

The Effect of Endodontic Infection on the Pathogenesis of the Systemic Disease: A Systematic Review and Meta-analysis

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ABSTRACT

Objective: The results showed that a few systemic disorders might impact endodontic healing. A systematic review can complete such analyses to investigate endodontic infection and cardiovascular disease thoroughly. This systematic review and meta-analysis aimed to evaluate the effect of Endodontic Infections on Cardiovascular Disease.

Method: Our search strategy was to screen the relevant articles on the electronic databases of Google Scholar, MEDLINE, Cochrane Library, PubMed, ISI, and Embase, published from January 2005 to January 2020. The management of electronic titles was performed using Endnote X9 software. The main keywords for the search process included "Cardiovascular disease OR CVD", "LEO", "Endodontics", "Endodontic Infections" "dental evaluations", "missing teeth", "apical lesions", "bone loss". The current systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.

Results: Electronic and manual searches resulted in 53 relevant titles and abstracts. Eventually, five publications were eligible for the inclusion criteria required for this systematic review. The risk ratio (RR) was 1, and the 95% certainty interval (CI) was 3.56-15.87; the obtained very low certainty indicated that the lesion of endodontic origin (LEO) might impact Cardiovascular disease (CVD) improvement.

Conclusion: Endodontic Infection may or may not exert a few effects on systemic Cardiovascular disease (CVD), and there was a low level of proof.

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INTRODUCTION

Cardiovascular disease (CVD) could be an infection lesson involving the heart, blood veins, and arteries. For example, coronary artery disease (CAD) includes myocardial infarction and angina,¹ and Endodontics deals with dental pulp and tissues around the tooth roots.² In a past systematic review, a relationship was found between a few systemic diseases and the pathogenesis of endodontic diseases.³ The creators, at that point, reported another systematic review regarding the association between endodontic treatment results and systemic diseases.^{4,5} The results detailed that a few systemic diseases may impact endodontic healing results. A systematic review can complete such analyses to investigate endodontic infection and cardiovascular disease thoroughly. This systematic review and meta-analysis aimed to evaluate the effect of Endodontic Infections on Cardiovascular Disease.

METHOD

Search strategy

Our search strategy was to screen the relevant articles on the electronic databases of Google Scholar, MEDLINE, Cochrane Library, PubMed, ISI, and Embase, published from January 2005 to January 2020. The management of electronic titles was performed using Endnote X9 software. The main keywords for the search process included "Cardiovascular disease OR CVD", "LEO", "Endodontics", "Endodontic

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Infections” “dental evaluations”, “missing teeth”, “apical lesions”, “bone loss”. The current systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.⁶

Surveying the Quality of Included Articles

The accuracy of obtained data in this systematic review was determined using the Newcastle-Ottawa Quality Appraisal Shape for Cohort Considers evaluating the risk of bias, the Oxford Systematic Review Examination Sheet, Basic Examination Skills Program, and the Reviewing of Proposals Assessment, Advancement, and Assessment system to review the proof.

Inclusion Criteria

1. Cohort and RCT studies
2. English language
3. Study with the control group
4. Studies that reported medical outcomes based on laboratory or clinical measurements.

Exclusion Criteria

1. Case-series
2. Case-control
3. Cross-sectional
4. Cell culture laboratory
5. Animal investigations

Data Extraction and method of analysis

Comprehensive Meta-Analysis Stata Version 14 software was used to draw the Forest plots.

RESULTS

Electronic and manual searches resulted in 53 potentially relevant titles and abstracts. The initial phase of selecting the study based on title and abstract led to the deletion of 13 publications. Within the moment phase, the full text of the remaining 29 articles was reviewed completely. In total, 24 articles were deleted due to ineligibility. Eventually, five

publications were eligible for this systematic review (Fig. 1). All these five eligible articles in this systematic review were with respect to CVD (Table 1). The quality of enrolled articles was assessed to possess a high risk of bias (Table 2). Two studies experienced meta-analysis for the subjective blend (Table 3). The risk ratio (RR) was 1, and the 95% certainty interval (CI) was 3.56-15.87; the obtained very low certainty indicated that the LEO might impact the improvement of CVD (Figure 2). This result showed that Endodontic Infection may or may not exert a few effects on the systemic CVD, and there was a low level of proof.

DISCUSSION

In this systematic review and meta-analysis, the total quality of enrolled eligible articles showed a high risk of bias. Generally, low-to-very low certainty was found in the quality of the evaluations, meaning that the genuine impact can be significantly more distinctive than the estimated impact. In the current systematic review, the creators centered on longitudinal cohort research, as such epidemiological investigations are regarded common in case-control or cross-sectional consider, so the transient affiliation suggesting causality can be proposed. Several considers have assessed CVD affiliation with AP by assessing the oral health mode of CVD subjects.^{11, 12}

