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Post-cardiac ring insertion impact on oral and periodontal health: Review

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ABSTRACT

Coronary stent insertion is a medical procedure that aims to enhance coronary heart disease patients' cardiac blood flow. However, some studies suggest that this procedure can affect the health of the oral cavity's soft tissues and periodontals. Side effects can be caused by physiological changes after medical procedures as well as the consumption of medications such as antiplatelets and anticoagulants prescribed after the insertion of the ring. The purpose of this study is to investigate how heart ring insertion affects the condition of the oral cavity's soft tissues and periodontal by analyzing the available research results. The method used in this study was a literature review from various sources that discussed changes in the state of the mouth following the placement of a heart ring. The results showed that patients after heart band insertion were more prone to disorders such as xerostomia (dry mouth), recurrent canker sores, oral candidiasis, as well as a higher chance of developing periodontal disorders, including gingivitis and periodontitis. The main factors that contribute to this condition are the side effects of medications taken regularly, changes in the body's immune response, as well as the connection between cardiovascular disease and periodontal disease that deteriorates the patient's general health. The conclusions of this review emphasize the importance of a multidisciplinary approach between cardiologists and dentists in monitoring the oral health of patients undergoing heart ring placement. Prevention and education about oral and dental health care need to be provided to minimize the risk of further complications.

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INTRODUCTION

Coronary heart disease (CHD) is a leading cause of death, and heart ring insertion (coronary stent) is a common procedure to improve blood flow and reduce cardiovascular risks. Patients typically undergo antiplatelet and anticoagulant therapy post-procedure, but these drugs can cause side effects affecting oral and periodontal health, such as dry mouth, canker sores, oral candidiasis, and

an increased risk of gingivitis and periodontitis (Lathifah et al., 2022; Yusa et al., 2023). These issues are linked to changes in the oral microbiota, immune response, and inflammation, and there is growing evidence that oral inflammation can affect heart health (Sonpanao et al., 2023; Demarchi et al., 2023).

While the cardiovascular effects of heart rings are well-studied, their impact on oral health has received less attention. This study aims to explore how heart ring insertion affects oral and periodontal tissues and identify contributing factors. The findings are intended to help healthcare professionals, particularly dentists and cardiologists, better monitor and educate patients on oral care after heart ring placement (Erdal et al., 2021; Nyagolova et al., 2024). This research also contributes to a better understanding of the link between cardiovascular and periodontal health, improving patient care and quality of life (Padial-Molina et al., 2023; Ambarawati et al., 2024).

RESEARCH METHOD

This study conducted a literature review to explore the impact of heart ring insertion on oral and periodontal health. Using a descriptive-qualitative approach, the research analyzed previous studies to identify general patterns and factors contributing to changes in oral health following heart ring fitting (Freire et al., 2024; Gupta et al., 2022). The review focused on patients who experienced oral health changes after the procedure, examining clinical studies, meta-analyses, and case reports that specifically discussed the relationship between heart rings, oral health, and potential drug side effects (Adita et al., 2023).

RESULTS AND DISCUSSIONS

According to the study's findings, installing a heart ring significantly affects the condition of the periodontal and oral cavity's soft tissues. One of the main problems patients experience is xerostomia (dry mouth), which occurs in 65% of patients. This condition is caused by the use of antiplatelet and anticoagulant drugs that reduce saliva production, thereby increasing the risk of irritation and infection in the oral cavity. In addition, about 50% of patients experience canker sores and oral candidiasis, which is triggered by changes in the balance of the oral microflora and decreased immunity due to cardiovascular conditions (Molania et al., 2021; Basirat et al., 2023).

Other problems that are quite often found are gingivitis and periodontitis, which occur in 45% of patients. The disease is associated with increased chronic inflammation in the oral cavity, which is exacerbated by impaired blood circulation as well as the side effects of medications taken by heart patients. In addition, 40% of patients experience bleeding gums, especially those taking blood-thinning medications. This condition causes the gums to become more susceptible to irritation and injury, which can worsen periodontal health Long-term (Davris et al., 2023; Humaira et al., 2023).

Based on the data analysis findings, it is visible that oral health problems in patients after heart ring installation are quite diverse and are closely related to the treatment undergone. Therefore, special attention to oral cavity health is indispensable to prevent more serious complications. Collaboration between cardiologists and dentists is an important step in this post-medical procedure monitoring and patient care effort (Kumar et al., 2018; Dwiyanti et al., 2024).

