

Colloquy of Apical Periodontitis and the Oral Systemic Disease: Time to Walk the Talk

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Abstract

Systemic diseases and oral diseases are closely related because they both share many associated risk factors. Apical periodontitis is an inflammatory disorder resulting from failed dynamic encounter between microbial infection of endodontic origin and subsequent host defense response. In last decade, a tide of researches and publications have established impact of untreated AP on cardiovascular diseases. Cardiovascular diseases (CVDs) are a cluster of diseases of the heart and blood vessels. Increasing awareness of the potential link between apical periodontitis and heart diseases is crucial for both healthcare professionals and the general public. This articles proposes strategies for empowering individuals to prioritise their oral health, and promote interdisciplinary collaboration to improve overall health outcomes

INTRODUCTION

Systemic diseases and oral diseases are closely related because they both share many associated risk factors. Apical periodontitis (AP) is an inflammatory disorder resulting from failed dynamic encounter between microbial infection of endodontic origin and subsequent host defense response.^[1-3] In the last decade, a tide of researches and publications has established impact of untreated AP on cardiovascular disease (CVD), pre-eclampsia, diabetes, and low birth weight of children.^[4-7] To prevent and treat oral systemic diseases efficiently, we need to fill up existing “Oral-systemic Gap.” It’s time to walk the talk. The two most common diseases affecting oral health are dental caries and periodontitis. Dental caries is the localized destruction of susceptible dental hard tissues by acidic by-products from bacterial fermentation of dietary carbohydrates.^[1] Periodontitis is a chronic inflammatory disease caused by bacterial infection of the supporting tissues around the teeth.^[2] Approximately half of all adults in the UK are affected by some level of irreversible periodontitis, which increases with age, and almost a third have obvious dental decay.^[3]

CVDs are a cluster of diseases of the heart and blood vessels. They include (i) coronary heart disease – disease of the blood vessels supplying the heart muscle; (ii) cerebrovascular disease – disease of the blood vessels supplying the brain; (iii) peripheral arterial disease – disease of blood vessels supplying the arms and legs; (iv) rheumatic heart disease – damage to the heart muscle

and heart valves from rheumatic fever, caused by streptococcal bacteria; (v) congenital heart disease – malformations of heart structure existing at birth; and (vi) deep vein thrombosis and pulmonary embolism – blood clots in the leg veins, which can dislodge and move to the heart and lungs.

AP and coronary artery disease (CAD) are two distinct medical conditions that may seem unrelated at first, but there is some research suggesting a potential association between them. Let’s take a closer look at each condition and their potential connection.

AP is a dental condition that involves inflammation and infection around the apex (tip) of a tooth’s root. It typically occurs as a result of untreated dental caries (cavities) or dental trauma. In AP, bacteria invade the pulp chamber and the root canals of a tooth, leading to the formation of a periapical lesion, which is essentially a localized abscess or inflammatory response at the root’s tip. If left untreated, AP can lead to pain, swelling, and the spread of infection to surrounding tissues. It is usually treated with root canal therapy to remove the infected tissue and seal the tooth.

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CAD is a cardiovascular condition characterized by the narrowing or blockage of the coronary arteries, which supply oxygen and nutrients to the heart muscle. The primary cause of CAD is the buildup of plaque (atherosclerosis) in the coronary arteries, which restricts blood flow to the heart. This can lead to chest pain (angina) or, in severe cases, a heart attack (myocardial infarction). Risk factors for CAD include high blood pressure, high cholesterol levels, smoking, diabetes, obesity, and a family history of heart disease.

The potential connection

Some studies have suggested a potential association between chronic dental infections, such as AP and an increased risk of CAD. The proposed mechanisms for this association include (i) inflammatory response: Chronic infections in the mouth can trigger a systemic inflammatory response. Inflammation is a known factor in the development and progression of atherosclerosis, which is a key component of CAD. (ii) Bacterial translocation: Bacteria from the oral cavity, including those associated with AP, can enter the bloodstream (bacteremia) during dental procedures or even routine activities such as chewing and toothbrushing. These bacteria might contribute to the formation of arterial plaques. (iii) Immune response: The body's immune response to chronic oral infections may contribute to endothelial dysfunction and the progression of atherosclerosis.

It is important to note that while there is some evidence suggesting a link between chronic dental infections and CAD, more research is needed to establish a definitive cause-and-effect relationship. Maintaining good oral hygiene and seeking prompt treatment for dental infections are advisable not only for oral health but also for potential broader health benefits, including cardiovascular health. Individuals with known risk factors for CAD should discuss their oral health with their health-care providers as part of their overall risk assessment and prevention strategy.

The biological mechanisms underlying the potential link between AP (a dental infection) and heart failure (a cardiovascular condition) are not fully understood, and research in this area is ongoing. However, several theories have been proposed to explain how chronic dental infections, like AP, might influence the development or exacerbation of heart failure: (i) Systemic Inflammation: AP is associated with chronic inflammation in the oral cavity. Inflammation is a known contributor to CVDs, including heart failure. The theory is that the chronic inflammatory response associated with dental infections may trigger a systemic inflammatory response that can affect the cardiovascular system. Systemic inflammation can contribute to endothelial dysfunction, plaque formation, and the progression of atherosclerosis, all of which are risk factors for heart failure. (ii) Bacterial Translocation: Bacteria from the oral cavity, including those associated with AP, can enter the bloodstream during dental procedures or even routine activities such as chewing and toothbrushing. This process, known as bacteremia, can lead to the dissemination of bacteria throughout the body, including

the heart and its surrounding tissues. In some cases, these bacteria may cause localized infections within the heart (e.g., endocarditis), which can damage the heart valves and lead to heart failure. (iii) Immune Response: The body's immune response to chronic dental infections can result in the release of inflammatory cytokines and other immune molecules. These molecules may have systemic effects, including on the heart. Inflammatory cytokines can impair cardiac function and contribute to heart failure development or exacerbation. (iv) Sympathetic Nervous System Activation: Chronic infections, including dental infections, can activate the sympathetic nervous system (the "fight or flight" response). Prolonged sympathetic nervous system activation is associated with increased cardiovascular stress and may contribute to heart failure.

