PERIODONTITIS & NECROTIZING ULCERATIVE GINGIVITIS

CHI Formulary Development Project

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Council of Health Insurance

INDICATION UPDATE

ADDENDUM- October 2023

To the CHI Original Periodontitis and Necrotizing Ulcerative Gingivitis Clinical Guidance- Issued May 2020

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Related Documents

Related SOPs

- IDF-FR-P-02-01-IndicationsReview&IDFUpdates
- IDF-FR-P-05-01-UpdatedIndicationReview&IDFUpdates

Related WI:

- IDF-FR-WI-01-01SearchMethodologyGuideForNewIndications

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Abbreviations

ADA	American Dental Association
AIDS	Acquired Immunodeficiency Syndrome
BOP	Bleeding on Probing
CAL	Clinical Attachment Levels
CHI	Council of Health Insurance
CVD	Cardiovascular Disease
DDD	Defined Daily Dose
EFP	European Federation of Periodontology
FDA	U.S. Food and Drug Administration
HIV	Human Immunodeficiency Virus
NCD	Non-Communicable Disease
NICE	National Institute for Health and Care Excellence
NSAID	Non-Steroidal Anti-Inflammatory Drug
NUG	Necrotizing Ulcerative Gingivitis
PPD	Probing Pocket Depth
PUFA	Polyunsaturated Fatty Acid
SDCE	Scottish Dental Clinical Effectiveness Program
SFDA	Saudi Food and Drug Authority
SPC	Supportive Periodontal Care
SRP	Scaling and Root Planning
YLD	Years Lived with Disability

Executive Summary

Gingivitis is a mild form of gum disease, characterized by inflammation of the gingiva (gum around the base of the teeth)[1]. Signs and symptoms of gingivitis include dark red gums that bleed easily upon brushing or flossing, tender and swollen gums, bad breath, and receding gums[1]. It is mostly caused by plaque formation due to poor oral hygiene[1]. A plaque is an invisible sticky film composed of starches and sugars that interact with normal mouth bacteria. If not removed daily, it can harden under the gumline into tartar (calculus) which collects bacteria and becomes harder to remove. The longer they remain, the more they cause irritation to the gingiva, causing inflammation and possibly tooth decay[1].

Left untreated, it can lead to a more serious and advanced form of gum disease also known as **periodontitis** (bacterial infection affecting soft tissue around the teeth)**,** and eventually tooth loss due to the destruction of bone and tissues supporting the teeth[1]. A severe form of gingivitis is **Necrotizing Ulcerative Gingivitis** (NUG) that causes pain, infected, bleeding gums and ulcerations that are more common in countries with poor nutrition and poor living conditions[1].

Risk factors include elder age, poor dental hygiene, difficult to clean crooked teeth or ill-fitting dental restorations, tobacco smoking/chewing, genetics or hormonal changes, diabetes, poor nutrition (Vitamin C Deficiency), decreased immunity due to conditions such as cancer or HIV/AIDS, certain viral or fungal infections, or certain drugs such as phenytoin or calcium channel blockers[1]. It is crucial to address gingivitis early to prevent it from progressing to periodontitis and to maintain good oral hygiene to promote healthy gums and teeth[1].

The 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions introduced a modern and comprehensive system for categorizing various oral health conditions. This classification system includes periodontal health and gingival diseases/conditions It also addresses periodontitis, which is further categorized into stages (I to IV) based on disease severity and grading (A, B, or C) according to the rate of progression. This classification underscores the importance of a personalized approach to diagnosis and treatment, considering factors such as disease severity, extent, and individual patient-specific risk factors, ultimately aiming to enhance the management of periodontal and peri-implant diseases and conditions for improved oral health outcomes. For the sake of brevity, this report will refer to the disease as Periodontitis and Necrotizing Ulcerative Gingivitis[2].

According to the Global Burden of Disease Study (2016), severe periodontal disease ranked as the 11th most prevalent condition globally, with a prevalence ranging from 20% to 50%[3]. According to the WHO (2023), “severe periodontal diseases are estimated to affect around 19% of the global adult population, representing more

than 1 billion cases worldwide"[4]. A retrospective study in the Eastern Province of Saudi Arabia (2022) had revealed overall periodontitis prevalence to be 52.1 % with a distribution of mild, moderate, and severe periodontitis prevalence of 36.1 %, 14.1 %, and 1.8 %, respectively[5]. The study population consisted of 470 (67.1 %) Saudi and 230 (32.9 %) non-Saudi nationals[5]. Results had revealed that significantly more Saudi than non-Saudi patients had moderate periodontitis[5].

Globally, it is a significant cause of tooth loss, impacting mastication, esthetics, self-confidence, and overall quality of life, contributing to 3.5 million years lived with disability (YLD) in 2016[3].

CHI issued Periodontitis and Necrotizing Ulcerative Gingivitis clinical guidelines after thorough review of renowned international and national clinical guidelines in May 2020. Updating clinical practice guidelines (CPGs) is a crucial process for maintaining the validity of recommendations.

This report functions as an addendum to the prior CHI **Periodontitis and Necrotizing Ulcerative Gingivitis** clinical guidance and seeks to offer guidance for the effective management of Periodontitis and Necrotizing Ulcerative Gingivitis. It provides an **update on the Periodontitis and Necrotizing Ulcerative Gingivitis. Guidelines** for CHI Formulary with the ultimate objective of updating the IDF (CHI Drug Formulary) while addressing **the most updated best available clinical and economic evidence related to drug therapies.**

Main triggers for the update were summarized, being **the issuance of updated versions of previously reviewed guidelines** namely the European Federation of Periodontology's 2019 Guidelines for Effective Prevention and Dossier on Periodontal Diseases. This guideline has been **divided into four new guidelines which have been added to this report** such as the 2020 Dossier on Periodontal Diseases, the 2020 Treatment of stage I–III periodontitis (the EFP S3 level clinical practice guideline), the 2022 Treatment of stage IV periodontitis (the EFP S3 level clinical practice guideline), and the 2023 Prevention and treatment of peri-implant diseases (the EFP S3 level clinical practice guideline). Moreover, the following guideline is no longer available, except if accessing in the UK: 2018 NICE guidelines of Gingivitis and Periodontitis.

After carefully examining clinical guidelines and reviewing the SFDA drug list, there are no new drugs to be added to the CHI formulary, and there is only one drug approved by the FDA: Atridox® (doxycycline hyclate) 10%[6]. Chlorhexidine mouthwash and hydrogen peroxide mouthwash are no longer SFDA-registered, and the recommendation is to delist them from CHI formulary.

All recommendations are well supported by reference guidelines, Grade of Recommendation (GoR), Level of Evidence (LoE) and Strength of Agreement (SoA) in

all tables reflecting specific drug classes' role in **Periodontitis and Necrotizing Ulcerative Gingivitis** therapeutic management.

Below is a table summarizing the major changes based on the different Periodontitis and Necrotizing Ulcerative Gingivitis guidelines used to issue this report:

Table 1. General Recommendations for the Management of Periodontitis and Necrotizing Ulcerative Gingivitis

Management of Periodontitis and Necrotizing Ulcerative Gingivitis		
General Recommendations	**Level of Evidence/ Grade of Recommendation**	**Reference**
Effective patient-performed oral hygiene is crucial for success. Regular advice and encouragement are needed for long-term change.	Strength: Not mentioned	BSP, 2016[7]
Regular removal of attached plaque biofilms and non-attached microflora is necessary. Plaque-retentive factors like calculus and restoration overhangs should be eliminated.	Strength: Not mentioned	BSP, 2016[7]
Patients may experience sensitivity after root surface instrumentation. Over-the-counter products can reduce dentine sensitivity. Antiplaque agents like chlorhexidine can be useful during difficult cleaning periods.	Strength: Not mentioned	BSP, 2016[7]
Consider Scaling and Root Planning (SRP) as the initial treatment for patients with chronic periodontitis.	Strength: In Favor	ADA, 2015[8]
Consider systemic sub antimicrobial-dose doxycycline as an adjunct to SRP, for patients with moderate to severe chronic periodontitis, with a small, expected net benefit.	Strength: In Favor	ADA, 2015[8]
Consider systemic antimicrobials as an adjunct to SRP, for patients with moderate to severe chronic periodontitis, with a small, expected net benefit	Strength: Weak	ADA, 2015[8]

