Oral Health and Stroke: The Overlooked Connection and Its Implications for Comprehensive Care

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Abstract

Stroke is a major cause of death and disability in the world. While hypertension, cardiovascular diseases, etc., are well-known risk factors, the relationship between oral health and stroke is rarely discussed. Emerging evidence suggests that poor oral health, particularly periodontal disease, significantly increases stroke risk through mechanisms such as systemic inflammation, bacterial invasion, and endothelial dysfunction. This paper examines these pathophysiological processes and reviews clinical findings from epidemiological studies and intervention trials. It emphasizes the need for stroke prevention and management using a multifaceted model that includes dental evaluation as part of general health check-ups. Neurology, cardiology, dentistry, pharmacology, psychology, and physical education are the specialties that should be involved in the comprehensive care model, thereby allowing meeting all the needs of comprehensive stroke prevention and management. The conclusion highlights the need to consider oral health in stroke prevention and looks forward to continued funding and implementation of research studies as well as public health interventions to enhance patient care and, consequently, avert more stroke incidences worldwide.

Keywords

stroke, oral health, periodontal disease, multidisciplinary care, preventive medicine, comprehensive healthcare

Introduction

Cerebrovascular accident (CVA), also known as stroke, involves the sudden alteration in brain function caused by the interruption of blood flow to the brain, and continues to be a major issue in the world. Some of the familiar risk factors of stroke are hypertension, cardiovascular diseases, diabetes mellitus, and hyperglycemia; however role of oral health in stroke has not received sufficient consideration. This article explores this relationship and its implications for a comprehensive approach to stroke care.

Main Body

This review aims to:

1. Examine the pathophysiological relationship between stroke and oral health, specifically periodontal diseases.
2. Critically review the existing literature on the effects of oral health interventions on stroke outcomes.
3. Explore the feasibility of incorporating dentistry in offering stroke prevention and its management.

Literature Search:

An extensive search of the databases including Pub Med, Medline, Embase, Scopus, the Cochrane Library, and all other medical databases was done using the relevant Medical Subject Headings (MeSH terms) including “oral health,” “periodontal diseases,” “stroke,” and other related words. Also, to obtain the most up-to-date data regarding the connections between stroke and oral health, our preference was to select more recent articles and sources.

The Oral-Systemic Health Connection:

Research supports the connection between oral health and systematic diseases such as stroke. Chronic infections in the oral cavity, specifically periodontal diseases, increase systemic inflammation and endothelial dysfunction, which are key contributors to atherosclerosis and stroke.

Pathophysiological Mechanisms:

1. Inflammation: Chronic periodontitis causes low-grade inflammation that has the effect of initiating atherogenesis so patients with this danger are more prone to stroke. Most epidemiological studies have also reported that elevated levels of inflammatory markers such as C-reactive protein (CRP) and interleukin-6 (IL-6) are frequently detectable in patients with periodontitis.
2. Bacterial Pathogens: Bacterial Pathogens: Periodontal pathogens such as Porphyromonas gingivalis can spread to the bloodstream and then attach and penetrate endothelial cells, finally exacerbating the inflammation in the blood vessels and causing atherosclerotic plaque development and thromboembolism.
3. Endothelial Dysfunction: Oral infections can lead to endothelial dysfunction that decreases the protective effects of the endothelium and propels blood vessels to be more vulnerable to atherosclerotic modifications and thrombosis. Endothelial dysfunction is a step to atherosclerosis, which is the major cause of ischemic strokes.

Clinical Evidence:

Epidemiological studies showed that periodontal diseases increase the risk of stroke. Meta-analyses proved this concept. Intervention studies indicated that periodontal treatment can decrease systemic inflammation thereby reducing the risk of stroke. Notable studies have been done including large cohort analyses, they demonstrated associations between oral health and stroke risk, as well as large randomized controlled trials establishing the impact of periodontal therapy on systemic inflammation markers.

Implications for Comprehensive Care:

Stroke management requires broad cooperation of health care professionals and specialists from different departments, specifically dentists. That’s why regular consultations with dentists are crucial.

1. Neurology and Cardiology: For determining the stroke risks among the patients, neurologists and cardiologists should incorporate oral health in their examinations. We should emphasize the importance of dental checkups in the prevention of stroke incidents and reduction of stroke risk. It can be achieved by collaborative care models that help to support this integration.
2. Dentistry: Dentists can decrease the stroke risk by managing periodontal diseases. Periodontal diseases can notably increase the prevalence of systemic risk factors. It is suggested to manage regular screening for

periodontal disease and timely interventions. Dentists should also increase the knowledge of patients about the systemic implications of oral health.