It is essential to emphasize that while these mechanisms are plausible, more research is needed to establish a direct cause-and-effect relationship between AP and heart failure.

Improving oral hygiene can potentially reduce the risk of CVD in patients with poor oral hygiene. Here are several strategies to achieve this:

Regular dental check-ups and cleanings

Encourage the patient to visit their dentist regularly for check-ups and professional cleanings. These visits allow the dentist to identify and address any oral health issues promptly.

Effective brushing technique

Educate the patient on proper brushing technique, including brushing at least twice a day for 2 min each time. Emphasize the importance of brushing all tooth surfaces, including the gum line, and using a fluoride toothpaste.

Flossing

Encourage daily flossing to remove plaque and food particles from between the teeth and along the gum line. Flossing helps prevent gum disease and reduces the risk of bacterial buildup in the mouth.

Use of antimicrobial mouthwash

Recommend the use of an antimicrobial mouthwash to help reduce the bacterial load in the mouth. Mouthwashes containing chlorhexidine or essential oils can help control plaque and gingivitis.

Healthy diet

Advise the patient to maintain a balanced diet rich in fruits, vegetables, whole grains, and lean proteins. Limiting sugary and starchy foods can help prevent tooth decay and gum disease.

Limit tobacco use

If the patient smokes or uses other tobacco products, encourage them to quit. Tobacco use is a significant risk factor for both oral health problems and CVD.

Manage diabetes

If the patient has diabetes, emphasize the importance of managing blood sugar levels effectively. Poorly controlled

diabetes can increase the risk of gum disease and cardiovascular complications.

Stress management

Help the patient develop strategies to manage stress effectively, as stress can contribute to poor oral hygiene habits and increase the risk of CVD.

Medication review

Review the patient's medications to identify any that may contribute to dry mouth or other oral health issues. Adjustments may be necessary in consultation with their health-care provider.^[8-10]

Educational resources

Provide educational materials and resources on maintaining good oral hygiene and its connection to overall health, including cardiovascular health. Empowering the patient with knowledge can motivate them to prioritize their oral health.

By implementing these strategies and emphasizing the importance of good oral hygiene practices, patients with poor oral hygiene can reduce their risk of oral health problems and potentially lower their risk of CVD.

Increasing awareness of the potential link between AP and heart diseases is crucial for both health-care professionals and the general public. Here are some strategies to raise awareness:

Education campaigns

Develop educational campaigns targeting both health-care professionals and the public to increase awareness of the connection between oral health, specifically AP, and heart diseases. These campaigns can include informational materials, brochures, posters, and online resources.

Continuing education for healthcare professionals

Offer seminars, workshops, and online courses for dentists, dental hygienists, cardiologists, and other health-care professionals to update their knowledge about the relationship between oral health and CVDs. Continuing education programs can also focus on the latest research findings and evidence-based practices.

Public awareness events

Organize public awareness events such as health fairs, community seminars, and webinars to educate people about the importance of maintaining good oral hygiene for overall health. These events can include presentations by health-care professionals, interactive demonstrations, and Q&A sessions.

Collaboration between dental and medical professionals

Facilitate collaboration between dental and medical professionals to promote interdisciplinary care and holistic approaches to patient health. Encourage dentists and dental specialists to communicate with cardiologists and other health-care providers to ensure comprehensive patient care.

Media campaigns

Utilize traditional and social media platforms to disseminate information about the link between oral health and heart

diseases. Partner with media outlets to feature articles, interviews, and public service announcements highlighting the importance of oral hygiene in preventing CVDs.

Patient education materials

Provide patients with educational materials, such as pamphlets, posters, and online resources, explaining the connection between AP and heart diseases. Empower patients to take proactive steps to improve their oral health and reduce their risk of cardiovascular complications.

Screening and referral programs

Implement screening programs in dental and medical settings to identify patients at risk of both AP and heart diseases. Establish referral pathways between dental and medical providers for comprehensive evaluation and management of patients with oral health issues and cardiovascular risk factors.

Professional guidelines and recommendations

Encourage professional organizations and governing bodies in dentistry and cardiology to include guidelines and recommendations related to the association between oral health and heart diseases in their practice guidelines and protocols.

School-based education programs

Collaborate with schools and educational institutions to incorporate oral health education into the curriculum. Teach students about the importance of oral hygiene practices in maintaining overall health and reducing the risk of chronic diseases, including CVDs.

Community partnerships

Partner with community organizations, public health agencies, and advocacy groups to reach diverse populations and underserved communities with targeted oral health and CVD prevention messages.

CONCLUSION

By implementing these strategies, we can raise awareness of the potential link between AP and heart diseases, empower individuals to prioritize their oral health, and promote interdisciplinary collaboration to improve overall health outcomes.

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