

Episode 129 – Periodontal Therapy and Systemic Health

March 21, 2025

Introduction

Periodontitis is a chronic inflammatory disease characterized by a dysregulated host inflammatory response to dysbiotic oral biofilm that, if not effectively treated, can cause progressive destruction of the tooth-supporting tissues and eventual tooth loss. [1]

Periodontitis is the sixth most prevalent disease condition, and the main cause of tooth loss in the adult population. In 2021, severe periodontal diseases affected ~19% of the adult population worldwide, translating to over one billion cases. By 2050, it is projected more than 1.5 billion people will have severe periodontitis. [2] [3] [4]

Preventing and managing periodontal disease is critical. Evidence-based treatment of stages I to III periodontitis involves following four sequential steps.[1] [5] [6]

Treating stages I-III periodontitis [6]

Step one

Reduce inflammation by motivating clients to adopt good oral hygiene practises and a healthy lifestyle, and through professional removal of supragingival deposits.

Step two

Provide professional subgingival debridement via hand and/or power instrumentation with adjunctive therapies as required.

Step three

Administer additional complex treatments (e.g., resective, access flap, and regenerative surgery) when indicated.

Step four

Prevent relapse through long-term supportive periodontal care, healthy lifestyle, and good oral hygiene.

[1] Refer to Episode 128 for discussion on the EFP clinical practice guideline for the treatment of stage I–III periodontitis.

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Client adherence to supportive periodontal care is essential to prevent disease recurrence and progression and to minimize tooth loss. Frequent supportive visits allow:

- Review of home oral self-care.
- Assessment of risk factors, such as tobacco use and diabetes management.
- Professional plaque removal and subgingival debridement as required
- Close monitoring of the attachment level, pocket depths, bleeding, exudate, and tooth mobility to determine if active therapy is needed for recurrent periodontal disease. [6] [7] [8]

Complications and treatment errors

Nonsurgical periodontal therapy is considered minimally invasive. However, treatment complications, adverse (side) effects, and errors can happen during and following periodontal therapy. Their occurrence may occur as a consequence of single or multiple events related to the clinician and/or the client. [9] [10]

Various risk factors, complications, adverse effects, and errors can affect nonsurgical periodontal therapy and wound healing. Understanding these influences is critical for making informed decisions.[2] Furthermore, these issues can affect the results of therapy anticipated by both the clinician and the client. [9] [11]

The most common risk factors, adverse effects, complications, and errors can be categorized as client-related or clinician-related:

- Client-related risk factors include poor dental plaque biofilm control, smoking, uncontrolled diabetes, and nonadherence to supportive periodontal therapy.[3] [6] [7]
- Clinician-related complications and errors include improper treatment planning, inappropriate selection of instruments and materials, excessive trauma during treatment, improper use of instruments, as well as inadequate skills, training, and knowledge to perform periodontal therapy effectively. [9]

Many risk factors, adverse effects, and complications can be prevented or managed by proper treatment planning, timely recognition of issues, and implementing corrective measures to minimize client discomfort. [9]

Accidental errors

Throughout a clinician's professional career, it is expected there will be a gradual improvement in both their technical knowledge and clinical skills. The effective combination of these two factors enables clinicians to perform more complex procedures with greater safety and precision. However, it is important to recognize that theoretical knowledge and clinical skills should not solely determine a treatment plan since having enhanced knowledge does not always equate to improved skills, and vice versa. [11]

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[2] When discussing treatment plans and treatment options, the benefits, side effects, and consequences must be presented to clients to obtain informed consent. Refer to the CDHO Registrants Handbook for information on informed consent: https://cdho.org/wp-content/uploads/2023/07/RegistrantsHandbook.pdf

[3] Refer to Episode 129 for additional information on client-related risk factors and periodontal therapy.

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A lack of theoretical knowledge, clinical skills, or both may lead to accidental errors. Thus, to prevent accidental errors, clinicians must determine the best client-specific evidence-based treatment options and whether they have sufficient technical knowledge, clinical skills, and training to manage the case properly. [11]

Adverse events

When determining treatment options, clinicians must weigh the potential clinical benefits against the risk of adverse events, ensuring the advantages of the therapy outweigh any potential harms. The treatment plan is devised only after the clinician critically appraises the benefits and risks of the procedure and assesses the extent of their knowledge, training, and clinical skills. If the ideal treatment is outside of the clinician's expertise, the client should be referred to another clinician or specialist. [11]

Both experienced and novice clinicians will encounter adverse events during their professional practice. The challenge lies with effectively preventing these events or, if they occur, managing them appropriately. It is essential to understand that adverse events and complications can influence clients' perceptions of their treatment and potentially affect their future decisions and care. [11]

Types of complications and treatment errors

Complications and treatment errors can occur during (intraoperatively) or after nonsurgical periodontal therapy (postoperatively).

