

Oral Hygiene and Cardiovascular Diseases: A Systematic Review

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ABSTRACT

Background: Major degree of tooth loss in adults is caused by spectrum of periodontal diseases and dental caries. Therefore, edentulism can be regarded as markers of past periodontal disease and caries. Literature from the recent data has highlighted extensive interest of the researchers in establishment of possible link between dental disease, specifically periodontal disease, and cardiovascular disease. In adults, added inflammatory burden might be produced by the oral diseases, which further may lead to increased levels of cardiovascular risk. Hence; in the present paper, we aim to highlight some of the important aspects and associative factors between oral hygiene and cardiovascular diseases.

Keywords: Cardiovascular, Dental, Oral hygiene.

INTRODUCTION

Cardiovascular and periodontic diseases square measure common inflammatory conditions within the human population. In arterogenesis, inflammation plays a nonstop role from epithelium cell expression of adhesion molecules to the event of the fatty streak, established plaque, and at last plaque rupture. Exposure to infections like periodontic disease (PD) are postulated to continue inflammatory events within the arterogenesis. Cardiovascular disease (CVD) accounts for twenty ninth of deaths worldwide and ranks the second leading reason behind death once infectious diseases. Artherosclerosis, that could be a major part of CVD affects one in four persons and contributes to thirty ninth of deaths annually within the us. A link between oral health and upset has been projected for over a century.^{1,2}

ORAL CAVITY AND CARDIOVASCULAR DISEASES

Some scientific studies have shown a link between infections of the mouth and coronary artery disease.

In one such study, Mattila and colleagues compared patients who had experienced a myocardial infarction, or MI, with healthy control subjects. They found that after adjusting for age, socioeconomic status, smoking, serum lipid levels and diabetes, dental health (as measured by the Total Dental Index) was worse in subjects who had experienced an MI. In another study by Mattila and colleagues, a statistically significant association was found between dental infections and atheromatosis. In examining the effects of different oral infections on the incidence of strokes, Grau and colleagues⁶ re-examined the Total Dental Index and found that only the periodontal component of the index was responsible for the association between oral infection and cerebrovascular ischemia (stroke).^{3,4}

Periodontal illness is a typical unending provocative condition portrayed by devastation of the tooth supporting structures because of bacterial contamination. The pervasiveness of periodontal illness is high in the grown-up populace of developed nations. In the USA, the Center for Disease Control and Prevention announced that somewhere in the range of 2009 and 2010, one in

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each two grown-ups more than 30 years had periodontal pathology. In Australia, the commonness rates of periodontitis ranges from 35–53% for those matured over 45 years. Periodontal illness is viewed as a multifactorial condition where the nearness of anaerobic gram-adverse microscopic organisms, the individual's safe components and hereditary inclination are accepted to play a vital part. Contributing risk factors incorporate a quickly maturing populace, and in addition way of life factors, for example, tobacco habit, poor nourishment and stress. Another concerning factor is that in many creating and some created nations where periodontal wellbeing is unsuitable, the concentration by dental experts is fundamentally on treating the condition instead of on avoidance periodontal disease.^{5,6}

Throughout the most recent decade there is expanding proof connecting periodontal infection with CVD and its unfavorable results. A few examinations have shown that provocative procedure response in atherosclerotic sores might be the connection between periodontal infection and CVD. The present view is that periodontitis prompts passage of microscopic organisms into the circulatory framework which thus initiates a host incendiary reaction bringing about worsening, development and, at last, atheroma arrangement in this way expanding the danger of CVD. One investigation found that among those with built up coronary illness, periodontal infection improved the probability of a repetitive coronary occasion by about 1.5 times. A joint accord report of the European Federation of Periodontology and American Academy of Periodontology reasoned that the confirmation supporting an expanded hazard for future CVD among those with periodontal sickness was solid and that the affiliation was autonomous of other cardiovascular hazard factors.^{7,8}

CLINICAL STUDIES

Najafipour H et al determined the association between some oral health status as a risk factor for cardiac diseases and other cardiovascular disease (CVD) risk factors in a sample of Iranian population in 2011. The study recruited 5900 inhabitants who aged 15–75 years old of Kerman city through a population based cluster sampling. Having collected

informed consent, participants were interviewed for CVD risk factors. Some oral health indicators such as DMFT, Gingival Inflammation index, and Community Periodontal Index were assessed. The association between oral health indices and CVD risk factors was tested using multivariate regression models. The mean age of participants was 33.5 years, and 45.1% were male. Moderate gingival inflammation was observed in 67.6% of participants. Presence of sub- or supragingival calculus was more common (90%) in participants. Older age (RR from 2.7 to 3.88), cigarette smoking (RR = 1.49), and high blood glucose (RR = 1.41) showed an increased risk for oral diseases after adjustment for different covariates including established CVD risk factors. The study results showed an increase in periodontal diseases in the presence of some CVD risk factors.⁹