Table 1. Display of information in table form

Oral Health Conditions	Percentage of Patients Experiencing (%)	Main Causes
Xerostomia	65%	Antiplatelet Drugs, Anticoagulants
Thrush and Oral Candidiasis	50%	Disturbance of Microflora, Decreased Immunity
Gingivitis & Periodontitis	45%	Chronic Inflammation, Poor Blood Circulation
Bleeding Gums	40%	Use of Blood Thinners

Table 2. Post-cardiac ring insertion effect on oral and periodontal soft tissue health

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
1.	(Terano et al., 2023)	2023	Quantitative, Observational (Study of Retrospective Cohorts)	1. Study Design: Retrospective cohort study 2. Sample: 157 heart valve surgery patients (Apr 2010 – Mar 2019) 3. Data Collection: Patient characteristics, systemic & oral conditions 4. Grouping: ≥20 vs. <20 remaining teeth 5. Analysis: Logistic regression with propensity score adjustment & subgroup analysis	1. The incidence of postoperative respiratory problems was greater in patients with fewer than 20 teeth.. 2. Univariate analysis showed significant differences in age, past cardiac surgery, NYHA class IV, denture use, tooth extraction, occlusal support, and periodontitis. 3. Logistic regression results: a. OR = 29.800 (p = 0.004) for <20 teeth and respiratory complications. b. Subgroup analysis: OR = 9.000 (p = 0.038).	1. Having <20 teeth is a significant risk factor for breathing issues following heart valve surgery in patients. 2. Emphasizing dental care and oral disease prevention may help reduce complications.
2.	(Ilango et al., (2023)	2023	Quantitative, Observational (Case-Control Study)	This case-control study involved 240 patients who were divided into four groups (60 patients each): 1. NP+NC (Nonperiodontitis + Noncardiac) 2. P+NC (Periodontitis + Noncardiac) 3. NP+C (Nonperiodontitis + Cardiac) 4. P+C (Periodontitis + Cardiac) The C-S subgroup includes NP+C and P+C patients undergoing CABG. The data collected included demographic variables, cardiac parameters, and periodontitis. Subgingival plaque samples (all groups) and atheromatous plaques (C-S) were examined for EBV, CMV, HSV, and PTX3 using RT-PCR and qPCR. The results are statistically analyzed.	1. There were no significant demographic differences between groups, except for age. 2. Systolic/diastolic blood pressure, LDL, and HDL was decreased and random blood sugar was greater at NP+C and P+C ($p < 0.05$). 3. PI, PPD, and CAL are higher at P+NC and P+C ($p \leq 0.05$). 4. PTX3 increased significantly in the P+C group. 5. EBV and CMV were higher in the periodontitis group (P+NC, P+C) (p = 0.000). 6. HSV is higher in the heart group (NP+C, P+C) ($p \leq 0.05$). 7. EBV and CMV in cardiac plaques increased significantly at P+C (p = 0.004, p = 0.033). 8. Oral PTX3 is closely correlated with BI, PPD, CAL (p = 0.000), as is PTX3 in cardiac plaques. 9. Logistic regression: Oral EBV was associated	1. Periodontitis is closely related to coronary heart disease (CAD)). 2. Increased EBV, CMV, and PTX3 in the P+C group showed an association of periodontal infection with CAD. 3. The development of CAD may be at risk due to periodontitis.

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
					with CAL ($p \leq 0.05$); Cardiac EBV is associated with CAL and oral EBV ($p \leq 0.05$).	
3.	(Miyauchi et al., 2022)	2022	Quantitative, Observational (Prospective Cohort Study)	76 patients with atrial fibrillation (AF) who had their left atrial appendage (LAA) removed during cardiac surgery participated in this prospective cohort research. Of the total patients, 18 had LAA thrombus, 25 had mitral valve regurgitation, and 55 had nonparoxysmal AF. Periodontitis assessment is carried out through: 1. Number of teeth left 2. Bleeding on probing (BOP) 3. Periodontal probing depth (PPD ≥4 mm) 4. Periodontal Inflamed Surface Area (PISA) Atrial fibrosis was assessed by Azan–Mallory staining on LAA samples and histological analysis. Correlation between periodontitis and atrial fibrosis was calculated, and regression analysis was performed with adjustments for age, AF duration, BMI, mitral valve regurgitation, and $CHADS_2$ score.	1. BOP ($R = 0.48$; $P < 0.0001$), PPD ≥4 mm ($R = 0.26$; $P = 0.02$), dan PISA ($R = 0.46$; $P < 0.0001$) has a positive correlation with atrial fibrosis. 2. In patients with more than 10 teeth remaining, PISA showed a stronger correlation with atrial fibrosis ($R = 0.57$; $P < 0.0001$). 3. After variable adjustment, PISA remained significantly associated with atrial fibrosis ($\beta = 0.016$; $P = 0.0002$).	1. Periodontitis is closely related to atrial fibrosis, a major factor in the development and sustainability of AF. 2. PISA, as an indicator of periodontal inflammation, remained significantly correlated with atrial fibrosis after variable adjustment. 3. One modifiable risk factor for AF may be periodontitis, therefore, dental health measures may lower the risk of AF and atrial fibrosis.
4.	(Carlsen et al., 2021)	2021	Quantitative, Cross-Sectional Study	This cross-sectional study analyzed national Veterans' Affairs (VA) dentistry data to assess the appropriateness of antibiotic administration in acute oral infections with ADA guidelines. Data were collected from January 1 – December 31, 2017,	1. Of the 470,039 dental VA visits coded as acute oral infections: a. 12% of irreversible pulpitis cases receive antibiotics. b. 17% of cases of apical periodontitis receive antibiotics. c. 28% of acute apical abscess cases receive antibiotics. 2. The median duration of	1. Most cases of apical periodontitis and irreversible pulpitis comply with the 2019 ADA criteria, although this study was conducted before the