Intraoperative complications and treatment errors [9] [12] [13] [14] [15] [16] [17]

Type	Description	Management / corrective measures
Pain, discomfort	Frequently reported during nonsurgical periodontal therapy	May be reduced through anesthetic use. Injectable local anesthetic is the first choice. However, injections are associated with pain, anxiety, and fear, causing some clients to prefer mild or moderate pain during scaling and root planing to anesthesia administration. Topical anesthetic may help reduce discomfort.
Mild bleeding	Frequently reported during nonsurgical periodontal therapy	Usually managed by direct compression with gauze.
Severe bleeding	Maybe related to: -Pharmacologic treatment (e.g., antithrombotic medications)[4] -Congenital (inherited) bleeding disorders (e.g., haemophilia, von Willebrand disease)	Usually managed with compression or hemostatic use. Discontinuing antiplatelet agents is not recommended for nonsurgical periodontal therapy.[5] Consultation with the appropriate medical provider (e.g., hematologist) is generally advised before any

[4] There are two classes of antithrombotic drugs: anticoagulants and antiplatelet drugs. Anticoagulants slow down clotting, thereby reducing fibrin formation and preventing clots from forming and growing. Antiplatelet agents prevent platelets from clumping and also prevent clots from forming and growing. [73]

[5] Refer to the CDHO Knowledge Network factsheet on direct oral anticoagulants and factsheet on atrial fibrillation for information on warfarin and international normalized ratio (INR) values: https://cdho.org/knowledge-network/

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Type	Description	Management / corrective measures
	-Acquired bleeding disorders (e.g., liver disease-associated bleeding)	invasive dental hygiene procedures are performed on clients with bleeding disorders.[6]
Soft-tissue damage	Incorrect control and use of hand instruments. Dull hand instruments increase risk of instrument slippage and gingival laceration.	Ensure correct angulation and adaptation of instrument blades. Effectiveness and efficiency of hand instruments depend on frequent sharpening. Replace sharpen-free instruments when dull.
	Incorrect use of air polishers.	Follow manufacturer instructions for use. Select appropriate type of powder.
	Mucosal erosions from overheated ultrasonic tip.	Ensure adequate water flow. Do not use damaged or malfunctioning ultrasonic instruments.
Damage to prosthetic restorations	Scratches, chipping, and surface roughness from manual, sonic, or ultrasonic instrumentation.	Excessive lateral pressure should be avoided during hand and power instrumentation. Using low-power ultrasonic inserts and abundant irrigation can help minimize the risk of damage.
	Incorrect use of air polishers.[7]	Follow manufacturer instructions for use, including maintaining proper working distance and nozzle angulation. Utilize a sweeping motion.
Subcutaneous emphysema	Rare complication developing immediately or up to 6 hours postoperatively from air penetrating into the connective tissue space. Cases have been reported from the use of an air polisher. Symptoms include facial swelling, tenderness, and pain.	May require antibiotic and anti-inflammatory management and immediate medical care to prevent serious health problems. Follow manufacturer instructions when using air polishers to reduce the likelihood of subcutaneous emphysema. Using an air polisher nozzle designed for subgingival debridement reduces the jet spray pressure, allowing the air and powders to exit horizontally minimizing the risk of subcutaneous emphysema.
Instrument fracture	Rare occurrence. Causes include improper instrument technique, using old, damaged or over-sharpened instruments, manufacture defects. Prompt intervention is required to locate and remove the instrument fragment to prevent swallowing, aspiration, local inflammation, local infection, or translocation in the oral tissues.	Inspect instruments before use and replace as required. Communicate the fractured instrument to the client. Fragments may be found by having the client spit into a cup, visually inspecting the mouth. Periapical X-ray or cone-beam computed tomography may be necessary to locate the broken tip. Remove fragment using forceps or another curette if located subgingival. Surgical removal maybe necessary depending on location and risk vs. benefit. [9]

[6] Refer to the CDHO Knowledge Network for information on bleeding disorders: https://cdho.org/knowledge-network/

[7] Refer to Episode 35 for additional information on air polishing.