Consider locally delivered chlorhexidine chips as an adjunct to SRP for patients with moderate to severe chronic periodontitis, with a moderate expected net benefit.	Strength: Expert Opinion For	ADA, 2015[8]
Consider locally delivered doxycycline hyclate gel, and minocycline microspheres as an adjunct to SRP for patients with moderate to severe chronic periodontitis, but the net benefit is uncertain.	Strength: Expert Opinion For	ADA, 2015[8]
Consider prescribing antibiotics (amoxicillin and/or metronidazole) for immunocompromised patients or cases of systemic involvement (fever, malaise, lymphadenopathy).	Strength: Not Mentioned	CDA, 2013[9]
In specific cases during periodontitis therapy, adjunctive antiseptics like chlorhexidine mouth rinses can be considered for a limited duration, as an adjunct to mechanical debridement, to complement the treatment.	Grade 0 ⇿, Consensus	EFP, 2020[10]
May consider specific locally administered sustained-release antibiotics as adjuncts to subgingival instrumentation in patients with periodontitis.	Grade 0 ⇿, Consensus	EFP, 2020[10]
Routine use of systemic antibiotics as an adjunct to subgingival debridement in patients with periodontitis is not recommended due to concerns about patient health and the potential impact on public health.	Grade A-↓↓, Consensus	EFP, 2020[10]
The use of adjunctive antiseptics may be considered in supportive periodontal care for periodontitis patients to help control gingival inflammation in specific cases.	Grade 0 ⇿, Consensus	EFP, 2020[10]
For adjunctive use of an antiseptic dentifrice formulation in supportive periodontal care for	Grade B-↑, Consensus	EFP, 2020[10]

periodontitis patients, consider products that contain chlorhexidine, triclosan-copolymer, and stannous fluoride-sodium hexametaphosphate.		
For adjunctive use of an antiseptic mouth rinse formulation in supportive periodontal care for periodontitis patients, consider products that contain chlorhexidine, essential oils, and cetylpyridinium chloride.	Grade B-↑, Consensus	EFP, 2020[10]
Avoid the professional application of adjunctive local antimicrobial agents in supportive peri-implant care (SPIC) to reduce the risk of recurrent peri-implantitis	Grade B↓, Strong Consensus	EFP, 2023[11]
In patients with peri-implant mucositis, avoid the use of local and systemic antibiotics as a treatment option.	Grade A↓↓, Unanimous Consensus	EFP, 2023[11]
In patients with peri-implant mucositis, the short-term use of oral rinse antiseptics as an adjunct to PMPR may be considered.	Grade 0 ↔, Strong Consensus	EFP, 2023[11]
Recommend against using antimicrobial photodynamic therapy either as an adjunct to sub-marginal instrumentation or as monotherapy.	Grade B↓, Unanimous Consensus	EFP, 2023[11]
Do not recommend routine use of systemic antibiotics as an adjunct to non-surgical treatment in patients with peri-implantitis due to concerns about patients' health and the potential impact on public health.	Grade A↓↓, Strong Consensus	EFP, 2023[11]
Necrotizing Ulcerative Gingivitis and Periodontitis: As an adjunct to local measures, metronidazole is the drug of choice where there is systemic involvement or persistent swelling despite local measures.	Strength: Not mentioned	SDCEP, 2014[12]
Necrotizing Ulcerative Gingivitis and Periodontitis: Recommend the use of either 6% hydrogen peroxide or 0.2% chlorhexidine mouthwash until the acute symptoms subside.	Strength: Not mentioned	SDCEP, 2014[12]
Full Mouth Disinfection (FMD) is a treatment involving two visits within 24 hours, but current	Strength: Not mentioned	SDCEP, 2014[12]

evidence suggests no extra benefits compared to cleaning alone.		
In cases of pulp necrosis and acute apical abscess with systemic involvement in immunocompetent adults, where immediate options like pulpotomy, pulpectomy, nonsurgical root canal treatment, or abscess drainage aren't available on the same visit: prescribe oral amoxicillin or oral penicillin V potassium. Provide an urgent referral for dental treatment.	Good Practice Statement	ADA, 2019[13]
Perform urgent DCDT along with prescribing oral amoxicillin or penicillin for immunocompetent adults with pulp necrosis and acute apical abscess with systemic involvement where immediate options like pulpotomy, pulpectomy, nonsurgical root canal treatment, or abscess drainage are available on the same visit.	Good Practice Statement	ADA, 2019[13]

At the end of the report, a key recommendation synthesis section is added highlighting the latest updates in **Periodontitis and Necrotizing Ulcerative Gingivitis clinical and therapeutic management**.

Section 1.0 Summary of Reviewed Clinical Guidelines and Evidence

This section is divided into two parts: the first includes recommendations from **updated versions of guidelines** mentioned in the previous CHI **Periodontitis and Necrotizing Ulcerative Gingivitis** report, and the second includes **newly added guidelines** that have helped generate this report.

1.1 Revised Guidelines

This part contains the updated versions of the guidelines mentioned in the May 2020 CHI **Periodontitis and Necrotizing Ulcerative Gingivitis** Report and the corresponding recommendations:

Table 2. Clinical Guidelines Requiring Revision

Guidelines Requiring Revision	
Old Version	**Updated Version**
Section 1.1 Evidence-Based Clinical Practice Guideline on The Nonsurgical Treatment of Chronic Periodontitis by Means of Scaling and Root Planning with or without Adjuncts[8] (2015, American Dental Association)	N/A*
Section 1.2 Managing Patients with Necrotizing Ulcerative Gingivitis[9] (2013, Canadian Dental Association)	N/A*
Section 1.3 Guidelines for Effective Prevention and Dossier on Periodontal Diseases (2019, European Federation of Periodontology)	**Section 1.1.3** Dossier on Periodontal Diseases (2020, European Federation of Periodontology)[14]
	Section 1.1.4 Treatment of stage I–III periodontitis—The EFP S3 level clinical practice guideline (2020)[10]
	Section 1.1.5 Treatment of stage IV periodontitis: The EFP S3 level clinical practice guideline (2022)[15]
	Section 1.1.6 Prevention and treatment of peri-implant diseases—The EFP S3 level clinical practice guideline (2023)[11]

Section 1.4 Guidelines of Gingivitis and Periodontitis (2018, NICE)	**Section 1.1.7** Only Available to UK Users[16]
Section 1.5 Prevention and Treatment of Periodontal Diseases in Primary Care[12] (2014, Scottish Dental Clinical Effectiveness Program [SDCE])	N/A*
Section 1.6 Evidence-Based Clinical Practice Guideline on Antibiotic Use for The Urgent Management of Pulpal- And Periapical-Related Dental Pain and Intraoral Swelling[13] (A Report from The American Dental Association, 2019)	N/A*
Section 1.7 Management of Acute Dental Problems Guidance for Healthcare[17] (2013, Scottish Dental Clinical Effectiveness Program [SDCEP])	N/A*
Section 1.8 Treatment of Plaque-Induced Gingivitis, Chronic Periodontitis, and Other Clinical Conditions[18] (Endorsed by The American Academy of Pediatric Dentistry, 2004)	N/A*
Section 1.9 The Good Practitioner's Guide to Periodontology[7] (2016, British Society of Periodontology)	N/A*

*: No updated versions available

1.1.1 American Dental Association Evidence-Based Clinical Practice Guideline on The Nonsurgical Treatment of Chronic Periodontitis by Means of Scaling and Root Planning with or without Adjuncts (2015)

*Please refer to **Section 1.1** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

There are no new updates. The recommendations of this guideline remain unchanged[8].

1.1.2 Canadian Dental Association: Managing Patients with Necrotizing Ulcerative Gingivitis (2013)

*Please refer to **Section 1.2** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

There are no new updates. The recommendations of this guideline remain unchanged[9].