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
				before the ADA guidelines were released (2019). Cases of acute oral infection were identified using the ICD-10-CM code, and antibiotic prescriptions from dentists within ±7 days of the visit were analyzed. Multivariate logistic regression analysis was used to identify patient variables associated with antibiotic prescribing.	antibiotic administration was 7 days, but prolonged use of antibiotics (≥8 days) was frequent (42%–49% of cases). 3. Patients at high risk (heart disease, prosthetic joints) or who undergo endodontic procedures, implants, as well as oral and maxillofacial surgery are more likely to receive antibiotics.	guidelines were published. 2. Prolonged use of antibiotics (>7 days) is still common, indicating the potential for misuse or inappropriate administration. 3. These findings suggest that the ADA guidelines could help standardize and improve antibiotic prescribing practices in dentistry.
5.	(Alim et al., 2020)	2020	Quantitative, Observational Study	This study was an observational study that evaluated the relationship between the management of postoperative C-reactive protein (CRP) levels and apical periodontitis (AP) prior to heart valve surgery. Data were collected from 91 patients who underwent heart valve surgery. Measurements are made against: a. Preoperative CRP levels b. CRP levels on the 3rd and 5th days postoperatively c. History of AP treatment and prophylactic use of antibiotics Analysis was performed using Analysis of Covariance (ANCOVA) to control for confounding factors and determine differences in CRP	1. There was no significant difference in preoperative CRP levels and CRP on day 3 between patients who had received AP treatment and those who had not ($p > .05$). 2. On day 5 postoperatively, patients who had received AP treatment showed significantly lower CRP levels than those who did not receive treatment AP ($p < .05$). 3. CRP levels on day 5 were significantly impacted by antibiotic prophylaxis as well.	1. Preoperative AP treatment may reduce postoperative systemic inflammatory responses, as indicated by decreased CRP levels. 2. A reduction in CRP following AP treatment may help to preserve heart health and lower the likelihood of consequences from heart valve dysfunction.

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
				levels based on AP treatment prior to surgery.		
6.	(Ilango et al., 2020)	2020	Quantitative, Observational Study	This study is an observational study that evaluates the prevalence of periodontal virus in individuals with and without periodontitis who have coronary artery disease (CAD). 1. Sample: 60 CAD patients undergoing coronary artery bypass surgery (CABG), divided into: a. 36 patients without periodontitis (CAD only) b. 24 patients with periodontitis (CAD + P) 2. Data collection: a. Demographic variables b. Cardiovascular parameters c. Periodontal parameters (plaque index, bleeding index, probing depth, clinical attachment rate/CAL) 3. Laboratory analysis: a. Samples of heart tissue taken during CABG surgery b. Reverse transcriptase polymerase chain reaction (RT-PCR) for the detection of periodontal viruses, including Epstein-Barr Virus [EBV], Cytomegalovirus [CMV], and Herpes	1. Groups differed significantly in age ($p < 0.05$). 2. Periodontal parameters (plaque index, bleeding, probing depth, and CAL) were significantly higher in the CAD + P group ($p < 0.05$). 3. The prevalence of periodontal virus (EBV and CMV) was significantly higher in the CAD+P group than in the CAD only group: a. EBV: 62.5% vs. 25% ($p < 0.05$) b. CMV: 75% vs. 47.2% ($p < 0.05$) 4. Logistic regression analysis showed a significant association between the presence of EBV and the severity of periodontitis (CAL) ($p = 0.046$).	1. Patients with CAD who have periodontitis are more likely to have EBV and CMV, indicating that periodontal viral infection may be a risk factor for CAD. 2. The presence of EBV in coronary artery plaques is associated with the severity of periodontitis (CAL), indicating a possible connection between heart disease and periodontal disease.

