Hormonal effect on the Periodontium: A Brief Review

Abstract
Periodontitis is a chronic bacterial infection of the supporting structures of the teeth. The host response to infection is an important factor in determining the extent and severity of periodontal disease. Periodontitis is now seen as resulting from a complex interplay of bacterial infection and host response, often modified by behavioral factors. Systemic factors modify periodontitis principally through their effects on the normal immune and inflammatory mechanisms. These systemic disorders have been documented as capable of affecting the periodontium and/or treatment of periodontal disease. In order to rationally treat and prevent periodontal disease, we need to know the etiologic agents for specific patients, and the mechanism of bacterial pathogenesis in periodontitis. In systemic diseases in which the periodontal tissues are affected as well, early detection and carefully managed therapeutics with the physician and periodontist working together may prove beneficial to the patient's general health and quality of life. In this article, we attempt to outline the effect of systemic hormones and body changes on the periodontium.

Key Words
Hormone; disease; periodontium

INTRODUCTION
Periodontal diseases include a group of inflammatory diseases characterized by progressive destruction of the periodontium. Dental plaque is the initiator of periodontal disease, but disease severity and response to treatment are determined predominantly by host-based risk factors. When dealing with periodontal problems, particularly in children and adolescents, it is advisable to establish a differential diagnosis of periodontal disease due to systemic conditions. Although specific microorganisms have been identified as putative periodontal pathogens, it has become apparent that pathogens are necessary, but not sufficient, for tissue breakdown to occur. Their presence, in fact, is a crucial factor in the onset of periodontitis, but disease susceptibility, progression, and severity as well as response to treatment is determined predominantly by host-based risk factors. These factors operate by affecting primary host defense mechanisms at the microbial-host interface (humoral immune response, polymorphonuclear leukocyte phagocytosis and killing) and the production of pro-inflammatory cytokines, prostaglandins, and matrix metalloproteinases in periodontal connective tissue. Therefore, systemic diseases and genetic disorders that affect immune function, inflammatory response, and tissue organization are considered major determinants of susceptibility and severity of periodontitis. Periodontal diseases and cardiovascular diseases Cardiovascular diseases (CVD) are a group of diseases that include congestive heart failure, cardiac arrhythmias, coronary artery disease (including atherosclerosis and myocardial infarction), valvular heart disease and stroke. CVD and periodontitis are both chronic and multifactorial diseases, and share some of their risk factors: age, male gender, lower socioeconomic status, smoking and psychosocial factors such as stress. Recently, periodontal disease (PD) has been investigated as a potential factor contributing to the onset and development of CVD. Several mechanisms that could explain this association have been investigated. The host response to the presence of periodontal pathogens may trigger the production of...
inflammatory mediators such as C-reactive protein, TNF-α, PGE2, IL-1β and IL-6, which can accelerate the progression of pre-existing atherosclerotic plaques and are related to an increased number of adverse cardiovascular events. Also, several studies demonstrated the ability of periodontal pathogens to induce platelet aggregation and the formation of atheromas.

Pregnancy and Periodontal Diseases

The first study to report the influence of poor oral health on the birth of low weight and preterm infants was performed by Offenbacher and colleagues. The etiology of preterm birth is multifactorial, but inflammation is the common pathway that leads to uterine contractions and cervical changes with or without premature rupture of membranes. Biological plausibility of the link between both conditions, periodontal disease and preterm birth, does exist and can be summarized in three potential pathways. One of them refers to the hematogenous dissemination of inflammatory products from a periodontal infection, while the second potential pathway involves the fetomaternal immune response to oral pathogens. The third pathway proposed to explain the theoretical causal relationship between periodontal disease and preterm birth involves bacteremia from an oral infection. There appears to be an association between both conditions, but whether periodontitis is a confounding factor, a marker or one of the causes of preterm birth remains unclear.