1.1.3 European Federation of Periodontology Dossier on Periodontal Diseases (2020)

*Please refer to **Section 1.3** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

The following recommendations are provided by the European Federation of Periodontology via their 2020 Dossier on Periodontal Diseases[14]:

- Diagnosis of periodontal disease:
    - A dentist or periodontist, specializing in gum conditions, evaluates the periodontal tissues using a probe to determine if there is superficial inflammation (gingivitis) or deeper loss of supporting tissue (periodontitis). X-rays may also be taken to confirm the findings.
- Prevention of Periodontal Disease:
    - Maintaining correct oral hygiene to control dental biofilm levels.
    - Have regular checkups/visits to the dentist, periodontist, or hygienist to ensure early diagnosis of any disease.
    - Methods to control dental biofilm in the mouth include:
        - Mechanical: normal manual brushing or powered brushing, and the use of special interdental brushes
        - Chemical: rinsing with mouthwashes and using toothpaste, gels, sprays, and antiseptic products in addition to mechanical methods to control bacterial plaque
    - Carry out correct oral hygiene after every meal.
- Treatment of Periodontal Diseases:
    - Gingivitis: Dental hygienists, dentists, or periodontists, perform professional dental prophylaxis, which involves cleaning dental plaque and calculus. This procedure is also known as supragingival scaling or tooth cleaning.

- Periodontitis: two phases of treatment: In the basic-treatment phase, also known as conventional or non-surgical periodontal therapy, bacteria are removed from periodontal pockets through scaling and root-surface debridement to eliminate bacteria, plaque, and calculus from the roots of the teeth. In some cases, antibiotics may be used as a complementary therapy, but their use is generally discouraged. For rapidly progressing or advanced diseases, a second treatment phase may be required, which involves periodontal surgery. This allows access to deep periodontal pockets and may involve localized application of periodontal regeneration techniques. Once active treatment is completed, the disease should be under control. The maintenance phase becomes crucial in achieving long-term control of periodontitis.
- At each maintenance visit, the dentist should follow a protocol of oral health evaluation to verify the clinical situation. The frequency of maintenance visits varies for each individual case and is determined by factors such as risks and needs analysis. Typically, maintenance visits are scheduled every three, four, or six months.

1.1.4 European Federation of Periodontology: Treatment of Stage I–III Periodontitis—The EFP S3 Level Clinical Practice Guideline (2020)

*Please refer to **Section 1.3** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

Evidence levels and recommendation grades are outlined below[10]:

Table 3. EFP Strengths of Recommendations

Grade of recommendation grade[a]	Description	Syntax
A	Strong recommendation	We recommend (↑↑)/ We recommend not to (↓↓)
B	Recommendation	We suggest to (↑)/ We suggest not to (↓)
0	Open recommendation	May be considered (↔)

[a]If the group felt that evidence was not clear enough to support a recommendation, Statements were formulated, including the need (or not) of additional research.

Table 4. EFP Strengths of Consensus

Unanimous consensus	Agreement of 100% of participants
Strong consensus	Agreement of > 95% of participants
Consensus	Agreement of 75%–95% of participants
Simple majority	Agreement of 50%–74% of participants
No consensus	Agreement of < 50% of participants

The following recommendations are provided by the European Federation of Periodontology on the treatment of Stages I-III of Periodontitis[10]:

- Diagnosis and Classification:
    - Clinical periodontal health is characterized by the absence of inflammation (measured by bleeding on probing at less than 10% of sites) and no attachment or bone loss resulting from previous periodontitis.
    - Gingivitis is defined by the presence of gingival inflammation (BOP at ≥10% of sites) without detectable attachment loss due to previous periodontitis. Localized gingivitis has 10%-30% bleeding sites, while generalized gingivitis has more than 30% bleeding sites.
    - Periodontitis is determined by the loss of periodontal tissue support, assessed by radiographic bone loss or probing attachment loss. Descriptions of periodontitis may include the number of teeth with probing pocket depth over certain thresholds (commonly >4 mm with BOP and ≥6 mm), the number of teeth lost due to periodontitis, and the presence of intra-bony and furcation lesions.
    - For periodontitis cases, a matrix is used to further classify the stage and grade of the disease. The stage is based on disease severity and case complexity, while the grade provides information about disease progression rate, risk factors, treatment outcomes, and potential impacts on general health.
    - After periodontal therapy, a stable periodontitis patient is defined by gingival health on a reduced periodontium (limited bleeding on probing, shallow probing depths of 4 mm or less). If bleeding on probing is present at >10% of sites, the patient is considered stable with gingival inflammation, while sites with persistent probing depths ≥4 mm and bleeding require further treatment. Successfully treated periodontitis patients remain at risk of recurrence, so inflammation

control measures should be implemented to prevent further periodontitis.

- Clinical pathway for a diagnosis:
    - Identifying a patient suspected of having periodontitis.
    - Confirming the diagnosis of periodontitis
    - Staging the periodontitis case
    - Grading the periodontitis case

Table 5. Staging of Periodontitis (Retrieved from the EFP 2020 Clinical Practice Guideline)

Periodontitis stage		Stage I	Stage II	Stage III	Stage IV
Severity	Interdental CAL at site of greatest loss	1–2 mm	3–4 mm	≥5 mm or extending to middle third of the root	≥8 mm or extending to apical third of the root
	Radiographic bone loss	Coronal third (<15%)	Coronal third (15%–33%)	Extending to Middle third	Extending to Apical third
	Tooth loss	No Perio Tooth Loss		Perio tooth loss ≤ 4 teeth	Perio tooth loss ≥ 5 teeth
Complexity	Local	Probing depth 3–4 Mostly horizontal bone loss	Probing depth 4–5 Mostly horizontal bone loss	In addition to Stage II Complexity Probing depth ≥6 Vertical bone loss ≥3 Furcation II or III Moderate ridge defect	In addition to Stage III Complexity Need for complex rehabilitation due to: Masticatory dysfunction Secondary occlusal trauma (Tooth mobility ≥ 2) Bite collapse, drifting, flaring Less than 20 remaining teeth (10 opposing pairs) Severe ridge defect
Extent & distribution	Add to Stage as descriptor	For each Stage, describe extent as localized (<30% of teeth involved), generalized or molar incisor pattern			

Note: The initial Stage should be determined using CAL; if not available then RBL should be used. Information on tooth loss that can be attributed primarily to periodontitis – if available – may modify stage definition. This is the case even in the absence of complexity factors. Complexity factors may shift the Stage to a higher level, for example furcation II or III would shift to either Stage III or IV irrespective of the CAL. The distinction between Stage III and Stage IV is primarily based on complexity factors. For example, a high level of tooth mobility and/or posterior bite collapse would indicate a Stage IV diagnosis. For any given case only some, not all, complexity factors may be present, however, in general it only takes 1 complexity factor to shift the diagnosis to a higher Stage. It should be emphasized that these case definitions are guidelines that should be applied using sound clinical judgment to arrive at the most appropriate clinical diagnosis.

For post-treatment patients CAL and RBL are still the primary stage determinants. If a stage shifting complexity factor(s) were eliminated by treatment, the stage should not retrogress to a lower stage since the original stage complexity factor should always be considered in maintenance phase management.

Table 6. Grading of Periodontitis (Retrieved from the EFP 2020 Clinical Practice Guideline)

Periodontitis grade		Grade A, Slow rate of progression	Grade B, Moderate rate of progression	Grade C, Rapid rate of progression
Primary criteria	Direct evidence of progression			
	Longitudinal data (PA radiographs or CAL loss)	Evidence of no loss over 5 years	<2 mm over 5 years	≥2 mm over 5 years
	Indirect evidence of progression			
	Bone loss/age	< 0.25	0.25–1.0	>1.0
	Case phenotype	Heavy biofilm deposits with low levels of destruction	Destruction commensurate with biofilm deposits	Destruction exceeds expectation given biofilm deposits; Specific clinical patterns suggestive of periods of rapid progression and/or Early onset disease e.g. Molar incisor pattern; Lack of expected response to standard bacterial control therapies
Grade modifiers	Risk factors			
	Smoking	Non-Smoker	Smoker <10 cigarettes/day	Smoker ≥10 cigarettes/day
	Diabetes	Normoglycaemic with or without prior diagnosis of diabetes	HbA1c < 7.0 in diabetes patient	HbA1c ≥ 7.0 in diabetes patient
Risk of systemic impact of periodontitis[a]	Inflammatory Burden			
	High sensistivity CRP (hsCRP)	<1 mg/L	1–3 mg/L	>3 mg/L
	Indicators of CAL/bone loss			
Biomarkers	Saliva, GCF, serum	?	?	?