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Postoperative complications and treatment errors [9] [12] [18]

Type	Description	Management / corrective measures
Mild / moderate dentin hypersensitivity	Common complication experienced by ~50%. Usually peaks during the first week and subsides or disappears over 2 to 4 weeks. The increase in the dentinal response to thermal and mechanical stimuli is probably due to removal of deposits and cementum during scaling and root planing.	Desensitizing agents can be used to help manage dentin hypersensitivity. Avoid aggressive instrumentation.
Pain, discomfort	Frequently reported after nonsurgical periodontal therapy. Pain usually peaks in intensity between 2 to 8 hours post-therapy and on average lasts for 6 hours.	Some clients may require over the counter analgesics to manage discomfort. Mild warm saline rinse may help sooth gingival tissues and promote healing.
Gingival recession	Common after both nonsurgical and surgical periodontal therapy due to resolution of periodontal inflammation. Regardless of the treatment modality used, deeper pocket sites experience more gingival recession than sites with shallow probing depths. Nonsurgical therapy usually results in less gingival recession than surgical.	Communicate possibility of gingival recession to clients when presenting treatment plan.
Increased root surface roughness	Due to excessive cementum removal.	Avoid aggressive hand instrumentation and root planing. Follow manufacturer instructions for use and correct powder when using air polishers.
Pulpal damage	Due to overheating from ultrasonic instrumentation.	Flow manufacturer instructions for use. Ensure adequate water flow. Do not use damaged or malfunctioning ultrasonic instruments.[8]
Periodontal abscess	Usually from small fragments of remaining calculus obstructing the pocket entrance once gingival edema resolves. May also occur when small pieces of calculus are forced	Thorough supragingival and subgingival debridement as gross scaling no longer recommended.

[8] Report any adverse reaction from using a medical device, drug, or other health products to the Canada Vigilance Program by visiting Adverse Reaction and Medical Device Problem Reporting.

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Type	Description	Management / corrective measures
	into deep, previously uninflamed periodontal tissues.	
Brain abscess	Extremely rare occurrence resulting from transient bacteremia. Symptoms may appear a few days postoperatively and may include weakness, shivering, swelling, headache, nausea, vomiting, impaired level of consciousness. Symptoms may not always be present.	Treatment may include a high dose of intravenous and oral antibiotics and surgical drainage or removal.
Fever	Fever development 24 hours postoperatively appears related to systemic inflammation following scaling and root planing, especially after full-mouth debridement.	Usually resolves without treatment.
Osteonecrosis of the jaw	A case was published reporting osteonecrosis of the jaw after nonsurgical periodontal therapy in an individual receiving subcutaneous injections of denosumab (osteoporosis treatment) every 6 months.	The case was managed by chlorhexidine mouthrinse, systemic antibiotics (doxycycline), removal of the affected teeth, sequestrectomy, and surgical debridement of the necrotic bone.

Periodontal therapy and systemic health

Research has evaluated the effect of periodontal therapy on proinflammatory mediators such as C-reactive protein (CRP) and various cytokines, as well as on systemic health conditions, including diabetes, cardiovascular disease, rheumatoid arthritis, obesity, cognitive function, pregnancy outcomes, chronic obstructive pulmonary disease, gut dysbiosis, and overall well-being.

Proinflammatory mediators

CRP is produced in response to infections and inflammation, making it a common biomarker of systemic inflammation. It is used to help diagnose infectious and inflammatory diseases, determine the need to treat acute and chronic conditions, and monitor the progression of various diseases, such as cardiovascular disease, rheumatoid arthritis, metabolic syndrome, diabetes, obesity, and cancer. Periodontitis is associated with low-grade inflammation, which can be evaluated through CRP levels. [19] [20]

Research has examined the impact of periodontal therapy on CRP levels. Studies indicate nonsurgical periodontal therapy leads to a decrease in CRP levels, with a progressive reduction observed for up to six months. Additionally, other studies have

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found high-sensitivity CRP levels significantly declined following periodontal therapy, particularly in individuals with cardiovascular disease. A systematic review and meta-analysis by Orlandi et al. (2022) support these findings, confirming reductions in both CRP and interleukin-6 (IL-6) after periodontal therapy. Additional studies have shown nonsurgical periodontal therapy significantly decreases serum IL-6 and IL-8 levels. [19] [20] [21] [22]

Important molecular agents involved in the coagulation cascade (i.e., clotting process), such as fibrinogen, are connected to diseases with an inflammatory component. Fibrinogen plays a proinflammatory role in various conditions, including vascular wall diseases, stroke, multiple sclerosis, Alzheimer's disease, rheumatoid arthritis, colitis, pulmonary fibrosis, renal fibrosis, and several types of cancer. It is well established serum fibrinogen levels are elevated in individuals with periodontitis, and periodontal therapy can reduce fibrinogen levels in these individuals. [19] [23] [24] [25]