3. Pharmacology: Periodontal treatments accompanied by pharmaceutical therapy can moderate systemic inflammations. It includes medications like statins and anti-inflammatory agents. Pharmacists can play an active role in educating patients and monitoring drug interactions and side effects.
4. Physical Education: Health and physical educators can indirectly take part in society's oral health improvement. They can encourage the adoption of specific lifestyles that would help in the elimination of risk factors for both periodontal diseases and stroke. Exercise and diet make up the core of physical education, which are fundamentals in the promotion of oral and cardiovascular health. Oral health education can be included as part of a health promotion strategy in programs that are effective for holistic wellness.

Increasing global awareness about the correlation between oral health and stroke is very useful for patient care and general health promotion. Thus, the integration of dental care into stroke prevention and management can improve the overall effectiveness of such interventions. The key to reducing the global stroke burden is a multidisciplinary approach with the assistance of various healthcare professionals.

Future Directions:

It should be noted that in this study we tried our best to provide the full picture of the connections between oral health and stroke, but it isn’t enough for the clarification of this title and further research and investigations are necessary. These studies should include longitudinal studies and clinical trials concerning stroke outcomes with periodontal disease treatment. Efforts toward oral health education and the use of dental facilities should be encouraged.

We would like to thank our colleagues from neurology, cardiology, dentistry, pharmacology, and physical education for their help and suggestions concerning the outlined approach to stroke treatment.
We would also like to express our respect to anyone who is making efforts to improve people’s health condition and the healthcare system.

1. Detailed Literature Search Strategy

To select and include the most valid and recent articles, the authors did an extensive literature review. To obtain the most relevant studies, the following databases were searched: Electronic databases such as PubMed, Medline, Embase, Scopus, and the Cochrane Library were searched. The search utilized the following Medical Subject Headings (MeSH) and keywords:

I. “Oral Health”
II. “Periodontal Disease”
III. “Stroke”
IV. “Inflammation”
V. “Atherosclerosis”
VI. “Endothelial Dysfunction”
VII. “Multidisciplinary Care”

Inclusion criteria:

I. Research articles and reviews released within the last five years
II. Articles in English
III. Epidemiological studies, meta-analyses, systematic reviews, and randomized controlled trials

Exclusion criteria:

I. Studies not directly related to the connection between oral health and stroke
II. Case reports and small cohort studies

2. Summary of Key Studies Reviewed

I. Sanz et al. (2020)

Title: Periodontitis and cardiovascular diseases: Consensus report

Findings: A consensus report states a connection between periodontitis and increased cardiovascular risk with an emphasis on the role of systemic inflammation.

Journal: Journal of Clinical Periodontology

II. Teeuw et al. (2017)

Title: Periodontitis as a possible early sign of diabetes mellitus

Findings: Suggested that periodontitis may be a diagnostic marker of diabetes mellitus, which is a well-known stroke risk factor.

Journal: BMJ Open Diabetes Research & Care

III. Liccardo et al. (2019)

Title: Periodontal disease: A risk factor for diabetes and cardiovascular disease

Findings: Discussed how periodontal disease is a risk factor in the development of diabetes and cardiovascular diseases and thus contributes to the stroke risk.

Journal: International Journal of Molecular Sciences

3. Clinical Assessment Tools

I. Periodontal Evaluation
   a) Gingival Index
   b) Periodontal Probing Depth
   c) Clinical Attachment Loss

II. Inflammatory Markers
   a) C-reactive protein (CRP)
   b) Interleukin-6 (IL-6)

III. Cardiovascular Assessment
   a) Carotid Intima-Media Thickness (CIMT)
   b) Ankle-Brachial Index (ABI)
   c) Echocardiography

4. Multidisciplinary Care Model

I. Neurology
   a) Integration of the oral health status into the stroke risk factors assessments.
   b) Collaboration with dental professionals for comprehensive patient evaluations.

II. Cardiology
   a) Screening and treatment of cardiovascular diseases while taking into account the oral health status.
   b) Focusing on the necessity of regular dental check-ups for cardiovascular prevention strategies.

III. Dentistry
   a) Periodic examination for periodontal diseases.
   b) Education of patients on the systematic implications of oral health.
   c) Periodontal therapy as a part of a comprehensive medical and dental approach.

IV. Pharmacology

References

a) Coordination of medication management to reduce systemic inflammation.

b) Education on the possible drug interactions and the side effects that are associated with oral health treatments.

V. Physical Education

a) Lifestyle modification that prevents risk factors associated with periodontal diseases and stroke.

b) Adoption of oral health education as a part of physical well-being programs.

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