Grade should be used as an indicator of the rate of periodontitis progression. The primary criteria are either direct or indirect evidence of progression. Whenever available, direct evidence is used; in its absence indirect estimation is made using bone loss as a function of age at the most affected tooth or case presentation (radiographic bone loss expressed as percentage of root length divided by the age of the subject, RBL/age). Clinicians should initially assume Grade B disease and seek specific evidence to shift towards grade A or C, if available. Once grade is established based on evidence of progression, it can be modified based on the presence of risk factors.

From: Tonetti, Greenwell and Kornman 2018.

[a]Refers to Increased risk that periodontitis may be an inflammatory co-morbidity for the specific patient. CRP values represent a summation of the patient's overall systemic inflammation, which may be in part influenced by periodontitis, but otherwise is an "unexplained" inflammatory burden that be valuable to assess in collaboration with the patient's physicians. The grey color of the table cells refers to the need to substantiate with specific evidence. This element is placed in the table to draw attention to this dimension of the biology of periodontitis. It is envisaged that in the future it will be possible integrate the information into periodontitis Grade to highlight the potential of systemic impact.

- Differential Diagnosis:
    - Gingivitis
    - Vertical root fracture
    - Cervical decay
    - Cemental tears
    - External root resorption lesions
    - Tumors or other systemic conditions extending to the periodontium.
    - Trauma-induced local recession
    - Endo-periodontal lesions
    - Periodontal abscess
    - Necrotizing periodontal diseases
- Sequence for the treatment of periodontitis stages I, II and III (Strong Consensus):
    - Patients diagnosed with periodontal conditions should undergo a stepwise approach to therapy, which involves different interventions depending on the disease stage. The process begins with informing the patient about the diagnosis, causes, treatment options, risks, and

benefits, followed by agreement on a personalized care plan. The therapy includes the following steps:

- Clinical Recommendations: First Step of Therapy
    - Supragingival dental biofilm control (by the patient)
        - Maintaining consistent oral hygiene practices to control gingival inflammation throughout all stages of periodontal therapy is advised, including during supportive periodontal care (Grade A-↑↑, Strong Consensus).
        - Oral hygiene is recommended to be emphasized, as well as actively involving the periodontitis patient in adopting behavioral changes to improve their oral hygiene (Grade A-↑↑, Strong Consensus).
        - Psychological methods like motivational interviewing or cognitive-behavioral therapy have not demonstrated a substantial impact in improving patient behavior towards compliance with oral hygiene practices (Grade Unclear, Strong Consensus).
        - Intervention: Adjunctive therapies for gingival inflammation has been evaluated within the second step of therapy.
    - Supragingival dental biofilm control (professional)
        - Supragingival professional mechanical plaque removal and control of retentive factors is recommended as part of first-step therapy (Grade A-↑↑, Unanimous Consensus).
        - Risk factor control interventions are recommended in periodontitis patients as part of first-step therapy (Grade A-↑↑, Strong Consensus).
        - Tobacco smoking cessation interventions are recommended to be implemented in patients undergoing periodontitis therapy (Grade A-↑↑, Unanimous Consensus).
        - Diabetes control interventions are recommended in patients undergoing periodontitis therapy (Grade A-↑↑, Consensus).
        - It is unknown whether interventions that aim to increase physical exercise/activity have a positive impact in periodontitis therapy (Grade 0, Consensus).
        - It is unknown whether dietary counseling may have a positive impact in periodontitis therapy (Grade 0, Consensus).

        - It is unknown whether interventions aimed at weight loss through lifestyle modifications may have a positive impact in periodontitis therapy (Grade 0, Strong Consensus).

- Clinical Recommendations: Second Step of Therapy
    - Subgingival instrumentation is recommended as a treatment for periodontitis. This approach helps reduce probing pocket depths, gingival inflammation, and the number of diseased sites, leading to improved periodontal health (Grade A-↑↑, Unanimous Consensus).
    - Subgingival periodontal instrumentation is recommended using hand or powered instruments (sonic/ultrasonic), either alone or in combination (Grade A-↑↑, Unanimous Consensus).
    - Subgingival periodontal instrumentation can be performed using either traditional quadrant-wise treatment or full mouth delivery within 24 hours (Grade B-↑, Strong Consensus).
    - It is suggested not to use laser as an adjunct to subgingival instrumentation (Grade B-↓, Simple Majority).
    - It is suggested not to use adjunctive antimicrobial photodynamic therapy (aPDT) at wavelength ranges of either 660–670 nm or 800–900 nm in patients with periodontitis (Grade B-↓, Consensus).
    - Local administration of statin gels (atorvastatin, simvastatin, rosuvastatin) as adjuncts to subgingival instrumentation is advised against (Grade A-↓↓, Strong Consensus).
    - The use of probiotics as an adjunct to subgingival instrumentation is not recommended (Grade B-↓, Consensus).
    - The use of a systemic sub-antimicrobial dose doxycycline (SDD) as an adjunct to subgingival instrumentation is not recommended (Grade B-↓, Consensus).
    - The use of a locally delivered bisphosphonate (BP) gels or systemic BPs as an adjunct to subgingival instrumentation is not recommended (Grade A-↓↓, Strong Consensus).
    - The use of systemic or local non-steroidal anti-inflammatory drugs (NSAIDs) are not recommended as adjunct to subgingival instrumentation (Grade A-↓↓, Strong Consensus).
    - Omega-3 PUFAs are not recommended as an adjunct to subgingival instrumentation (Grade A-↓↓, Consensus)
    - The local administration of metformin gel is not recommended as adjunct to subgingival instrumentation (Grade A-↓↓, Strong Consensus)

- In specific cases during periodontitis therapy, adjunctive antiseptics like chlorhexidine mouth rinses can be considered for a limited duration, as an adjunct to mechanical debridement, to complement the treatment (Grade 0 ⇿, Consensus).
- May consider locally administered sustained release chlorhexidine as an adjunct to subgingival instrumentation in periodontitis patients (Grade 0 ⇿, Consensus).
- May consider specific locally administered sustained-release antibiotics as adjuncts to subgingival instrumentation in patients with periodontitis (Grade 0⇿, Consensus).
- Routine use of systemic antibiotics as an adjunct to subgingival debridement in patients with periodontitis is not recommended due to concerns about patient health and the potential impact on public health (Grade A-↓↓, Consensus).
- The adjunctive use of specific systemic antibiotics may be considered for certain patient categories, such as young adults with generalized Stage III periodontitis (Grade 0 ⇿ Consensus).

- Clinical Recommendations: Third Step of Therapy
  - For patients with Stage III periodontitis who have deep residual pockets (PPD ≥ 6 mm) after the first and second steps of periodontal therapy, access flap surgery is to be considered. For patients with moderately deep residual pockets (4–5 mm), repeat subgingival instrumentation is recommended as an alternative approach (Grade B↑- Consensus).
  - After completing the necessary first and second steps of periodontal therapy, there is currently not enough evidence to provide a definitive recommendation on the choice of flap procedures for cases involving deep residual pockets (PPD ≥ 6 mm) and intrabony defects in patients with Stage III periodontitis. Access periodontal surgery can be conducted using different flap designs (Grade 0 ⇿ Consensus).
  - In cases of deep residual pockets (PPD ≥ 6 mm) in patients with Stage III periodontitis following a sufficient second step of periodontal therapy, consider resective periodontal surgery. Be aware of the potential risk of gingival recession that may increase (Grade B↑, Simple Majority).
  - Surgical treatment is effective but complex. It should be provided by dentists with additional training or specialists in referral centers. Efforts to improve access to this level of care for patients are recommended (Grade A↑↑, Consensus).