Diabetes

Diabetes is a chronic metabolic disease characterized by hyperglycemia due to deficient insulin secretion, insulin resistance, or both. In 2019, diabetes was reported to be the ninth leading cause of death with an estimated 1.5 million deaths directly attributable to diabetes. The cost to government health budgets for managing people with diabetes is substantial. The global cost of diabetes care in 2021 was estimated to be $612 billion USD. [26] [27]

Glycemic control is a key component in diabetes management. Glycemic control is measured through various methods, including glycated (glycosylated) hemoglobin assay (HbA1c), which shows average blood glucose levels over the past three months. Higher HbA1c levels indicate poorer blood glucose management. Prolonged hyperglycemia is associated with various complications, including retinopathy, peripheral neuropathy, coronary artery and cerebrovascular disease, and renal failure. [27]

Diabetes and periodontal disease have a well documented bidirectional relationship. Periodontitis is defined as the sixth complication of diabetes, since diabetes can promote the progression, extent, and severity of periodontitis. Conversely, periodontitis is a risk factor for worsening glycemic control and may increase the risk for diabetes complications. The degree of glycemic control appears to be an important determinant in this relationship. [26] [28] [29]

A 2022 Cochrane review investigated the effects of periodontal therapy on glycemic control in individuals with diabetes and periodontitis. The review found moderate-certainty evidence periodontal treatment using subgingival instrumentation improves glycemic control in individuals with both periodontitis and diabetes by a clinically significant amount when compared to no treatment or usual care. [27]

A retrospective cohort study by Kusama et al. (2025) found periodontal therapy in participants with type 2 diabetes was associated with a reduced risk of dialysis initiation by 32%-44%. These findings highlight the importance of incorporating routine

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periodontal care into comprehensive diabetes management to help prevent the progression of diabetic kidney disease and improve client outcomes. [30]

Periodontitis results not only in local inflammation within the periodontal tissues but also leads to a systemic inflammatory response. Inflammation is recognized as a cause of insulin resistance. Therefore, reducing systemic levels of proinflammatory mediators through periodontal therapy, leading to decreased systemic inflammation, is probably partly responsible for controlling hyperglycemia. [19] [27]

Improvement in glycemic control from regular periodontal therapy has the potential to reduce the development of diabetic complications, lessen the long-term costs of these complications, and improve the quality of life for people with diabetes. [27]

An analysis by Thakkar-Samtani et al. (2023) of commercial insurance and Medicaid databases found a 12% and 14% decrease, respectively, in overall healthcare costs for individuals with diabetes who had received periodontal therapy. The study also found periodontal therapy was significantly associated with reduced outpatient healthcare costs among individuals with commercial insurance or Medicaid. The authors concluded a healthy mouth can play a key role in diabetes management. Expanding Medicaid benefits to include comprehensive periodontal therapy has the potential to reduce healthcare costs for individuals with diabetes. [31]

Sakamoto et al. (2025) investigated whether managing periodontal disease before the onset of type 2 diabetes impacts health outcomes and medical costs. The results showed individuals who received periodontal disease management both before and after diabetes onset experienced greater improvements in HbA1c levels and significantly lower medical costs compared to those who only managed periodontal disease after diabetes onset. The findings highlight regular periodontal care before diabetes onset can improve health outcomes and reduce medical expenses. These findings also demonstrate the importance of interprofessional collaboration in care management for clients with diabetes. [32]

A microsimulation model estimating the cost-effectiveness of periodontal therapy for individuals with type 2 diabetes showed providing periodontal treatment would save costs from a healthcare perspective. The analysis indicated total net savings of $5,904 USD and an increase of 0.6 quality-adjusted life years (QALY) per person. [33]

Cardiovascular diseases

Oral health is increasingly recognized as an important factor in cardiovascular health. Periodontitis and cardiovascular disease (CVD) share risk factors, such as tobacco use, obesity, poor nutrition, and physical inactivity. Research has linked various oral health issues with an elevated risk of CVD, including hypertension, carotid atherosclerosis, and myocardial infarction.[9] However, it is unclear if periodontal therapy can prevent the onset of CVD or secondary events. [8] [34] [35] [36]

[9] Refer to Episodes 37, 79, and 80 for additional information on CVD and oral health.

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A meta-analysis of six randomized controlled trials (RCTs) by Liu et al. (2022) assessed the influence of nonsurgical periodontal therapy (NSPT) on individuals with coronary artery disease and periodontitis. All participants in the intervention group received supragingival and subgingival scaling and root planing, including oral self-care instructions. The control group received no periodontal therapy or delayed therapy.

