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Guidelines for periodontal scaling and root planing

Periodontitis is an infection and inflammation of the soft tissues and bone surrounding the teeth, caused by an accumulation of bacterial plaque and the ensuing inflammatory response. According to the Canadian Dental Association, periodontal disease is common, affecting up to 70% of Canadians at some point in their lifetimes. If left untreated, periodontitis can progress to connective tissue destruction and alveolar bone loss, causing teeth to fall out. Therefore, prevention of periodontitis is very important, and preventative measures provided by oral health care professionals include offering oral hygiene instructions (encouraging patients to brush teeth and floss regularly), and performing routine dental cleaning. Dental cleaning includes scaling, which is the mechanical removal of plaque and calculus from the teeth around the gum line. For patients who develop periodontitis, a more extensive procedure called scaling and root planing (SRP) is performed. This involves mechanical debridement of plaque and calculus down to the root of the affected teeth, and is considered the "gold standard" initial treatment for periodontitis. However, the optimal frequency of regular preventative scaling or therapeutic SRP, and the usual length of time (or number of units; one unit is defined as 15 minutes of service) to perform each procedure, is unclear. The purpose of this report is to review the evidence regarding the clinical and cost-effectiveness of scaling with or without root planing, as well as evidence-based guidelines for their use. Background: Extensive reviews on the role of scaling and root planing (SRP) in the treatment of periodontitis have been previously published. This commentary will address the importance of subgingival calculus in the progression and treatment of periodontitis and addresses factors that make the execution of a "definitive" SRP a critical part of therapy. Methods: A search for articles, using keywords relevant to the subject, (e.g., periodontitis, dental scaling, root planing, dental calculus, biofilm, inflammation) was conducted using PubMed, Ovid Medline, Cochrane Reviews and the ADA Center for Evidence Based Dentistry data bases. Additionally, references cited in relevant articles were also considered. Results: Surfaces of subgingival calculus are covered with a biofilm of metabolically active bacteria. Periodontal inflammation is clearly related to the presence of calculus and biofilm. The primary goal of SRP is removal of subgingival calculus and biofilm deposits to create a biologically compatible root surface and reduce the inflammatory burden. Current evidence suggests that inflammation associated with periodontal infections affects both the immediate oral environment and the patient's systemic health. Conclusion: SRP is still critical to the treatment of periodontitis. SRP involving deep probing depths (≥ 5 mm) and root surfaces with anatomical and surface irregularities, regardless of the type of instrumentation, requires time, exceptional skill and perseverance, and patient compliance with periodontal maintenance. Sites with persistent nonresponding probing depths and signs of inflammation following a definitive SRP, should be considered for surgical intervention. Keywords: biofilms; dental calculus; dental scaling; inflammation; periodontitis; root planing. Roughly 42 percent of all dentate U.S. adults 30 years of age or older have periodontitis Attachment and bone loss associated with periodontal disease are results of the body's immune response to plaque biofilm and its metabolic byproducts.

While associations between periodontitis and various systemic conditions and diseases have been suggested by research, evidence of causality is mixed and the strength of the evidence differs for various conditions. In 2017 the World Workshop on the Classification for Periodontal and Peri-Implant Diseases and Conditions established a classification system for periodontitis that involves staging (i.e., the severity and extent of the disease) and grading (i.e., the potential for disease progression and treatment outcome). The goal of periodontal treatment is to eliminate dysbiotic plaque biofilm from the tooth surface and to establish an environment that allows the maintenance of health. This treatment of periodontal disease can be non-surgical or surgical with the optimal treatment being based on individual patient, site, and systemic factors. NOTE: In 2017, the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP) convened panels of experts to develop a classification system for periodontal and peri-implant diseases and conditions.1 In 2018, these panels published consensus reports that described periodontal diseases including: periodontal health, gingival diseases and conditions;2 periodontitis;3, 4; and other conditions affecting the periodontium;3, 4; as well as a system describing for peri-implant diseases (peri-implant health, peri-implant mucositis, and peri-implantitis).5 This Oral Health Topic page will focus on classifications related to periodontitis. Periodontal disease is a chronic infection that can result in the destruction of tooth-supporting structures (i.e., the gingiva, periodontal ligament, and/or alveolar bone) and eventual tooth loss.6 According to analysis of data from the National Health and Nutrition Examination Survey (NHANES) collected from 2009 to 2014, roughly 42% of dentate adults 30 years of age or older in the United States have some form of periodontitis (mild, moderate or severe).7 The prevalence of periodontitis increases with age; it is significantly more common in males than in females, and in non-Hispanic Blacks and Hispanics than non-Hispanic whites.7 Periodontitis is an inflammatory disease of bacterial etiology resulting in loss of periodontal tissue attachment and alveolar bone. 8 The host response to the bacterial challenge leads to clinical signs such as deep pockets, bleeding on probing, gingival recession, and tooth mobility, which can ultimately cause tooth loss. In 2018, the American Academy of Periodontology and the European Federation of Periodontology published the World Workshop Classification System for Periodontal and Peri-Implant Diseases and Conditions, which established a new approach to diagnosing periodontal disease to replace the system developed in 1999. The current classification system was endorsed by the American Dental Association in 2021.