- As a minimum requirement, regular scaling and root debridement, with or without access flap surgery is recommended as part of high-quality step 1 and 2 treatments for periodontitis. Additionally, a frequent program of supportive periodontal care, including subgingival instrumentation, is essential for maintaining periodontal health (Grade A↑↑, Consensus).
- Performing periodontal (including implant) surgery in patients who have not achieved and cannot maintain adequate levels of self-performed oral hygiene is not recommended (Grade A↑↑, Strong Consensus).
- It is recommended to use periodontal regenerative surgery to treat teeth with residual deep pockets associated with intrabony defects that are 3 mm or deeper (Grade A↑↑, Consensus).
- It is recommended to use either barrier membranes or enamel matrix derivative with or without the addition of bone-derived grafts in regenerative therapy (Grade A↑↑, Consensus).
- Specific flap designs that prioritize preserving interdental soft tissues, such as papilla preservation flaps are recommended. It is also recommended to limit flap elevation under specific circumstances to optimize wound stability and reduce morbidity (Grade A↑↑, Consensus).
- It is recommended to provide periodontal therapy for molars with Class II and III furcation involvement and residual pockets (Grade A↑↑, Strong Consensus).
- Furcation involvement should not be considered a reason for extraction (Statement, Consensus).
- Periodontal regenerative surgery is recommended to treat mandibular molars with residual pockets associated with Class II furcation involvement (Grade A↑↑, Consensus).
- It is recommended to treat molars with residual pockets associated with mandibular and maxillary buccal Class II furcation involvement with periodontal regenerative therapy using enamel matric derivative alone or bone-derived graft with or without resorbable membranes (Grade A↑↑, Simple Majority).
- May consider non-surgical instrumentation, OFD, periodontal regeneration, root separation or root resection in maxillary interdental Class II furcation involvement (Grade 0↔Consensus).

    - May consider nonsurgical instrumentation, OFD, tunneling, root separation or root resection in maxillary Class III and multiple Class II furcation involvement in the same tooth (Grade 0↔ Strong Consensus)
    - May consider nonsurgical instrumentation, OFD, tunneling, root separation or root resection in mandibular Class III and multiple Class II furcation involvement in the same tooth (Grade 0↔ Unanimous Consensus)
- Clinical Recommendations: Supportive Periodontal Care
    - After completing active therapy, it is important to schedule supportive periodontal care visits at intervals of 3 to 12 months, depending on the patient's risk profile and the state of their periodontal health. This individualized approach ensures proper follow-up and maintenance of periodontal well-being (Grade A↑↑, Strong Consensus).
    - It is strongly recommended to promote adherence to supportive periodontal care, as it plays a crucial role in achieving long-term periodontal stability and potential further improvements in the patient's periodontal health (Grade A↑↑, Unanimous Consensus).
    - It is recommended to provide repeated and personalized instructions in mechanical oral hygiene, including interdental cleaning, for patients undergoing supportive periodontal care (SPC). This approach helps control inflammation and prevents potential damage to their periodontal health (Grade A↑↑, Unanimous Consensus).
    - It is recommended to take into account patients' needs and preferences when choosing a toothbrush design, and when choosing an interdental brush design (Grade A↑↑, Strong Consensus).
    - May consider the use of a powered toothbrush as an alternative to manual toothbrushing for periodontal maintenance patients (Grade 0 ↔, Strong Consensus)
    - It is recommended to supplement tooth brushing with the use of interdental brushes, if anatomically possible (Grade A-↑↑, Unanimous Consensus).
    - Flossing is not suggested as a first choice for interdental cleaning in periodontal maintenance patients (Grade B-↓, Consensus)
    - It is suggested to supplement tooth brushing with the use of other interdental cleaning devices in periodontal maintenance patients, for interdental areas not reachable by toothbrushes (Grade B-↑, Consensus).

- Additional strategies in motivation: it is recommended to utilize “first step of therapy” section (Strong Consensus).
- Self-performed mechanical removal of biofilm is the basis of management of gingival inflammation. May consider adjunctive measures, including antiseptic, as part of a personalized treatment approach (Grade 0 ↔, Consensus).
- The use of adjunctive antiseptics may be considered in supportive periodontal care for periodontitis patients to help control gingival inflammation in specific cases (Grade 0 ↔, Consensus).
- The effectiveness of other adjunctive agents, such as probiotics, prebiotics, anti-inflammatory agents, and antioxidant micronutrients, in controlling gingival inflammation in patients receiving supportive periodontal care is not yet known (Grade 0, Consensus).
- For adjunctive use of an antiseptic dentifrice formulation in supportive periodontal care for periodontitis patients, consider products that contain chlorhexidine, triclosan-copolymer, and stannous fluoride-sodium hexametaphosphate. These ingredients have shown efficacy in controlling gingival inflammation and can be beneficial in maintaining periodontal health in this context (Grade B-↑, Consensus).
- For adjunctive use of an antiseptic mouth rinse formulation in supportive periodontal care for periodontitis patients, consider products that contain chlorhexidine, essential oils, and cetylpyridinium chloride. These ingredients have demonstrated effectiveness in controlling gingival inflammation and can be beneficial in maintaining periodontal health in this context (Grade B-↑, Consensus).
- Routine professional mechanical plaque removal (PMPR) is suggested as part of supportive periodontal care to limit tooth loss and enhance periodontal stability/improvement (Grade B-↑, Strong Consensus).
- Conventional professional mechanical plaque removal (PMPR) should not be replaced by Er:YAG laser treatment in supportive periodontal care (Grade B-↓, Strong Consensus).
- It is suggested not to use adjunctive methods (sub-antimicrobial dose doxycycline, photodynamic therapy) to professional mechanical plaque removal (PMPR) in supportive periodontal care (Grade B-↓, Strong Consensus).
- Risk factor control interventions in periodontitis patients is recommended in supportive periodontal care (Grade A-↑↑, Strong Consensus)

- Tobacco smoking cessation interventions are recommended to be implemented in periodontitis patients in supportive periodontal care (Grade A-↑↑, Strong Consensus).
- It is suggested to promote diabetes control interventions in patients in maintenance therapy (Grade B↑, Consensus).
- It is not known whether physical exercise (activity), dietary counseling or lifestyle modifications that aim at weight loss are relevant in supportive periodontal care (Grade 0, Strong Consensus).

1.1.5 European Federation of Periodontology: Treatment of Stage IV Periodontitis: The EFP S3 Level Clinical Practice Guideline (2022)

*Please refer to **Section 1.3** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

Evidence levels and recommendation grades are similar to those outlined in tables 3 and 4 above. The following recommendations are provided by the European Federation of Periodontology on the treatment of Stage IV Periodontitis[15] :

- Periodontal Diagnosis and Treatment Sequence for The Management of Stage IV Periodontitis Patients:
  - According to this classification, stage IV periodontitis is a more severe form than stage III periodontitis, characterized by periodontal inflammation and attachment loss reaching the middle third of the root or beyond. Stage IV periodontitis requires complex rehabilitation due to certain factors:
    - Secondary occlusion trauma/tooth hypermobility caused by reduced periodontal attachment caused by periodontitis
    - Tooth migration or drifting
    - Loss of five or more teeth due to periodontitis
    - Loss of posterior support and/or flaring of anterior teeth
    - Masticatory dysfunction resulting from the above issues.
  - These signs of functional impairment may also be present in people with severe tooth loss due to caries or malocclusion, even in those without significant periodontal breakdown or in people with stages I-II periodontitis who do not meet the criteria for stage IV. Therefore, a careful differential diagnosis is important.
  - Standard periodontal therapy (steps I-III and supportive care) is insufficient to stabilize the mouth, resolve masticatory dysfunction, and

improve the patient's quality of life. To effectively treat these patients, an interdisciplinary treatment plan, including managing secondary occlusal trauma, orthodontic tooth movement, and/or restorative dental care after successful periodontal therapy, must be implemented.

