as the presence or absence of PAR (14). The absence of PAR was defined as follows: the width of the periodontal ligament space was within normal limits (15), and there was no break in the continuity of the lamina dura (PAI scores 1 and 2). PAR was defined as widening of the periodontal ligament, a break in the lamina dura, and/or periapical tissues in accordance with PAI scores of 3 to 5. Multirooted teeth were categorized according to the root with the highest score.

In addition, the number of total teeth present, the number of root canal–treated teeth, the quality of root canal filling, and the quality of coronal restoration were recorded. The same criteria as in previous studies were used to evaluate the quality of obturation and restoration (16, 17). Root canal fillings were judged adequate when all the canals were obturated with no voids visualized in the obturation and no gaps present between the filling and the canal wall and root fillings ended between 0 and 2 mm from the radiographic apex. In multirooted teeth, the root with the most inadequate filling was used. Coronal restoration was classified as adequate when the restoration was radiographically intact and had no signs of recurrent carries or open margins.

SPSS 22.0 (SPSS Inc, Chicago, IL) was used for data analysis. The study outcomes were reported as frequency/percentage and compared between the groups using the Pearson chi-square test or the Fisher exact test (where appropriate). A *t* test was used to determine if the mean age between the groups differed significantly. The level of significance adopted was 5% ($P < .05$).

Results

One hundred thirty-one patients (112 women and 19 men) with RA ranging from 22–83 years old (mean = 56.52, standard deviation = 13.878) were identified as eligible for this study (Table 1). The control group consisted of 131 subjects (112 women and 19 men) ranging from 24–83 years old (mean = 56.14, standard deviation = 12.675). The difference was not statistically significant ($P > .05$). The controls had significantly more teeth than those with RA ($P < .05$). The average number of teeth per individual was 24.9 in the test group and 25.9 in the control group. Overall, the prevalence of teeth with PAR was 3.96% in the diseased group and 3.53% in the control group ($P > .5$). The prevalence of root canal–treated teeth was 6.2% in the RA group and 5.6% in the control group ($P > .5$).

In the RA group, 62.59% of patients had at least 1 root canal–treated tooth, and of the subjects in the control group, 58.78% presented 1 or more teeth with endodontic treatment. When analyzed by subject, there was no statistically significant difference in the prevalence of root canal–treated teeth between the groups ($P > .05$). Similarly, when analyzed by tooth, there was also no statistically significant difference in the prevalence of root canal–treated teeth ($P > .05$).

PAR in 1 or more teeth was detected in 49.6% and 54.2% of patients in the test and control groups, respectively. When analyzed by subject, there was no statistically significant difference in the prevalence of PAR ($P > .05$). Similarly, when analyzed by tooth, there was also no statistically significant difference in the prevalence of PAR ($P > .05$).

In the RA group, 24.1% of the root canal–treated teeth had PAR, and in the control group 30.7% of the root canal–treated teeth had PAR ($P > .05$). The number of teeth with adequate endodontic filling in the RA group was equal to 45.81% of the root canal–treated teeth, 17.2% of which had PAR. In the control individuals, teeth with adequate endodontic filling were equal to 58.85% of the treated teeth, 19.5% of which had PAR. The differences between the groups were not statistically significant regardless of the quality of coronal restoration. However, in the control group, the prevalence of PAR was higher in the teeth with inadequate endodontic filling ($P < .05$).

TABLE 1. Prevalence of Periapical Rarefying Osteitis (PAR) in Patients with Rheumatoid Arthritis

	Rheumatoid arthritis	Control	
	131 (112 F, 19 M)	131 (112 F, 19 M)	*P* value
Mean age (y)	56.52	56.14	.232
Patients with PAR, *n* (%)	65 (49.6)	71 (54.2)	.458
Teeth	3260	3395	.027*
Teeth with PAR, *n* (%)	129 (3.96)	120 (3.53)	.364
Patients with RCT, *n* (%)	82 (62.59)	77 (58.78)	.527
RCT teeth, *n* (%)	203 (6.2)	192 (5.6)	.324
RCT teeth with PAR, *n* (%)	49 (24.1)	59 (30.7)	.142
Adequate RCT	93 With PAR 16 (17.2%) Without PAR 77 (82.8%)	113 With PAR 22 (19.5%) Without PAR 91 (80.5%)	.676
Adequate RCT and crown	69 With PAR 10 (14.5%) Without PAR 59 (85.5%)	92 With PAR 17 (18.5%) Without PAR 75 (81.5%)	.503
Adequate RCT and inadequate crown	24 With PAR 6 (25%) Without PAR 18 (75%)	21 With PAR 5 (23.8%) Without PAR 16 (76.2%)	.926
Inadequate RCT	110 With PAR 33 (30%) Without PAR 77 (70%)	79 With PAR 37 (46.8%) Without PAR 42 (53.2%)	.018*

F, female; M, male; PAR, periapical rarefying osteitis; RCT, root canal treatment.

* Indicates significance.