Measured outcomes included CRP and IL-6, lipid metabolism parameters (e.g., triglyceride, total cholesterol, low-density lipoprotein [LDL], and high-density lipoprotein [HDL]), and flow-mediated dilation.[10]

The researchers found a significant reduction in CRP with NSPT in participants with coronary artery disease and periodontitis, with limited evidence NSPT positively affected IL-6, flow-mediated dilation,[11] and lipid metabolism parameters. The authors concluded NSPT can be considered an important preventive strategy for major cardiovascular events in coronary artery disease. However, there is a need for more RCTs to investigate the efficacy of NSPT in individuals with coronary artery disease and periodontitis, including longer-term follow-up. [37]

Arterial stiffness dysregulation is a significant factor in CVD development because it affects the elasticity of arteries, limiting their ability to expand and contract in response to blood flow. Several studies have indicated NSPT may have effects direct and indirect measures of arterial stiffness, including flow-mediated dilation, carotid intima-media thickness (CIMT), and pulse wave velocity. [38]

A systematic review and meta-analysis by Polizzi et al. (2024) evaluated the impact of NSPT on arterial stiffness outcomes in individuals with periodontitis. The study found moderate evidence NSPT had beneficial effects on flow-mediated dilation and carotid intima-media thickness. However, due to study limitations, high heterogeneity, and risk of bias, it cannot be concluded that NSPT effectively improves arterial stiffness. Thus, further studies are needed to obtain high-quality evidence on the effect of NSPT on arterial stiffness in individuals with periodontitis. [38]

A systematic review and meta-analysis by Roca-Millan et al. (2018) analyzed the effect of periodontal therapy on cardiovascular risk parameters in individuals with atherosclerotic CVD. Periodontal therapy consisted of mechanical debridement in all intervention cases, including oral hygiene instruction in most cases.

Periodontal therapy reduced CRP (78%), tumour necrosis factor-alpha [TNF-α] (67%), IL-6 (100%), and leukocytes (50%). Fibrinogen levels improved considerably (67%).

[10] Flow-mediated dilation is an indicator of endothelial function. Impaired flow-mediated dilation may indicate future risk of CVD. Endothelial cells line the inside of all blood vessels (arteries, veins, capillaries) and secrete substances that control vascular tone (e.g., appropriate stiffness, elasticity of the blood vessel walls). Vascular tone determines blood pressure and dictates how hard the heart has to work to pump blood. [43] [75]

[11] Refer to Episode 99 for discussion with Ker Hung on research he led that found the oral inflammatory load, measured by oral neutrophil count, was a predictor of reduced flow-mediated dilation. The study provides evidence that oral health may impact endothelial function and cardiovascular health, even among young healthy people.

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Effects on lipid parameters were more limited, whereby only oxidized LDL and very-low-density lipoprotein (VLDL) cholesterol decreased significantly. Meta-analysis showed a statistically significant decrease in CRP and leukocyte values with nonsurgical periodontal therapy compared to no treatment.

The authors concluded periodontal therapy can improve some biochemical parameters involved in CVD development, including CRP, TNF-α, IL-6, fibrinogen, leukocytes, oxidized LDL, and VLDL. Further RCTs with longer follow-up periods are necessary to determine the impact of periodontal therapy. [39]

A Cochrane review by Ye et al. (2022) investigated the effects of periodontal therapy on primary or secondary prevention of CVD in individuals with chronic periodontitis.[12] For primary prevention of CVD in individuals with periodontitis and metabolic syndrome, the very low-certainty evidence was inconclusive about the effects of scaling and root planing plus antibiotics compared to supragingival scaling. There was no reliable evidence available regarding secondary prevention of CVD in individuals with chronic periodontitis and CVD. Further trials are needed to determine whether periodontal treatment can help prevent occurrence or recurrence of CVD. [40]

A Cochrane review by Luo et al. (2021) assessed the effect of different periodontal therapies on blood pressure in individuals with chronic periodontitis. The authors stated that conclusions could not be drawn about the effect of periodontal therapy on blood pressure in individuals with chronic periodontitis due to low certainty of evidence and lack of relevant studies. Only one study suggested periodontal therapy may reduce systolic and diastolic blood pressure over a short period in individuals with hypertension and chronic periodontitis, but the certainty of evidence was moderate. [41]