- Specific diagnostic pathways in patients with stage IV periodontitis
    - To evaluate the severity of periodontal breakdown and the complexity of treatment required in stage IV periodontitis, a comprehensive periodontal examination, along with appropriate imaging, is necessary. Additionally, a thorough assessment of tooth function and aesthetics is essential. This includes evaluating tooth hypermobility, tooth vitality, secondary occlusal trauma, stable posterior vertical stops, fremitus in occlusion and excursive movements, chewing function, aesthetics, and phonetics.
    - Determining the number of teeth lost due to periodontitis can be challenging and requires a complex assessment based on the history of tooth loss/extraction and associated symptoms. Clinical history is valuable in determining the probable cause of tooth loss, providing useful information for individual case diagnosis.
    - The prognosis of individual teeth in stage IV periodontitis patients requires a multidisciplinary approach. Differentiating between compromised/ questionable teeth and those with a hopeless prognosis is challenging and depends on the experience and technical ability of the dental professional(s) involved. Predicting tooth survival accurately is difficult, even for specialists, as they tend to underestimate the outcome. Achieving the endpoints of periodontal therapy, as outlined in the treatment guidelines for stages I-III periodontitis, is crucial for improving the long-term prognosis of individual teeth. Implementing an effective supportive periodontal care program is also essential.
    - Restorative factors play a significant role in determining the prognosis. The assessment should consider the extent of edentulous spaces and the number, distribution, and restorability of teeth that can be retained. Different restorative scenarios, including using natural teeth alone or in combination with dental implants, must be considered, taking into account the technical complexities and availability of adequate ridge dimensions for implant placement.
    - When determining the overall case prognosis, the patient's individual susceptibility to periodontal disease is vital. This requires a thorough analysis of modifiable and non-modifiable risk factors, using primary grade criteria and grade modifiers defined earlier. Estimating the

probability of disease recurrence or progression is critical in managing stage IV periodontitis patients compared to other complex restorative cases.

- Differential Diagnosis should be established based on the identification of cases with specific characteristics:
    - Opening of diastemata or tooth migration, which may be secondary to orthodontic relapse.
    - Primary occlusal trauma in people with periodontitis.
    - Masticatory dysfunction in people with multiple tooth loss not attributed to periodontitis and without periodontitis.
    - Masticatory dysfunction in people with multiple tooth loss not attributed to periodontitis, but with stage I-II or localized stage III periodontitis.
    - Generalized stage III periodontitis without tooth loss or other criteria defining stage IV periodontitis (difficult in some cases).
    - A recent cross-sectional study (Uy et al., 2021) found that stage IV periodontitis cases were more likely to have:
        - Severe periodontal breakdown.
        - Tooth hypermobility.
        - Loss of posterior functional tooth units.
        - Self-reported changes in dietary habits due to oral condition.
        - Impaired chewing ability.
        - Lower quality of life.
        - The applicability of the study might be limited.
- Phenotypic variation and identification of clinical case types:
    - Four major stage IV periodontitis phenotypes lead to specific clinical case types:
        - Case type 1: Tooth hypermobility due to secondary occlusal trauma, correctable without tooth replacement.
        - Case type 2: Pathological tooth migration amenable to orthodontic correction.
        - Case type 3: Partially edentulous patients prosthetically restored without full-arch rehabilitation.

- Case type 4: Partially edentulous patients requiring full-arch rehabilitation, either tooth- or implant-supported/retained.
- Phenotypes and clinical case types may overlap on occasion, requiring different approaches for each arch.

- Treatment tools for rehabilitation include temporary control of secondary occlusal trauma, prosthetic splinting, orthodontic therapy, tooth-supported/retained dental prostheses, implant-supported/retained dental prostheses, and cross-arch dental prostheses.
- Most stage IV periodontitis cases can be successfully treated to maintain natural dentition in a healthy and functional state.
- Comprehensive diagnosis and case study, including tooth-by-tooth prognosis, are essential before treatment planning for stage IV periodontitis patients.

- Sequence for the treatment of stage IV periodontitis:
  - The treatment plan for stage IV periodontitis should achieve a successful outcome after interventions in steps 1, 2, and 3, following the treatment of stage I-III periodontitis.
  - Specific additional treatment measures are necessary for stage IV periodontitis, including rehabilitation of function, restoration of masticatory comfort, and treatment of secondary occlusal trauma, which may be implemented simultaneously with steps 1-3.
  - Informing the patient of the diagnosis, treatment alternatives, risks, and benefits, including the option of no treatment, is essential before therapy. The "no treatment" option must be discouraged due to the high risk of dentition loss in stage IV periodontitis.
  - Combining periodontal therapy in line with stage I-III periodontitis guidelines with rehabilitation is key to managing stage IV cases.
  - The appropriate timing and sequence of orthodontic/restorative treatment and periodontal treatment must be identified.
  - Frequent re-evaluations to assess oral hygiene, biofilm control, and risk factor interventions are crucial for achieving desired

treatment outcomes and justifying resources for restorative or orthodontic therapy.

- Specific criteria must be considered when assessing the ability of a tooth to function as a restorative abutment, including periodontal maintainability, residual periodontal support, and restorative parameters.
- Teeth with a reduced but healthy periodontium may function well as prosthetic abutments, but the threshold of residual periodontal support may be controversial and dependent on restoration design, abutment number, and prosthesis stability.

- Specific treatment pathways according to the different stage IV periodontitis case types
  - The treatment plan for all stage IV periodontitis case types requires careful diagnosis, including both periodontal and rehabilitation phases.
  - Adequate self-performed oral hygiene and risk factor control are necessary before progressing to subsequent periodontal/oral rehabilitation.
  - Case type 1 (Tooth hypermobility due to secondary occlusal trauma):
    - Temporary tooth splinting and occlusal adjustment during step 1.
    - Longer-term splinting re-assessed after steps 2 and 3 of periodontal therapy.
  - Case type 2 (Pathological tooth migration):
    - Orthodontic therapy planned during steps 2 and 3 but implemented after achieving periodontal treatment objectives.
    - Special considerations for regenerative treatment of intra-bony defects.
  - Case type 3 (Partially edentulous patients without full-arch rehabilitation):
    - Intermediate restorations deferred until after step 2 of treatment.
    - Definitive restorative treatment or dental implants after successful completion of periodontal therapy.

- Case type 4 (Partially edentulous patients requiring full-arch rehabilitation):
    - Tooth-supported full-arch restorations: Intermediate restoration placed after step 1, definitive restoration after periodontal therapy.
    - Implant-supported full-arch restorations: Implants placed after step 1, sequence of treatment and insertion of intermediate prostheses carefully managed for healing and patient comfort.

- Additional therapeutic interventions in stage IV periodontitis:
    - Specific treatment interventions for stage IV periodontitis include:
        - Temporary control of secondary occlusal trauma.
            - In stage IV periodontitis patients, consider temporary splinting and/or limited selective occlusal adjustment of hypermobile teeth during all steps of therapy (particularly step 1) to increase comfort of patient and enable/facilitate therapy (Grade 0↔, Unanimous Consensus).
            - In stage IV periodontitis patients who do not require tooth replacement but show persistent hypermobility or increased mobility after successfully completing periodontal therapy, consider long-term tooth splinting to improve the comfort of the patient (Grade 0↔, Unanimous Consensus).
        - Orthodontic therapy.
            - In successfully treated Stage IV periodontitis patients that are in need of orthodontic therapy, it is suggested to undergo orthodontic therapy if it doesn't significantly affect periodontal outcomes (probing pocket depth-PPD and clinical attachment levels-CAL), gingival inflammation (bleeding on probing- BOP) and gingival recession, or if it does not lead to a significant increase in root resorption (Grade B↑, Unanimous Consensus).
            - It is recommended to start Orthodontic therapy once periodontal therapy endpoints have been

achieved [no sites with PPD = 5 mm and BOP and no sites with PPD ≥6 mm) in successfully treated Stage IV periodontitis patients in need (Grade A↑↑, Strong Consensus).