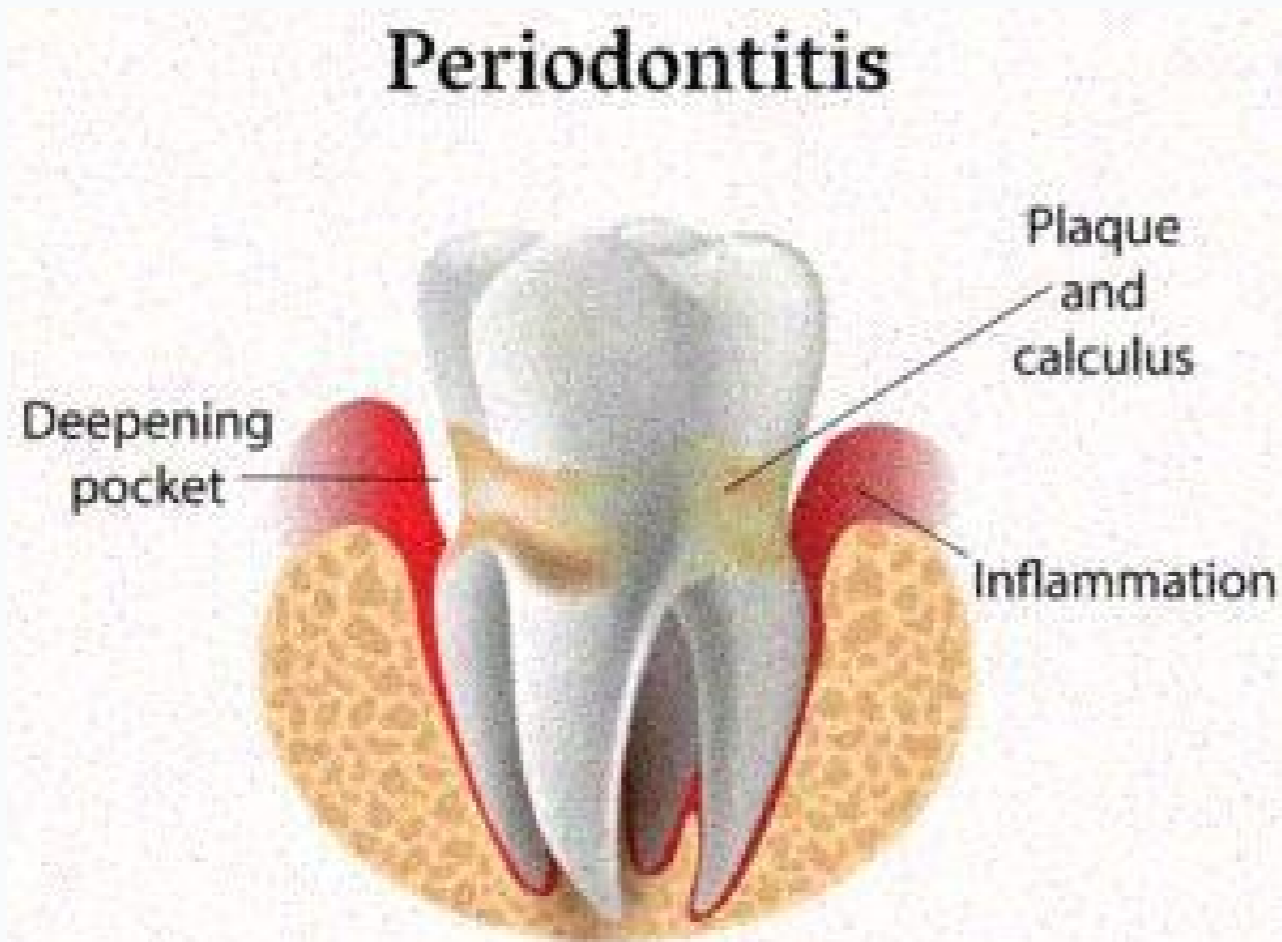
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Scaling and Root Planing

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Keywords: biofilms; dental calculus; dental scaling; inflammation; periodontitis; root planing. Roughly 42 percent of all dentate U.S. adults 30 years of age or older have periodontitis Attachment and bone loss associated with periodontal disease are results of the body's immune response to plaque biofilm and its metabolic byproducts. While associations between periodontitis and various systemic conditions and diseases have been suggested by research, evidence of causality is mixed and the strength of the evidence differs for various conditions. In 2017 the World Workshop on the Classification for Periodontal and Peri-Implant Diseases and Conditions established a classification system for periodontitis that involves staging (i.e., the severity and extent of the disease) and grading (i.e., the potential for disease progression and treatment outcome). 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In 2018, the American Academy of Periodontology and the European Federation of Periodontology published the World Workshop Classification System for Periodontal and Peri-Implant Diseases and Conditions, which established a new approach to diagnosing periodontal disease to replace the system developed in 1999. The current classification system was endorsed by the American Dental Association in 2021. Evidence of the association of periodontitis with systemic conditions is mixed (see the related Oral Health Topic page, Oral/Systemic Health). Associations, though not causal relationships, with periodontitis have been suggested for several conditions: Cardiovascular diseases: Although a causal relationship has not been established, the presence of periodontal disease has been associated with various cardiovascular diseases including myocardial infarction,9 hypertension,10 and carotid atherosclerosis.11 While research indicates a positive relationship between periodontal treatment and a short-term relationship on surrogate outcomes associated with cardiovascular disease, these studies have significant limitations and lack focus on true cardiovascular disease outcomes.12 Diabetes: Periodontal disease and diabetes are considered to have a bidirectional relationship: hyperglycemia has an effect on oral health and periodontitis has an effect

on glycemic control. A 2018 systematic review by Graziani et al. concluded that periodontitis is associated with (1) higher HbA1c levels in individuals without diabetes and in individuals with type 2 diabetes, (2) worsened diabetes-related complications in individuals with type 2 diabetes, and (3) an increased prevalence of complications in individuals with type 1 diabetes. The effect of periodontal treatment on diabetes-related parameters such as glycemic control is still inconclusive.13 Respiratory diseases: Research suggests associations between periodontitis and respiratory diseases such as asthma, chronic obstructive pulmonary disease and pneumonia, possibly due to inflammatory processes and aspiration of microorganisms from the periodontal pocket. 14 Pregnancy complications: An umbrella review of 23 systematic reviews found that periodontitis during pregnancy seems to contribute to increased risk of preterm birth, low birthweight infants and preeclampsia.15 However, there was no effect of periodontal treatment found on pre-term birth prevention. Rheumatoid arthritis: A 2020 systematic review indicates that periodontitis may increase the risk of developing rheumatoid arthritis.16 Chronic kidney disease: Although there is no evidence on causal association, studies have shown a high periodontitis prevalence in chronic kidney disease populations also demonstrating racial and ethnic disparities.17 Cancers: Periodontal disease and periodontal pathogens have been associated with cancers. 18 Dementias: Periodontitis and periodontal pathogens have been associated with dementias and Alzheimer’s Disease. 