However, a systematic review and meta-analysis of randomized clinical trials by Luthra et al. (2022) showed when individuals received nonsurgical periodontal therapy versus no treatment, there was a significant decrease in their CRP, up to six months follow-up. The reduction was to a degree equivalent to that observed after traditional lifestyle or drug interventions. Secondary outcomes included changes in levels of other inflammatory biomarkers (IL-6, IL-8, IL-10, TNF-α); along with changes in periodontal measures of inflammation (bleeding on probing, gingival pocket probing, clinical attachment levels). The authors concluded the evidence supported a causal association between periodontitis and systemic inflammation. [42]

A systematic review and meta-analysis by Lyu et al. (2024) showed periodontal therapy enhances endothelial function. Additionally, after subgroup analysis of long-term and short-term follow-up, periodontal therapy was shown to increase flow-mediated dilation levels in participants with severe periodontitis. [43]

A review by Angjelova et al. (2024) suggests periodontal therapy effectively improves established CVD risk factors and serves as an effective strategy for endothelial

[12] The authors acknowledged the AAP periodontal classification system but used the term ‘chronic periodontitis’ because reviewed studies were based on this terminology.

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dysfunction management. The primary outcome following periodontal therapy was a decrease in serum levels of CRP, indicative of systemic inflammation stabilization, alongside enhancements in endothelial dysfunction measures, representing markers of CVD. Based on the reviewed evidence, periodontal therapy demonstrates beneficial effects on blood inflammatory markers and improves the lipid profile.

A retrospective cohort study by Nalliah et al. (2022) found individuals who were treated for myocardial infarction had shorter hospital stays if they were previously receiving regular periodontal care, while those with no periodontal care had the longest hospital stays after a heart attack. Early intervention to insure stable periodontal health in people with risk factors for acute myocardial infarction could reduce downstream hospital resource use. [44]

Rheumatoid arthritis

Rheumatoid arthritis is a chronic inflammatory autoimmune disease with many inflammatory mediators similar to periodontitis, including IL-1b, IL-6, and TNF-α). In addition, both diseases cause connective tissue destruction. Research has shown reducing the systemic burden of inflammation through nonsurgical periodontal therapy may have beneficial effects on rheumatoid arthritis activity. [45] [46]

Erythrocyte sedimentation rate (ESR) is a commonly used blood test that can indicate and monitor an increase in systemic inflammation caused by conditions, such as autoimmune diseases, infections, or tumours. ESR is not specific for any disease but is used with other tests to determine increased inflammatory activity. Two recent systematic reviews assessed the effectiveness of nonsurgical periodontal therapy on rheumatoid arthritis disease-activity. Nonsurgical periodontal treatment significantly reduced the disease activity score and the ESR. [19] [45] [47]

A systematic review and meta-analysis by Kaur et al. (2014) found significant reductions in the ESR as well as a reduced trend in TNF-α levels and the disease activity score after nonsurgical periodontal treatment, highlighting nonsurgical periodontal therapy can benefit individuals with rheumatoid arthritis. [48]

Obesity

Several studies have evaluated the effect of nonsurgical periodontal therapy on gingival bleeding, probing depths, and cytokine levels in individuals with and without obesity and chronic periodontitis. The findings of the influence of obesity on periodontal treatment are varied.

Some authors suggest clinical attachment levels and probing depths are comparable in participants with and without obesity after nonsurgical periodontal therapy. Other investigations report individuals with obesity have a lower response to periodontal therapy compared to those with normal weight, highlighting the damaging effects of chronic inflammation on the periodontium. Conversely, some studies indicate periodontal therapy can improve the lipid profile, positively impacting obesity control. This variability calls for studies with higher methodological quality to evaluate the clinical impact of periodontal therapy in individuals with obesity. [49]

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There is evidence suggesting individuals with obesity may experience slower healing due to an exacerbated inflammatory response, which could affect the results of surgical periodontal treatment. Additionally, it is common for individuals with obesity to have coexisting comorbidities that may complicate surgical periodontal therapy. [49]

Cognitive function

A growing body of evidence suggests oral health conditions such as tooth loss, periodontal disease, and poor self-reported oral health are associated with accelerated cognitive decline and increased risk of dementia. [50]

Numerous longitudinal cohort studies from various populations, including the USA, Japan, Sweden, the UK, and China, support the association between oral health and cognitive impairment or dementia. A meta-analysis by Qi et al. (2021) of 14 longitudinal studies (34,074 adults ≥60 years) identified a dose-response association, Each additional missing tooth was associated with a 1.4% increased risk of cognitive impairment and a 1.1% increased risk of a dementia diagnosis. [51] [52]