- In stage IV periodontitis with pathological tooth migration, it is suggested to undergo orthodontic therapy once the endpoints of periodontal therapy have been reached, based on evidence that it does not significantly affect periodontal outcomes, seems to reduce gingival inflammation, does not significantly alter gingival margin levels, seems to improve inter-dental papilla height, and does not significantly affect root resorption and seems to reduce tooth mobility (Grade B↑, Consensus).
- Orthodontic therapy may be considered in stage IV periodontitis patients with tilted molars, although there is lack of evidence on possible effect of periodontal outcomes (Grade 0↔, Strong Consensus).
- In stage IV periodontitis patients where intra-bony defects have been treated, it is recommended to undertake orthodontal therapy based on the evidence that the combined treatment significantly improves periodontal outcomes and reduces gingival inflammation (Grade A↑↑, Consensus).
- In stage IV periodontitis patients where intra-bony defects have been treated, it is suggested not to wait for a prolonged period after regenerative intervention before initiation OT, since there is evidence that a short (1 month) and a prolonged (6 month) period between periodontal/regenerative and OT result in comparable outcomes (Grade A↑↑, Consensus).
- In patients with severe periodontitis (Stage IV or equivalent) with indication of OT to maintain/improve periodontal stability, it is suggested to use fixed appliances rather than removable appliances (Grade B↑, Consensus).

- In patients with severe periodontitis (Stage IV or equivalent) with indication of OT to maintain/improve periodontal stability, consider the use of fiberotomy as an adjunct to orthodontic tooth movement to improve periodontal outcomes (Grade 0↔, Consensus).
- In patients with severe periodontitis (Stage IV or equivalent) with indication of OT to maintain/improve periodontal stability, consider the use of skeletal anchorage devices to enhance orthodontic tooth movement (Grade 0↔, Consensus).
- During OT, it is recommended to closely monitor and manage the patient's periodontal status, ideally at each orthodontic appointment. Active OT should be interrupted if signs of periodontitis are detected, and affected teeth should be passively maintained while rendering proper periodontal treatment and oral hygiene reinforcement. OT can be reinstituted once periodontal health/stability has been re-established. After OT completion, it is recommended to provide life-long periodontal care and orthodontic retention that are tailored to the individual needs/risk profile of the patient (Grade A↑↑, Unanimous Consensus).
- An appropriately designed permanent fixed passive retention (with or without additional removable retention) is recommended to be used after the completion of orthodontic therapy. A life-long supporting protocol is also recommended in order to identify early retainer failures and/or undesired tooth movements (Grade A↑↑, Consensus).

- Rehabilitation of edentulous spaces and posterior free end edentulism.
  - Consider different options (namely tooth-supported fixed dental prostheses, implant-supported fixed dental prostheses, removable dental prostheses, or no prosthetic rehabilitation) in partially edentulous stage IV periodontitis patients with tooth-delimited edentulous spaces (Grade 0↔, Consensus).

    - It is suggested to use tooth-supported fixed dental prostheses in patients with Stage IV periodontitis when abutment teeth are periodontally maintainable and restorable (Grade B↑, Consensus).
    - In certain circumstances such as in small tooth-delimited edentulous spaces, resin-bonded fixed dental prostheses may be considered (Grade 0↔, Consensus).
    - Resin-bonded fixed dental prostheses are not suggested for large tooth-delimited edentulous spaces (Grade B↑, Consensus).
    - Implant-supported fixed dental prostheses are suggested when abutment teeth are not periodontally maintainable and restorable (Grade B↑, Strong Consensus)
    - Consider metal-based frame removable dental prostheses as transitional or definitive treatment options when a fixed solution is not a consideration (Grade 0↔, Consensus).
    - Consider different options, namely shortened dental arch, implant-supported restorations, or removable dental prostheses, for the rehabilitation of partially edentulous stage IV periodontitis patient with free-end situations (Grade 0↔, Strong Consensus).
    - No tooth replacement may be considered in the free-end situation in stage IV periodontitis patients with a shortened dental arch with sufficient occluding/masticatory units (Grade 0↔, Simple Majority).
    - Implant-supported fixed dental prostheses is suggested in stage IV periodontitis patients with free-end situations who require additional occluding units. When implants are not an option, removable dental prostheses with a metal-based framework is suggested (Grade B↑, Strong Consensus).
- Tooth-supported and implant-supported full-arch fixed and removable dental prostheses.

        - A tooth-supported full-arch fixed dental prosthesis is suggested in patients with periodontitis stage IV with a sufficient number (4 or more abutment teeth) of periodontally maintainable, bilaterally distributed and restorable teeth in the maxilla and/or mandible (Grade B↑, Consensus).
        - A tooth-supported full-arch fixed dental prosthesis (overdenture) may be considered in patients with periodontitis stage IV with an insufficient number or distribution of periodontally maintainable teeth to support a tooth-supported full-arch fixed dental prosthesis (Grade 0↔, Strong Consensus).An implant-supported full-arch fixed dental prosthesis is suggested in periodontitis stage IV patients in whom tooth preservation was deemed impossible, and a sufficient number (4 or more) of bilaterally distributed and adequately sized dental implants are planned in the maxilla and/or mandible (Grade B↑, Consensus).
        - An implant-supported full-arch removable dental prosthesis (overdenture) may be considered in periodontitis stage IV patients in whom tooth preservation was deemed impossible and adequately sized dental implants can be used, albeit not in sufficient number and/or adequate position to support a full-arch fixed dental prosthesis (Grade 0↔, Strong Consensus).
    - Some interventions should be performed simultaneously or within steps 1-3 of periodontal therapy, while others are reserved for the last step (Step R, for rehabilitation) after successful completion of periodontal therapy.
  - Supportive periodontal care in stage IV periodontitis patients
    - Supportive periodontal care is crucial for achieving periodontal stability and long-term tooth/implant retention in stage IV periodontitis patients.
- Impact of therapy in stage IV periodontitis patients on systemic health and quality of life
  - Periodontal therapy and rehabilitation may positively impact systemic health and quality of life in stage IV periodontitis patients.

- Key aspects in the treatment of stage IV periodontitis
    - These include detailed patient education about treatment options, preservation of periodontally compromised teeth, adherence to periodontal therapy guidelines, and frequent assessment of patient motivation and adherence to oral hygiene and risk factor control. Restorations should be designed to achieve function, aesthetics, and effective self-performed oral hygiene.
- Clinical Recommendations: Overall Strategy for The Management of Stage IV Periodontitis Patients:
    - Stage IV periodontitis can be effectively managed through a combination of periodontal therapy, functional rehabilitation, and improvements in aesthetics and quality of life, along with supportive periodontal care (Statement, Unanimous Consensus).
    - Tooth retention is strongly recommended as the primary treatment approach for rehabilitating stage IV periodontitis patients (Grade A ↑↑, Strong Consensus).
    - It is advised to preserve the dental arch integrity by avoiding extractions whenever possible in patients with stage IV periodontitis (Grade B↑, Consensus).
    - For patients with stage IV periodontitis seeking enhancements in aesthetics, phonetics, masticatory function, and overall well-being, the consideration of direct and indirect tooth restorations and/or epitheses is suggested (Grade 0↔, Consensus).
- Clinical Recommendations: Case Type 1
- Case type 1: the patient with tooth hypermobility due to secondary occlusal trauma that can be corrected without tooth replacement.
    - In stage IV periodontitis patients, temporary splinting and/or limited selective occlusal adjustment of hypermobile teeth can be considered throughout all steps of periodontal therapy, especially during step 1, to enhance patient comfort and aid in periodontal treatment (Grade 0↔, Unanimous Consensus).
    - If stage IV periodontitis patients do not need tooth replacement but experience persistent hypermobility or increasing tooth mobility after successful periodontal therapy, long-term tooth splinting may be considered to improve patient comfort (Grade 0↔, Unanimous Consensus).