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
				Simplex Virus 4. Statistical analysis: a. Comparison between groups b. Logistic regression to evaluate the relationship between the severity of periodontitis (CAL) and the presence of EBV		
7.	(Ziebolz et al., 2018)	2018	Quantitative, Basic Science (Pilot Study)	This pilot study assessed the connection between heart tissue and periodontal bacterial DNA in patients with heart valve dysfunction (VHD). 1. Sample: 10 patients with myocardial revascularisation or aortic valve stenosis surgically indicated. 2. Perioperative Examination: a. Thorough periodontal evaluation b. Sampling of specific subgingival bacteria 3. Heart Tissue Biopsy: a. Right atrium (A) b. Left septal myocardium (M) c. Katup aorta (V) 4. Laboratory Analysis: a. The DNA of eleven periodontal bacteria can be found in oral samples and cardiac tissue (A/M/V) using polymerase chain reaction	1. All patients develop periodontitis with severity: a. 7 patients: weight b. 2 patients: moderate c. 1 patient: mild 2. Periodontal bacterial DNA is found in the atrium, myocardium, and aortic valves with different distributions. 3. Bacterial detection is more common in the atrium as opposed to the heart or valve tissue. 4. Morphological analysis reveals that extracellular inflammatory cells are migrating more. 5. IHC showed positive expression for LBP, CD68, and CD14 in the atrium and myocardium for all patients.	1. The discovery of periodontal bacterial DNA in heart tissue suggests a potential link between periodontitis and heart valve disease (VHD). 2. Inflammatory markers such as LBP, CD14, and CD68 indicate the presence of an inflammatory response that may be associated with periodontal bacterial infection in the heart tissue. 3. More research is needed to confirm these preliminary data and explore their clinical implications.

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
				(PCR). b. Lipopolysaccharide binding protein (LBP) Western blot analysis. c. Immunohistochemistry (IHC): Detection of LBP-big42, CD14 receptor, and CD68 macrophages. d. Scoring of morphological inflammation in heart tissue.		
8.	(Garbade et al., 2020)	2020	studi cross-sectional	The study included 113 healthy individuals as a control group (HC) and 128 LVAD patients who were recruited from the University Department for Cardiac Surgery at Heart Centre, Leipzig, Germany. Data is collected through: Standard questionnaire to assess dental health behavior. 1. An examination of one's dental health that counts cavities, missing teeth, and filled teeth. 2. Assessment of periodontitis according to clinical attachment loss and probing depth. 3. Measures of oral health-related quality of life (OHRQoL) use a German-language condensed version of the Oral Health Impact Profile (OHIP G14). 4. The association	1. Only 16.4% of LVAD patients use interdental hygiene kits. 2. The mean OHIP G14 score in LVAD patients was 4.96 ± 8.67, suggesting a worse quality of life associated with oral health in comparison to the control group. 3. Patients with LVAD had a higher number of missing teeth than the control group (11.91 ± 9.13 vs. 3.70 ± 3.77; P < 0.01). 4. The prevalence of periodontitis was higher in the LVAD group (41.4% compared to 27.4% in the control group; P < 0.01). 5. The need for periodontal care was high in both groups (LVAD = 84.4% vs. HC = 86.7%), but showed no significant difference (P = 0.71). 6. LVAD patients with "bridge to transplantation" therapy had a significant correlation with the need for periodontal care (OR = 11.48; P = 0.03).	1. Patients with LVAD had poorer oral health compared to the control group, characterized by more tooth loss and a higher prevalence of periodontitis. 2. The correlation between LVAD as a "bridge to transplantation" and the need for periodontal care suggests that medical factors may affect the oral health of patients with LVAD. 1. Lack of good dental hygiene habits in LVAD patients can increase the risk of cardiovascular health-related complication

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
				between dental health and LVAD-related characteristics was examined statistically using the Mann-Whitney U test, Chi-square test, and logistic regression.		s of infections.
9.	(Ding at al., 2018)	2018	Observational study	Data were collected from patients with aortic aneurysms using standard periodontal parameters, including clinical and radiographic examinations.	Patients with aortic aneurysms showed poor oral hygiene levels and more severe periodontal conditions than the control group.	There is a significant association between periodontal disease and aortic aneurysms, which suggests the need for special care for patients with this condition.
10.	(Binner et al., 2019)	2019	Cross-sectional study	Clinical evaluation of heart transplant recipients' and heart insufficiency patients' periodontal health.	Patients with heart insufficiency have inadequate oral behavior and a high need for periodontal care.	There is a strong correlation between patients with heart failure and post-transplantation patients who have poor periodontal health and their likelihood of developing new problems.
11.	(Ziebolz et al., 2021)	2021	Comparative observational study	Clinical evaluation and statistical analysis are used to compare the periodontal parameters of patients with ischaemic and dilative cardiomyopathy.	Patients with cardiomyopathy showed worse periodontal condition than healthy controls, with increased oral inflammation.	Periodontal disease is associated with cardiomyopathy severity, emphasizing the importance of periodontal care for cardiovascular patients.
12.	(Pardo et al., 2021)	2021	Pilot study	Examination of periodontal disease-causing DNA in samples of heart and oral tissue from patients having aortic valve replacement.	Periodontal bacteria were found in the patient's heart tissue, suggesting a possible role of periodontal infection in heart disease.	The link between periodontal infections and a higher risk of cardiovascular complications warrants further research.
13.	(Reichert et al., 2021)	2021	Cohort study	Monitoring individuals having coronary artery	Individuals with periodontitis are more likely to experience post-operative	Periodontitis can be a predictor factor in poor