Shetty D et al assessed the association and relationship between oral hygiene status of individuals with cardiovascular diseases and its associated risk factors. A simple random sampling was carried out in 200 inhabitants of Western Uttar Pradesh, India. An oral health visit and examination was made for an equal number of males and females of different age groups with cardiovascular diseases. Evaluation of the oral status was made by means of an oral hygiene index, community periodontal index of treatment needs and loss of attachment. Evaluation of oral status in patients with cardiovascular diseases and in the control group has shown a statistically significant low level of oral health in patients with cardiovascular diseases as compared to control. Prevalence of systemic diseases in different age groups significantly correlated with the prevalence of severe periodontal diseases.¹⁰

Mathews MJ et al investigated potential pathogenetic pathways linking periodontal disease to CHD (Coronary heart disease) biomarkers. The integrated model was created to provide insight into possible higher-order biological interactions underlying CHD and periodontal disease. In order to simplify these interactions a novel 'connection graph' was developed. It quantitatively illustrates the relationship between periodontal disease and various serological biomarkers of CHD. The pathogenesis of periodontitis shows various possible pathways which could link periodontitis to

CHD pathogenesis. An integrated model of CHD was developed which provides a summary of the potential CHD effects of periodontal disease.¹¹

Holmlund A et al determined whether oral health is uniformly associated with three different cardiovascular diseases (CVDs), including myocardial infarction (MI), stroke, and heart failure (HF), which has not been studied previously. A full mouth investigation was performed in 8999 individuals referred to a specialized periodontology clinic between 1979 and 2012. The number of deepened pockets (NDP), number of teeth (NT), and bleeding on probing (BOP) were investigated. Incident CVD diagnosis was obtained from the Swedish cause of death and the hospital discharge registers. During a median follow-up time of 15.8 years (153,103 person years at risk), 1338 incident cases of fatal/non-fatal CVD occurred (672 fatal/non-fatal MI, 545 stroke and 302 HF). When NT, BOP and NDP were all included in the same model with age, sex, smoking, calendar time, and education level, NT and NDP, but not BOP, were significantly related to future CVD (combined endpoint, $p = 0.0003$ for NT and $p = 0.007$ for NDP). In similar analyses of 3 separate CVD outcomes, NT was significantly related to MI, with an incidence rate ratio (IRR) for a given interquartile range change of 0.90 (95% CI 0.82-0.99) and to HF, with an IRR of 0.87 (95% CI 0.77-0.99). However, NT was not significantly related to stroke. BOP and NDP were not significantly related to any of the three separate CVD outcomes. Oral health, mainly represented by NT, was related to incident MI and HF, but not to incident stroke.¹²

VanWormer JJ et al examined the degree to which an oral hygiene index was associated with CVD and T2D risk scores among disease-free adults in the Survey of the Health of Wisconsin. All variables were measured in 2008–2010 in this cross-sectional design. Based on toothbrushing and flossing frequency, and oral hygiene index (poor, fair, good, excellent) was created as the primary predictor variable. The outcomes, CVD and T2D risk score, were based on previous estimates from large cohort studies. There were 712 and 296 individuals with complete data available for linear regression analyses in the CVD and T2D samples, respectively. After covariate adjustment, the final model indicated that participants in the excellent

($\beta \pm SE = -0.019 \pm 0.008$, $p = 0.020$) oral hygiene category had a significantly lower CVD risk score as compared to participants in the poor oral hygiene category. Sensitivity analyses indicated that both toothbrushing and flossing were independently associated with CVD risk score, and various modifiable risk factors. Oral hygiene was not significantly associated with T2D risk score. Regular toothbrushing and flossing are associated with a more favorable CVD risk profile, but more experimental research is needed in this area to precisely determine the effects of various oral self-care maintenance behaviors on the control of individual cardiometabolic risk factors.¹³

CONCLUSION

Although the precise mechanisms of interaction are not clear, sufficient evidence exists to conclude that oral lesions, especially advanced periodontic pathologies, place certain patients at increased risk of developing cardiovascular disease and stroke.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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