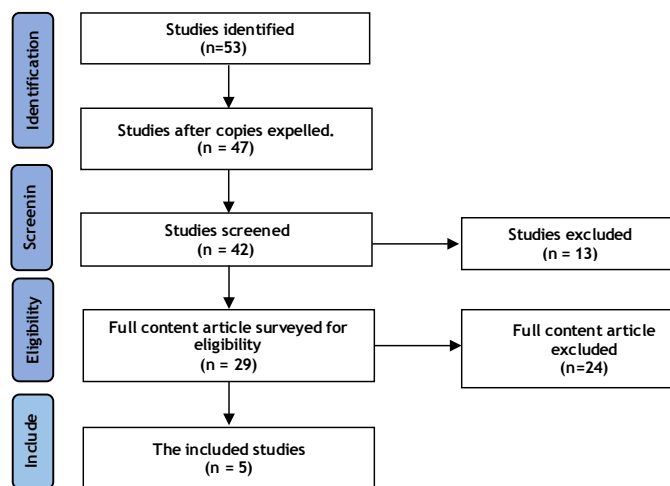


Fig. 1: Study Attrition Diagram

Table 1: Details of Selected studies according to inclusion criteria

Study/year	Sort of disease	Follow-up time	Assessment	Sample size	Control
Chauhan et al., 2019 ⁷	free of periodontal disease, cardiovascular disease (CVD), and other traditional cardiovascular risk factors.	NA	All participants had a complete physical and dental examination, echocardiography, ultrasound evaluation of FMD of the correct brachial artery, and c-IMT.	120	60
Gomes et al., 2016 ⁸	cardiovascular disease	17.4 y	Completed medical and dental assessments of members were detailed with an incident of cardiovascular disease	278	278
Liljestrand et al., 2016 ⁹	cardiovascular disease	NA	patients who had coronary angiography and an extensive clinical and radiographic oral examination.	508	508
Inchingolo et al., 2014 ⁴	Oxidative stress	3 mo	The biological antioxidant potential test and the identification of reactive oxygen metabolites test were used to determine the levels of oxidative stress.	33 + 103 = 136	103
Caplan et al., 2006 ¹⁰	cardiovascular disease	24 y	Time of first cardiovascular disease	708	708

Table 2: Risk of bias in all included studies

Study/year	Fundamental result	Choice bias	Discovery bias/ comparability	Detailing bias/outcome	Bias risk
Chauhan et al., 2019[7]	risk of cardiovascular disease	High	High	High	Moderate
Gomes et al., 2016[8]	risk of cardiovascular disease	Low	Low	High	Moderate
Liljestrand et al., 2016[9]	risk of cardiovascular disease	Low	Low	High	Moderate
Inchingolo et al., 2014[4]	Patients with injuries had higher levels of systemic oxidative stress than the gather without injuries.	High	High	High	High
Caplan et al., 2006[10]	Time of first cardiovascular disease determination and compared with after dental treatment	Low	Low	High	Moderate

Table 3: Risk ratio in included studies

Study	Risk of bias	95% Conf. Interval		% Weight
		Lower	upper	
Caplan et al., 2006 ¹⁰	4.254	3.566	5.08	65.12
Gomes et al., 2016 ⁸	9.207	6.54	12.96	25.75
Inchingolo et al., 2014 ⁴	8.730	4.80	15.87	9.13

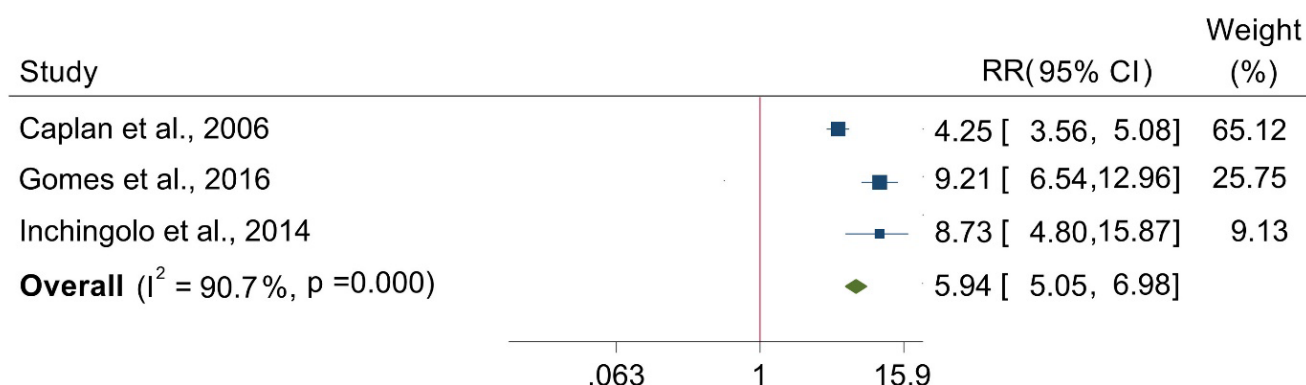


Fig. 2: Forest plots Heterogeneity chi-squared = 21.41 (d.f. = 2), p = 0.000, I² (variation in RR attributable to heterogeneity) = 90.7%, Test of RR=1: z= 21.64 p = 0.000.

Based on the findings, greater endodontic root injuries were found in CVD subjects. The most impediment to such investigations was patients' CP nearness, which was probably a central confounding factor influencing the outcomes. Chauhan et al. performed an exhaustive periodontal examination for patients, and those with periodontitis were omitted.⁷ Three studies evaluated patients with AP who were free of any chronic oral infection for the presence of CVD risk factors,^{4, 13, 14} which revealed a positive affiliation. Such findings are substantial because of free from perplexing components, and suitable interventions can be carried out if the patient is at risk for CVD. In work by Caplan et al., the incidental LEO was significantly linked with the subsequent CHD in younger but not in older men, in line with the previous investigation on the risk of CHD and periodontal inflammation.¹⁰

CONCLUSION

In conclusion, Endodontic Infection may or may not exert a few effects on systemic CVD. There was a low level of proof. Longitudinal investigations would be required to create this causality claim.

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Authorship contributions

Samira Jamali: Conceptualization, Methodology, Formal Analysis, Investigation, Writing - Original Draft, Writing - Review and Editing and Visualization.

Elnaz Mousavi: Data analysis, Methodology, Writing - Original Draft and Writing - Review and Editing.

Sepideh Behzadi: Writing - Review and Editing.

Golchin Jabbari: Validation and Writing - Review and Editing.

Ali Eslambol Nassaj: Validation and Writing - Review and Editing.

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Ethical approval

In this systematic review and meta-analysis article is not applicable.

Informed Consent

In this systematic review and meta-analysis article is not applicable.

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