NO.	Name	Year	Type of Research	Research Methods	Results	Significant Results
				bypass surgery to determine how periodontitis affects clinical results.	complications compared to those with better oral health.	outcomes after heart surgery, which suggests the importance of periodontal management before surgical procedures.
14.	(Ogawa et al., 2021)	2021	Prospective cohort study	Clinical evaluation and postoperative monitoring	A higher chance of postoperative problems was linked to poor dental health.	Maintaining good oral health may contribute to better surgical outcomes.
15.	(Baru et al., 2021)	2024	Clinical trial	Comparative analysis of LPRF and xenografts in maxillary sinus lift	LPRF showed comparable effectiveness to xenografts for bone regeneration.	LPRF could be a viable alternative to traditional bone grafting materials.

This study employed a literature review to examine the impact of heart ring insertion on the soft tissue health of the oral cavity and periodontal cavity. A descriptive-qualitative approach was used, analyzing previous research relevant to the topic. The focus was to identify general patterns of effects on oral health, including contributing factors (Freire et al., 2024; Gupta et al., 2022). The subjects were patients who had undergone heart ring insertion and experienced changes in oral and periodontal health. Studies included clinical research, meta-analyses, and case reports, with an emphasis on those addressing the relationship between heart ring installation and oral health, especially drug side effects (Adita et al., 2023).

Data was gathered through a systematic search of medical journals and academic sources such as PubMed, ScienceDirect, and Google Scholar, using keywords like "heart ring insertion," "oral cavity health," and "periodontal disease." The analysis used thematic analysis to categorize information into themes such as common oral disorders, risk factors, and the connection between dental and heart diseases. The study aims to provide insights for medical practitioners in managing oral health complications following heart ring insertion (Lathifah et al., 2022; Widyastuti et al., 2022).

CONCLUSION

The study reveals that heart ring insertion significantly affects oral health, increasing the risk of xerostomia, canker sores, oral candidiasis, gingivitis, and periodontitis due to antiplatelet and anticoagulant drugs, as well as circulation issues that impair tissue healing. The link between cardiovascular and periodontal diseases highlights the need for specialized oral care in heart patients. These findings emphasize the importance of collaboration between cardiologists and dentists, as well as increased patient education on oral care and regular dental check-ups. Further research with larger samples is needed to explore the relationship between heart ring placement and periodontal health and to develop effective dental care strategies. Further research is urgently needed in several key areas to evaluate the effectiveness of dental health interventions in the cardiac patient population. These studies should aim to better understand the complex relationship between oral health and cardiovascular health, and to identify the most effective and feasible interventions for improving dental care in cardiac patients.

The following areas of research are critical: Longitudinal Studies on the Impact of Oral Health on Cardiovascular Outcomes: There is a need for large-scale, long-term cohort studies that track the dental health status of cardiac patients over time to assess whether improved oral hygiene

or dental interventions lead to better cardiovascular outcomes, such as reduced rates of heart attack, stroke, and other cardiovascular events. These studies should aim to clarify the mechanisms linking periodontal disease, oral bacteria, and cardiovascular health. Randomized Controlled Trials (RCTs) of Dental Interventions: High-quality RCTs that test the effectiveness of specific dental interventions, such as periodontal treatment or oral hygiene education, in reducing cardiovascular risk factors like systemic inflammation, hypertension, and atherosclerosis, are crucial.

These trials would help establish evidence-based recommendations for dental care as part of the overall management of cardiac patients. Assessing the Role of Oral Pathogens in Cardiac Disease Progression: Research is needed to investigate the role of specific oral pathogens, such as Porphyromonas gingivalis, Fusobacterium nucleatum, and other bacteria associated with periodontal disease, in the progression of cardiovascular diseases. Studies exploring the potential for targeted treatments that address these pathogens could provide insights into how improving oral health may directly impact heart health.

Evaluating Cost-Effectiveness of Dental Interventions in Cardiac Care: Cost-effectiveness studies should be conducted to assess the financial impact of integrating dental health interventions into the management of cardiac patients. These studies would help determine whether preventive dental care or treatment reduces overall healthcare costs by preventing cardiovascular events, hospitalizations, and other complications associated with poor oral health. Exploring Patient Compliance and Barriers to Dental Care: Research is needed to identify factors that affect the willingness and ability of cardiac patients to access and adhere to dental care, including socioeconomic barriers, healthcare access, and patient attitudes.

Understanding these factors will help design targeted interventions that encourage cardiac patients to seek regular dental care. Interdisciplinary Approaches in Cardiac and Dental Care: There is a need for studies exploring the effectiveness of integrated, interdisciplinary care models that combine dental and cardiac care. Collaborative efforts between cardiologists and dentists could improve the management of both conditions, particularly in patients with complex health profiles, by aligning oral health interventions with cardiovascular treatment plans. Impact of Oral Health Education and Prevention Programs: Evaluating the effectiveness of patient education programs aimed at improving dental hygiene practices in cardiac patients is important. Research should focus on whether such programs reduce the incidence of oral diseases and, subsequently, cardiovascular events, especially in high-risk groups such as those with diabetes or advanced age.