19 Notably, the 2017 system published by AAP/EFP eliminates use of the diagnostic categories “Chronic” and “Aggressive” periodontitis. These are now considered under the general category of “periodontitis,” owing to the determination that extent and severity does not distinguish these as separate disease.3 Periodontitis is categorized by signs and symptoms of inflammation and attachment/radiographic bone loss. Under the 2017 system, the current categories of periodontitis are3 Necrotizing periodontal diseases Periodontitis as a Manifestation of Systemic Diseases Necrotizing periodontal diseases feature papilla necrosis, bleeding, and pain, and are associated with impaired immune response.3 Periodontitis as a manifestation of systemic disease focuses on diseases and conditions other than diabetes (e.g. genetic disorders, neoplasms, and other metabolic and endocrine disorders).4, 20 Disease that does not meet these criteria are considered as periodontitis. Once the determination of periodontitis has been made, the disease is classified according to one of four Stages (I-IV) based upon the most severe area of disease presentation, which describe the disease severity and extent of disease, focusing on attachment and bone loss (Table 1A). The extent of disease is categorized by the extent of stage-defining destruction. After the Stage is determined, the case is assigned one of three Grades (A, B, C) that indicate the potential for disease progression and treatment outcome (Table 1B). Grading is based on supplemental considerations like direct evidence of disease progression, indirect evidence of disease progression (radiographic bone loss divided by age), smoking patterns, and diabetes and glycemic control.3 The goal of periodontal treatment is to eliminate plaque, biofilm and calculus, from the tooth surface and establish an environment that can be maintained in health.21 Treatment of periodontitis can be non-surgical or surgical. The optimal treatment is based on the patient, site and systemic factors. Non-Surgical The American Academy of Periodontology defines non-surgical treatment as the professional removal of supragingival and subgingival bacterial plaque or biofilm and calculus, which provides a biologically acceptable root surface, as well as patient adoption of a comprehensive daily plaque or biofilm control routine. 22 Non-surgical therapy includes21: Patient education and oral hygiene instruction Complete removal of supragingival calculus Restoration or temporization of carious lesions Treatment of areas where plaque and food debris can collect, including orthodontic treatment and removal of plaque retentive factors. According to ADA clinical practice guidelines on non-surgical treatment.23 derived from a 2015 systematic review.23 scaling and root planing without adjuncts is the treatment of choice for patients who have periodontitis. The guidelines go on to endorse use of systemic sub-antimicrobial dose doxycycline along with scaling and root planing for patients with moderate-to-severe periodontitis. Specifically, the guidelines recommend oral doxycycline (20 mg twice a day) for 3 to 9 months following scaling and root planing for these patients. Patients often require several treatment sessions for complete debridement of the tooth surfaces.21 After scaling, root planing, and other adjunctive treatment approaches such as use of antibiotic therapy, the periodontal tissues require approximately 4 weeks to demonstrate optimal effects of nonsurgical therapy.21 Surgical Many moderate to advanced cases require surgical access to the root surface for root planing and reducing pocket depth, which will allow the patient to achieve successful home care.21 Surgical treatment entails21: Correction of anatomic conditions that predispose the patient to periodontitis, impair aesthetics, or impede placement of prosthetic appliances Extraction of teeth that cannot be successfully treated Placement of implants when teeth are lost Surgical treatment options include24: Gum Graft Surgery: Gum graft surgery is intended to prevent further gingival (gum) recession and bone loss and to reduce sensitivity. During this procedure, tissue is taken from the palate or another donor source to cover exposed roots. Periodontal Pocket Reduction Procedures: In this approach, gingival tissue is folded back to allow for removal of disease-causing bacteria, after which the tissue is sutured back in place. This is intended