Diabetes and Periodontium

Diabetes is a group of metabolic diseases characterized by hyperglycemia and results from either a deficiency in the secretion of insulin and/or reduced insulin action. Chronic periodontal disease and diabetes mellitus are common chronic conditions in adults throughout the world. Severe periodontal disease often coexists with diabetes and is considered the sixth most common complication of the disease. A number of studies have demonstrated that poor blood sugar control may contribute to poor periodontal health and that such individuals have a 2.8-fold greater chance of developing destructive periodontal disease as well as a 4.2-fold greater chance of having progressive alveolar bone loss. The increased risk of developing periodontal disease cannot be explained by age, gender or hygiene. The interrelationship between periodontal disease and diabetes provides an example of a systemic disease predisposing individuals to oral infection and, once the infection is installed, it exacerbates the systemic disease. The interrelationship between diabetes and periodontal disease is established through a number of pathways and is bidirectional. Diabetes is a risk factor for gingivitis and periodontitis. Blood sugar control is an important variable in the relationship between diabetes and periodontal disease. Individuals who have poor control over glycemia have a greater prevalence and severity of gingival and periodontal inflammation. It has been suggested that hyperglycemia promotes periodontitis and its progression.

Periodontal Diseases and Respiratory Diseases

Respiratory diseases is the term for diseases of the respiratory system, including lung, pleural cavity, bronchial tubes, trachea, and upper respiratory tract. There is increasing evidence that a poor oral health can predispose to respiratory diseases, especially in high-risk patients (nursing home residents, older subjects, intensive care unit patients and hospitalized individuals requiring medical ventilation). The oral cavity is contiguous with the trachea and may be a portal for respiratory pathogen colonization. Dental plaque can be colonized by respiratory pathogens, which may be aspirated from the oropharynx into the upper airway and then reach the lower airway and adhere to bronchial or alveolar epithelium. There is fair evidence of an association of pneumonia with oral health, but there is poor evidence of a weak association between COPD and oral health. Improved oral hygiene and professional oral health care reduces the progression or occurrence of respiratory diseases among high-risk elderly adults.

Oral contraceptives and Periodontium

Hormones are specific regulatory molecules that have potent effects on the major determinants of the development and the integrity of the skeleton and oral cavity including periodontal tissues. It is clear that periodontal manifestations occur when an imbalance of these steroid hormones take place. Women using hormonal contraceptives can be considered to be a 'risk group' for periodontal disease, due to prolonged, sustained serum levels of oestrogens and progesterone. It is clear that endogenous sex steroid hormones play significant roles in modulating the periodontal tissue responses. A better understanding of the periodontal changes to varying hormonal levels throughout life can help the dental practitioner in diagnosis and treatment. The women under contraceptive seem to set up a group
at risk for developing a periodontal disease, it is thus necessary to systematise periodontal appraisal before and during contraceptive use period.[43]

CONCLUSION
The connection between systemic diseases and chronic destructive periodontitis (CDP) has received increasing attention in recent years. A major unanswered question is how disease in one part of the body (e.g., the joints and skeletal tissues) can transmit signals to the periodontium. Current treatment approaches available to the periodontist and dentist include: (i) antimicrobial therapy, including mechanical debridement and surgical reduction of probing depth to reduce the bacterial “load” in the periodontal pocket, combined (as needed) with topical and systemically administered antimicrobials; and (ii) host-modulation therapy (using FDA-approved, MMP-inhibitor subantimicrobial-dose doxycycline by itself or, after confirmation by additional research, using other pharmaceuticals, such as non-steroidal anti-inflammatory drugs [NSAIDs] and bisphosphonates, or combinations of these). There appears to be more than a casual relationship between serum lipid levels and systemic health (particularly cardiovascular disease, diabetes, tissue repair capacity, and immune cell function), susceptibility to periodontitis, and serum levels of pro-inflammatory cytokines. In terms of the potential relationship between periodontitis and systemic disease, further research is warranted for the better treatment of the patients.

REFERENCES
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