Investigating the Impact of Dental Prophylaxis on Cardiac Surgery Outcomes: For patients undergoing cardiac surgery, particularly valve replacement or coronary artery bypass, further research is needed to evaluate whether pre-operative dental cleanings or periodontal treatment reduce post-operative complications such as infections, bleeding, or clotting, which could have implications for recovery and long-term cardiac health. By addressing these gaps through targeted research, we can gain a better understanding of how dental health interventions can directly influence the cardiovascular health of cardiac patients, ultimately leading to more effective prevention and treatment strategies.

The results of this review can inform clinical guidelines and patient education by emphasizing the integration of oral health into post-cardiovascular care. Clinical guidelines can include routine dental evaluations before and after procedures, with standardized protocols for dental screenings. Patient education modules can focus on the link between oral health and cardiovascular risks, highlighting the importance of oral hygiene in preventing complications like infections. These modules should be simple and accessible, teaching patients how to maintain oral health and recognize signs of problems. Additionally, training programs for healthcare providers can ensure they recognize the importance of dental referrals, promoting a multidisciplinary care approach. Tailored education for high-risk groups, such as patients with diabetes, can further improve oral and cardiovascular health management. Ultimately, this approach would lead to

better outcomes, fewer complications, and improved patient understanding of oral risks post-cardiovascular procedures.

References

Adita, A. K. and Dharma, W. S. T. (2023). Evaluası penggunaan obat pasıen penyakıt jantung koroner pasca pemasangan stent dı rspad gatot soebroto. Journal Borneo, 3(2), 106-117. https://doi.org/10.57174/j.born.v3i2.97

Alim, B. A., Canturk, E., & Koksal, C. (2020). The effect of treated apical periodontitis before heart valve surgery on C-reactive protein levels. Oral Diseases. https://doi.org/10.1111/odi.13554

Ambarawati, I. G. A. D., Purbasari, I. G. A. K. I., Kristanto, R., Manuaba, I. B. P. P., & Dewi, I. G. A. P. (2024). Distribution of demographic characteristics and predisposing disease in oral candidiasis patients at prof. ngoerah hospital denpasar in 2022-2023. World Journal of Advanced Research and Reviews, 21(3), 2349-2355. https://doi.org/10.30574/wjarr.2024.21.3.0674

Augustina, E. F., Setyawati, E. M., & Aghasy, A. Z. Z. (2021). Webinar dan workshop kesehatan periodontal secara digital di era pandemi covid-19 di sidoarjo. Jurnal Abdi Masyarakat Indonesia, 1(2), 407-412. https://doi.org/10.54082/jamsi.93

Baru, O., Buduru, S. D., Berindan-Neagoe, I., Leucuta, D. C., Roman, A. R., Tălmăceanu, D., Silvasan, H., & Badea, M. E. (2024). Autologous leucocyte and platelet rich in fibrin (L-PRF) – is it a competitive solution for bone augmentation in maxillary sinus lift? A 6-month radiological comparison between xenografts and L-PRF. Medical Papers and Research. https://doi.org/10.15386/mpr-2719

Basirat, M., Mirrazeghi, S. F., Soleimani, F., & Karimi, F. N. (2023). Risk factors and serum parameters associated with xerostomia in cardiac patients – a case-control study. Polish Annals of Medicine, 1-6. https://doi.org/10.29089/paom/175108

Binner, C., Wagner, J., Schmalz, G., Eisner, M., Rast, J., Kottmann, T., Haak, R., Oberbach, A., Borger, M. A., Garbade, J., & Ziebolz, D. (2019). Insufficient oral behaviour and the high need for periodontal treatment in patients with heart insufficiency and after heart transplantation: A need for special care programs? Journal of Clinical Medicine, 8(1668). https://doi.org/10.3390/jcm8101668

Carlsen, D. B., Durkin, M. J., Gibson, G., Jurasic, M. M., Patel, U., Poggensee, L., Fitzpatrick, M. A., Echevarria, K., McGregor, J., & Evans, C. T. (2021). Concordance of antibiotic prescribing with the American Dental Association acute oral infection guidelines within Veterans' Affairs (VA) dentistry. Cambridge University Press. https://doi.org/10.1017/ice.2021.78

Davris, W., Mailani, F., & Muliantino, M. R. (2023). Edukasi kesehatan terhadap kecemasan pasien pra-kateterisasi dengan diagnostik jantung koroner. Jik Jurnal Ilmu Kesehatan, 7(2), 287. https://doi.org/10.33757/jik.v7i2.724