to allow gingival tissue to reattach to the bone. Regenerative Procedures: These are procedures that are performed when there is bone destruction. Once again, the gingival tissue is folded back and the disease-causing bacteria are removed, after which membranes, bone grafts, or tissue-stimulating proteins are used to help promote regeneration of supporting periodontal tissues. Maintenance A patient with gingivitis can revert to a state of health with a reduced periodontium, but due to the host-related disease susceptibility, a periodontitis patient remains a periodontitis patient, even following successful therapy, and requires life-long supportive care to prevent recurrence of disease.2 Further, patients with more severe periodontitis Stage and Grade have been found to be more likely to experience disease recurrence and tooth loss without regular periodontal maintenance visits. 25 Much of the literature agrees that, after non-surgical and/or surgical periodontal treatment, patients could benefit from more frequent visits, possibly every 3-6 months.26, 27 These appointments could include a review of home oral hygiene behaviors, ascertainment of exposure to risk factors such as tobacco use, professional plaque removal, and subgingival debridement, as needed.26-28 Patients also could be assessed to determine if active therapy is needed to treat recurrent periodontal disease.27 Researchers generally agree the maintenance phase is key to allow for close monitoring of the attachment level and pocket depth along with the other clinical variables, such as bleeding, exudation, tooth mobility.21 Caton JG, Armitage G, Berglundh T, et al. 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Last Updated: June 9, 2022 Prepared by: Department of Scientific Information, Evidence Synthesis & Translation Research, ADA Science & Research Institute, LLC. Disclaimer Content on this Oral Health Topic page is for informational purposes only. Content is neither intended to nor does it establish a standard of care or the official policy or position of the ADA; and is not a substitute for professional judgment, advice, diagnosis, or treatment. ADA is not responsible for information on external websites linked to this resource. NCBI Bookshelf. A service of the National Library of Medicine, National Institutes of Health. Dental Scaling and Root Planing for Periodontal Health: A Review of the Clinical Effectiveness, Cost-effectiveness, and Guidelines [Internet]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2016 Oct 17. Evidence from two systematic reviews, 12 randomized-controlled trials, and one non-randomized controlled clinical trial showed that scaling with or without root planing, provided with or without oral hygiene instructions, were associated with improvements in periodontal outcomes across a variety of adult patient populations within three months of treatment. Exceptions to this trend were noted in patients with less severe periodontal disease at baseline and in one study of pregnant women. Three evidence-based guidelines were identified that recommend SRP for the treatment of chronic periodontitis, including specific subtypes of periodontitis. One evidence-based guideline regarding the prevention of periodontitis was identified that recommends professional mechanical plaque removal to support self-performed oral health care. Limited evidence was identified regarding the clinical effectiveness of varying frequencies or units of scaling (not including root planing) that showed no significant differences between any evaluated frequencies. Long-term studies were not identified, which makes it difficult to conclude how long the positive effects of SRP may be maintained. One evidence-based guideline was identified that recommends supportive periodontal therapy every three to six months for patients with chronic periodontitis. No evidence was identified to address the cost-effectiveness question. Copyright © 2016 Canadian Agency for Drugs and Technologies in Health. Copyright: This report contains CADTH copyright material and may contain material in which a third party owns copyright. This report may be used for the purposes of research or private study only. 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