A longitudinal analysis by Schwahn et al. (2022) showed periodontal therapy and subsequent supportive periodontal care favourably affected Alzheimer's disease-related brain atrophy, analyzed through magnetic resonance imaging (MRI). [53]

A prospective cohort study by Saito et al. (2022) of 31,775 Japanese adults (aged 75 or 80) found regular periodontal therapy was associated with a significantly lower risk of Alzheimer's disease and vascular dementia, highlighting regular visits to treat or prevent periodontal disease may potentially prevent dementia. [54]

Qi et al. (2024) examined the link between periodontal therapy and cognitive decline and dementia risk in adults (≥50 years) with periodontal problems. The researchers found those who received periodontal therapy had a slower decline in cognitive function and a 38% lower risk of developing dementia compared to those who did not receive periodontal care. The authors concluded prompt periodontal therapy for adults with symptoms of periodontal disease may benefit their cognitive health. [50]

Pregnancy outcomes[13]

A significant amount has been written about the relationship between maternal periodontitis and pregnancy outcomes. Although individual study results have varied, an overview of 23 systematic reviews by Daalderop et al. (2017) found associations between periodontitis and preterm birth, low birth weight infants, preterm low birth weight infants, and preeclampsia. [55]

A 2017 Cochrane review assessed whether treating periodontal disease during pregnancy could prevent adverse birth outcomes. Fifteen RCTs, with 7,161 participants, met the inclusion criteria. The authors found no clear evidence periodontal therapy during pregnancy reduces preterm birth. There is some evidence it may reduce the incidence of low birth weight. There is insufficient evidence to determine which

[13] Listen to Episodes 108, 109, and 110 for additional information on pregnancy and oral health.

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periodontal treatment is better in preventing any adverse pregnancy outcome. The authors noted the quality of the evidence was low to very low because of high bias risk, imprecision, or serious inconsistency. Therefore, further research is likely to change the confidence of the effect and the estimate. [56]

A randomized controlled trial by Caneiro-Queija et al. (2019) included 40 pregnant participants with stage II grade B periodontitis. Participants were randomly allocated to control and intervention groups. During the second trimester, the control group received only oral hygiene instructions and professional supragingival dental biofilm control, whereas the intervention group also received subgingival instrumentation. The study found a statistically significant reduction in all clinical and microbiological parameters after periodontal therapy in the intervention group. However, there were no significant differences observed in the risk for preterm birth or low birth weight. [57] [58]

A review by Bobetsis et al. (2020) reported most high-quality RCTs indicate nonsurgical periodontal therapy during the second trimester does not improve pregnancy outcomes. A partial explanation might be that therapy delivered at the fourth to sixth months of pregnancy is too late to prevent placental colonization by periodontal pathogens and consequently incapable of affecting pathogen-induced injury to the fetoplacental unit. Therefore, nonsurgical interventions may be more significant preconception or early in pregnancy, considering the potential association between periodontal disease and adverse pregnancy outcomes. Although there is insufficient evidence that periodontal therapy alters pregnancy outcomes, it does improve oral health and health-promoting behaviour, which advances general health of the pregnant person. [59] [60]

A systematic review and meta-analysis by Le et al. (2021) investigated whether treating gingivitis in pregnancy affects pregnancy outcomes. Three clinical trials with 1,031 participants were included in the review. The results showed treating gingivitis may improve pregnancy outcomes, including reduced risk of preterm birth and low birth weight in infants. Future trials are needed to validate the results. [61]

Chlorhexidine use is not contraindicated during pregnancy and can be used when the benefits outweigh the risks. There is limited evidence of the concurrent use of chlorhexidine mouthrinse with periodontal therapy in pregnancy. A systematic review and meta-analysis by Merchant et al. (2022) reported that for pregnant individuals with periodontal disease, using chlorhexidine with nonsurgical periodontal therapy reduced risks of preterm birth and low birth weight. However, there were significant biases in the studies analyzed in this research. Further well-conducted RCTs are needed to ascertain this potential benefit. [62] [63]

Overall, more research is needed to determine the relationship between periodontitis and pregnancy outcomes. Nonsurgical periodontal therapy is recognized as safe to perform during all three trimesters of pregnancy, with early second trimester being the safest period to provide routine oral healthcare. [55]

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Chronic obstructive pulmonary disease
Chronic obstructive pulmonary disease (COPD) is a common lung disease that causes restricted airflow and breathing problems. COPD is the fourth leading cause of death worldwide. [64]

Periodontitis and COPD are chronic progressive inflammatory diseases that share common risk factors such as smoking and age. Evolving evidence indicates an association between COPD, oral health, and periodontal disease. [65]

A systematic review by Apessos et al. (2021) investigated the impact of periodontal therapy on individuals with COPD. The finding suggest effective periodontal therapy is associated with a reduced frequency of COPD exacerbations and a slower decline in lung function. Additionally, periodontal therapy reduced the rate of hospitalizations for respiratory events (including COPD exacerbations) and was associated with lower all-cause mortality.