Demarchi, L. S., Vogel, M. T., Haubert, G., & Rigo, L. (2023). Impact of xerostomia and the use of dental prosthesis on the quality of life of elderly. Brazilian Journal of Oral Sciences, 22, e237543. https://doi.org/10.20396/bjos.v22i00.8667543

Ding, F., Wu, D., Han, X., Cheng, L.-J., Sun, Z., & Lv, Y.-L. (2018). Oral hygiene and periodontal conditions in Chinese patients with aortic aneurysm. BMC Oral Health, 18(136). https://doi.org/10.1186/s12903-018-0594-3

Dwiyanti, S., Benyamin, B., Zita, M., Ole, M. R., & Wiranatha, J. (2024). Preoperative oral health screening prior to cardiovascular intervention: a case report. Journal of Medicine and Health, 6(1), 72-83. https://doi.org/10.28932/jmh.v6i1.6606

Erdal, E., Ustaoğlu, G., Karaş, Z., & Bilgin, S. (2021). Investigation of patients with coronary slow flow in terms of periodontal health status. Revista Da Associação Médica Brasileira, 67(4), 561-565. https://doi.org/10.1590/1806-9282.20201043

Freire, J. A. Y., Quezada, S. X. P., Proaño, M. G. C., & Cabezas, D. P. P. (2024). Impact of periodontal health on the risk of cardiac conditions: common factors and preventive strategies. Salud, Ciencia Y Tecnología - Serie De Conferencias, 3. https://doi.org/10.56294/sctconf2024.103

Garbade, J., Rast, J., Schmalz, G., Eisner, M., Wagner, J., Kottmann, T., Oberbach, A., Lehmann, S., Haak, R., Borger, M. A., Binner, C., & Ziebolz, D. (2020). Oral health and dental behaviour of patients with left ventricular assist device: A cross-sectional study. ESC Heart Failure, 7(2), 632–642. https://doi.org/10.1002/ehf2.12636

Gupta, K., Kumar, S., Kukkamalla, M. A., Taneja, V., Syed, G. A., Pullishery, F., … & Chaturvedi, S. (2022). Dental management considerations for patients with cardiovascular disease—a narrative review.

Reviews in Cardiovascular Medicine, 23(8). https://doi.org/10.31083/j.rcm2308261
Hamdani, R., Pramitha, S. R., & Putera, G. M. P. (2022). Gambaran kasus jaringan lunak rongga mulut di kota banjarmasin tahun 2017 – 2020. An-Nadaa Jurnal Kesehatan Masyarakat, 9(1), 49. https://doi.org/10.31602/ann.v9i1.6498
Hartanto, H. A., Arsanti, M., & Wicaksono, M. S. (2024). Penyakit gigi dan gusi sebagai penyebab penyakit jantung. Jurnal Teras Kesehatan, 7(2), 11-18. https://doi.org/10.38215/jtkes.v7i2.131
Huang, F. and Luo, Z. (2019). Cardiovascular outcomes associated with crush versus provisional stenting techniques for bifurcation lesions: a systematic review and meta-analysis. BMC Cardiovascular Disorders, 19(1). https://doi.org/10.1186/s12872-019-1070-y
Humaira, N., Mursyid, M., & Zahran, I. (2023). Kajian interaksi obat pada pasien penyakit jantung di rsud st. madyang palopo. Jurnal Surya Medika, 9(3), 66-70. https://doi.org/10.33084/jsm.v9i3.6469
Ilango, P., Mahendra, J., Mahendra, L., Cherian, S. M., Kathaperumal, K., Suresh, V., Mahalingam, A., & Abirami, T. (2020). Evidence linking the role of periodontal viruses in coronary artery disease with and without periodontitis. Journal of Periodontology. https://doi.org/10.1002/JPER.19-0704
Ilango, P., Mahendra, J., Mahendra, L., Cherian, S. M., Suresh, V., Mahalingam, A., Khanna, V. V., Vummidi, A. V., Thanigaimalai, A., & Dave, P. H. (2023). Evidence linking the association of periodontal viruses and pentraxins in periodontitis patients with coronary artery disease. Journal of Periodontology. https://doi.org/10.1002/JPER.23-0096
Kumar, A. and Rai, A. (2018). Oral health status, health behaviour and treatment needs of patients undergoing cardiovascular surgery. Brazilian Journal of Cardiovascular Surgery, 33(2). https://doi.org/10.21470/1678-9741-2017-0137
Lathifah, N., Yuwindry, I., & Zulfadhilah, M. (2022). Pengaruh efek samping obat terhadap kepatuhan penggunaan obat pada pasien penyakit jantung koroner di rsud brigjend h.hasan basry hulu sungai selatan. Journal Pharmaceutical Care and Sciences, 3(1), 38-44. https://doi.org/10.33859/jpcs.v3i1.216
Mando, R., Sigua-Arce, P., Spencer, L., & Halalau, A. (2019). Slippery stents: a case report and review of the literature describing patients with may-thurner syndrome that experienced stent migration. Case Reports in Vascular Medicine, 2019, 1-5. https://doi.org/10.1155/2019/7606727
Masriani, L. (2020). Pengaruh pemberian pendidikan kesehatan prakateterisasi jantung terhadap tingkat kecemasan pasien di instalasi pelayanan jantung terpadu rssa malang. Jurnal Ilmiah Kesehatan Media Husada, 9(1), 37-46. https://doi.org/10.33475/jikmh.v9i1.211
Miyauchi, S., Nishi, H., Ouhara, K., Tokuyama, T., Okubo, Y., Okamura, S., Miyamoto, S., Oguri, N., Uotani, Y., Takasaki, T., Katayama, K., Furusho, H., Miyauchi, M., Takahashi, S., Hiyama, T., & Nakano, Y. (2022). Relationship between periodontitis and atrial fibrosis in atrial fibrillation: Histological evaluation of left atrial appendages. JACC: Clinical Electrophysiology. https://doi.org/10.1016/j.jacep.2022.08.018
Molania, T., Shafaroudi, A. M., Taghavi, M., Ehsani, H., Moosazadeh, M., Haddadi, A., … & Salehi, M. (2021). Oral health-related quality of life (ohrqol) in cardiovascular patients referring to fatima zahra hospital in sari, iran. BMC Oral Health, 21(1). https://doi.org/10.1186/s12903-021-01756-0
Murrad, B. G., Hussein, A. F., & Al-Rashidi, R. R. (2024). Adipose cell induction under the impacted tooth and extraction facilities (clinical therapy). International Journal of Applied Dental Sciences, 10(2), 253-261. https://doi.org/10.22271/oral.2024.v10.i2d.1949
Nazir, M. A., AlGhamdi, L., Alkadi, M., AlBeajan, N., Alrashoudi, L., & AlHussan, M. (2018). The burden of diabetes, its oral complications and their prevention and management. Open Access Macedonian Journal of Medical Sciences, 6(8), 1545-1553. https://doi.org/10.3889/oamjms.2018.294
Nyagolova, A., Slavova, V., Angelova, R., Hristova, R., Tonkova, D., Tsoneva, Z., … & Georgiev, S. (2024). Periodontitis in patients undergoing coronary angiography: a cross-sectional study. Cureus. https://doi.org/10.7759/cureus.75320
Ogawa, M., Satomi-Kobayashi, S., Yoshida, N., Tsuboi, Y., Komaki, K., Nanba, N., Izawa, K. P., Inoue, T., Sakai, Y., Akashi, M., Hirata, K., & Okada, K. (2021). Impact of oral health status on postoperative complications and functional recovery after cardiovascular surgery. CJC Open, 3(3), 276–284. https://doi.org/10.1016/j.cjco.2020.10.007
Padial-Molina, M., Gonzalez-Perez, G., Martín-Morales, N., Sánchez-Fernández, E., O'Valle, F., & Galindo-Moreno, P. (2023). Periostin in the relation between periodontal disease and atherosclerotic coronary artery disease: a pilot randomized clinical study. Journal of Periodontal Research, 59(3), 446-457. https://doi.org/10.1111/jre.13229
Pardo, A., Signoriello, A., Signoretto, C., Messina, E., Tessari, M., De Manna, N. D., Rossetti, C., Carelli, M., Albanese, M., Lombardo, G., & Luciani, G. B. (2021). Detection of periodontal pathogens in oral samples

and cardiac specimens in patients undergoing aortic valve replacement: A pilot study. Journal of Clinical Medicine, 10(17), 3874. https://doi.org/10.3390/jcm10173874

Radhiyyah, H. D., Adiputro, D. L., Biworo, A., Rudiansyah, M., & Illiandri, O. (2022). Gambaran pemberian beta bloker pada pasien gagal jantung di rsud ulin banjarmasin. Homeostasis, 5(1), 69. https://doi.org/10.20527/ht.v5i1.5182

Reichert, S., Schulz, S., Friebe, L., Kohnert, M., Grollmitz, J., Schaller, H.-G., & Hofmann, B. (2021). Is periodontitis a predictor for an adverse outcome in patients undergoing coronary artery bypass grafting? A pilot study. Journal of Clinical Medicine, 10(4), 818. https://doi.org/10.3390/jcm10040818

Rozas, N. S., Tribble, G. D., & Jeter, C. B. (2021). Oral factors that impact the oral microbiota in parkinson's disease. Microorganisms, 9(8), 1616. https://doi.org/10.3390/microorganisms9081616

Siddiqui, M. U., Warner, E. D., Junarta, J., O'Neill, P., Signarovitz, D., Kanawati, E., … & Fischman, D. L. (2024). Outcomes of drug-eluting stents in comparison to bare metal stents in cancer patients with percutaneous coronary intervention: a systematic review and meta-analysis. Journal of Interventional Cardiology, 2024, 1-9. https://doi.org/10.1155/2024/3072909