Several mechanisms have been proposed to explain the beneficial effects of periodontal therapy on COPD outcomes, including:

- Periodontal therapy has been found to reduce levels of various inflammatory biomarkers, potentially leading to a less severe inflammatory response in people with COPD.
- Removal of dental plaque may decrease oral mucosa colonization by pathogens commonly found in respiratory and oral specimens of individuals with COPD, especially during exacerbations.[14] [65]

Gut dysbiosis
Emerging evidence suggests pathogenic bacteria associated with periodontal disease may contribute to dysbiosis in the gut microbiome. A clinical study by Baima et al. (2024) explored the oral-gut microbial signatures associated with periodontitis. Stool and saliva samples from 47 participants with generalized stage III to IV periodontitis were collected and analyzed before and three months after undergoing steps one and two of periodontal therapy. Principal component analysis was conducted to identify differences in oral-gut microbial profiles between participants with periodontitis at baseline and periodontally healthy participants (control group).

The results showed gut microbiota of participants with periodontitis significantly differed compared to healthy participants. Steps one and two of periodontal therapy were associated with a significant change in gut microbiota, resulting in post-treatment microbial profiles similar to healthy participants. These findings signify the potential for future diagnostic tools, therapeutic interventions, and broader implications for gastrointestinal health. [66]

[14] Some studies have reported that bacterial contamination from aerosols generated during ultrasonic debridement can worsen COPD respiratory symptoms. To reduce this risk, it is recommended to take precautionary measures such as using a preprocedural antimicrobial mouthrinse, utilizing high-volume evacuation suction, and avoiding air polishing. [65]

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Overall well-being
Nonsurgical therapy of periodontitis improves overall well-being, based on studies assessing client-related outcomes and quality of life. [67]

Health-related quality of life (HRQoL) is a multidimensional concept that evaluates how a person's health status affects their quality of life. Oral health-related quality of life (OHRQoL) focuses on how the health of the oral cavity influences an individual's quality of life. OHRQoL provides insights into an individual's subjective perception of their oral health and can complement the objective periodontal parameters measured by clinicians. [19] [68]

An umbrella review of systematic reviews by Wong et al. (2021) analyzed the impact of periodontal disease on OHRQoL. The results showed periodontal disease can negatively impact an individual's HRQoL and OHRQoL. Both nonsurgical and surgical periodontal therapy can improve OHRQoL, although to varying degrees depending on the individual's perception. [19] [69]

Moya-Villaescusa et al. (2023) assessed the impact of nonsurgical periodontal therapy on OHRQoL. The results showed periodontal disease negatively impacts the OHRQoL of individuals with periodontitis, especially in severe stages (III–IV). Nonsurgical periodontal treatment improved the OHRQoL of individuals with periodontitis one month after treatment. [70]

Al-Sharqi et al. (2024) found nonsurgical periodontal therapy improved OHRQoL in participants with stages II and III periodontitis. The improvement was more significant in those with stage III compared to those with stage II. Severe clinical attachment loss (CAL), high bleeding on probing, and pockets in the anterior teeth were associated with poorer OHRQoL. These findings further support that earlier treatment of periodontitis is associated with improved OHRQoL. [68]

Long-term supportive periodontal therapy is also associated with OHRQoL. Research has found good compliance with supportive therapy intervals based on individual periodontal risk profiles contributes to improved OHRQoL compared to irregular attendance. [71]

Take home messages
- Periodontal therapy has been shown to help manage various systemic conditions, and highlights the importance of an interdisciplinary approach to manage these conditions.
- Complications and adverse effects can and will occur during and/or after periodontal therapy. Many of these events can be prevented or managed by understanding and recognizing potential risk factors, continuously advancing knowledge and skills, and treatment planning appropriately, which may include referring to more experienced clinicians or specialists.
- Clients must be informed the potential benefits, risks, and side effects of any proposed treatment.

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- Thorough post-operative instructions can help clients manage discomfort they may experience after nonsurgical periodontal therapy.

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Client Resources

Periodontal (Gum) Disease, ODHA Factsheet
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Oral Health and Overall Health, ODHA Factsheet
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Additional Resources

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