- Clinical Recommendations: Case Type 2
- Case type 2: the patient with pathological tooth migration, characterized by tooth elongation, drifting and flaring, which is amenable to orthodontic correction.
    - In successfully treated stage IV periodontitis patients requiring orthodontic therapy, it is suggested that orthodontic treatment can be undertaken based on evidence showing minimal impact on periodontal outcomes (probing pocket depth-PPD and clinical attachment levels-CAL), gingival inflammation (bleeding on probing—BOP) and gingival recession, and root resorption (Grade B↑, Consensus).
    - After successfully treating stage IV periodontitis patients, it is advisable to commence orthodontic therapy once specific periodontal treatment goals have been reached: no sites with PPD = 5 mm and BOP and no sites with PPD ≥6 mm (Grade A↑↑, Strong Consensus).
    - Orthodontic therapy (OT) in stage IV periodontitis patients with pathological tooth migration is recommended after achieving the endpoints of periodontal therapy, as it appears to improve periodontal outcomes, reduce gingival inflammation, and preserve gingival margin levels and inter-dental papilla height (Grade B↑, Consensus).
    - In patients with stage IV periodontitis and tilted molars, orthodontic therapy may be considered as a potential treatment option. However, it is important to note that there is currently limited evidence available regarding its potential impact on periodontal outcomes (Grade 0↔, Strong Consensus).
    - In stage IV periodontitis patients with treated intra-bony defects, orthodontic therapy is recommended as a combined treatment that significantly improves periodontal outcomes and reduces gingival inflammation (Grade A↑↑, Consensus).
        - There is no need to wait for a prolonged healing period before initiating orthodontic treatment (Grade B↑, Consensus).
    - In severe periodontitis cases requiring orthodontic therapy:
        - Fixed appliances are suggested over removable ones (Grade B↑, Strong Consensus).
        - The use of fiberotomy and skeletal anchorage devices may be considered to enhance orthodontic tooth movement and improve periodontal outcomes (Grade 0↔, Consensus).

    - During orthodontic treatment, close monitoring and management of the patient's periodontal status are recommended. If signs of periodontitis recurrence are detected, active orthodontic treatment should be interrupted, and proper periodontal treatment and oral hygiene reinforcement should be provided (Grade A↑↑, Unanimous Consensus).
    - After completion of orthodontic therapy, life-long supportive periodontal care and orthodontic retention tailored to the patient's needs and risk profile are recommended (Grade A↑↑, Unanimous Consensus).
    - Appropriate permanent fixed passive retention, with or without additional removable retention, should be used after orthodontic therapy. Life-long supporting protocols should be implemented to identify early retainer failures and undesired tooth movements (Grade A↑↑, Consensus).
- Clinical Recommendations: Overall Strategy for The Management of Case Types 3 And 4
    - In partially edentulous stage IV periodontitis patients, it is essential to identify their restorative needs based on factors such as tooth loss pattern, functional and aesthetic preferences, patient comfort, and prognosis. The chosen rehabilitation level and design should be compatible with long-term case stability to achieve the best possible outcome (Grade A↑↑, Strong Consensus).
    - Placing an interim dental prosthesis, if needed, early during periodontal therapy, but only after ensuring satisfactory oral hygiene (Grade A↑↑, Strong Consensus).
    - Design dental prostheses to facilitate effective self-performed oral hygiene and professional plaque removal (Grade A↑↑, Unanimous Consensus).
    - Provide the definitive prosthesis after a thorough evaluation of the maintainability and prognosis of abutment teeth or implants (Grade A↑↑, Unanimous Consensus).
    - When considering dental implants for stage IV periodontitis patients' rehabilitation, verify the absence of contraindications to surgery. Also evaluate the dimensions of the hard and soft tissues and assessing the potential need for soft or hard tissue augmentation (Grade A↑↑, Consensus).
    - When considering dental implants for the rehabilitation of stage IV periodontitis patients, it is essential to provide information about the increased risk of peri-implantitis and potential implant loss (Grade A↑↑, Consensus).

    - To minimize the risk of tooth loss and prosthesis failure, avoid combined tooth/implant-supported fixed partial dental prostheses whenever feasible, and explore alternative treatment options (Grade B↑, Unanimous Consensus).
- Clinical Recommendations: Case Type 3
- Case type 3: partially edentulous patients who can be prosthetically restored without full-arch rehabilitation.
    - For partially edentulous stage IV periodontitis patients with tooth-delimited edentulous spaces, various treatment options can be considered, including tooth-supported fixed dental prostheses, implant-supported fixed dental prostheses, removable dental prostheses, or no prosthetic rehabilitation (leaving the edentulous spaces as they are) (Grade 0↔, Consensus).
    - In patients with stage IV periodontitis, tooth-supported fixed dental prostheses are recommended when the abutment teeth are both periodontally maintainable and restorable (Grade B↑, Consensus).
    - In certain situations, with small tooth-delimited edentulous spaces, resin-bonded fixed dental prostheses may be considered as an alternative (Grade 0↔, Consensus).
    - It is not recommended to use resin-bonded fixed dental prostheses for large tooth-delimited edentulous spaces (Grade B↑, Consensus).
    - When the patient's natural teeth cannot be effectively maintained and restored due to severe periodontal issues, consider implant-supported fixed dental prostheses as a suitable alternative (Grade B↑, Strong Consensus).
    - Metal-based frame removable dental prostheses can be taken into consideration as either a temporary transitional option or a definitive treatment choice when a fixed dental solution is not feasible or preferred (Grade 0↔, Consensus).
    - Various treatment options can be considered for the restoration of partially edentulous stage IV periodontitis patients with free-end situations (namely shortened dental arch, implant-supported restorations or removable dental prostheses) (Grade 0↔, Strong Consensus).
    - In cases of stage IV periodontitis patients with a shortened dental arch, where there are enough occluding and masticatory units (e.g., from second premolar to second premolar), no evident risk of tooth flaring or elongation, and the patient experiences adequate comfort, tooth

replacement in the free-end situation may not be necessary (Grade 0↔, Simple Majority).

- For stage IV periodontitis patients with free-end situations who need more occluding units, consider implant-supported fixed dental prostheses. If dental implants are not feasible, removable dental prostheses with a metal-based framework are suggested as an alternative option (Grade B↑, Strong Consensus).

- Clinical Recommendations: Case Type 4
- Case type 4: partially edentulous patients who need to be restored with full-arch rehabilitation, either tooth- or implant-retained.
  - For patients with stage IV periodontitis who have at least four periodontally maintainable, bilateral, and restorable teeth in the maxilla and/or mandible, consider a tooth-supported full-arch fixed dental prosthesis (Grade B↑, Consensus).
  - In stage IV periodontitis patients with an inadequate number or distribution of periodontally maintainable teeth to support a tooth-supported full-arch fixed dental prosthesis, a tooth-supported full-arch removable dental prosthesis (overdenture) can be considered as an alternative option (Grade 0↔, Strong Consensus).
  - In stage IV periodontitis patients where tooth preservation is not possible, and there are an adequate number (≥4) of bilaterally distributed and appropriately sized dental implants planned in the maxilla and/or mandible, an implant-supported full-arch fixed dental prosthesis is recommended as a suitable treatment option (Grade B↑, Consensus).
  - In stage IV periodontitis patients where tooth preservation is not possible, and adequately sized dental implants can be used but not in sufficient number and/or suitable positions to support a full-arch fixed dental prosthesis, consider an implant-supported full-arch removable dental prosthesis (overdenture) as a treatment option (Grade 0↔, Strong Consensus).
- Long-Term Outcomes of Treatment in Stage IV Periodontitis Patients
  - Provide and adhere to regular professionally administered supportive periodontal care (SPC) to reduce tooth loss in the long term (≥5 years). Initially, SPC should be provided at 3-month intervals, and the frequency for the medium to long term should be personalized for each individual patient, considering their clinical and behavioral circumstances (Grade A↑↑, Consensus).

- In patients with periodontitis, if residual probing pocket depths (≥5 mm) persist after active therapy, there is an increased risk of disease recurrence/progression, even if the patient is receiving supportive periodontal care (SPC) (Unclear Grade, Unanimous Consensus).
- Tailor the recall intervals for supportive periodontal care (SPC) based on individual patient risk factors, such as smoking and hyperglycemia, as well as disease-related clinical measures like pocket depths and bleeding on probing (Grade A↑↑, Unanimous Consensus).
- Incorporate several essential elements while designing a supportive periodontal care (SPC) program, including (Grade A↑↑, Unanimous Consensus):
    - Specific interventions involving interviews, assessments, evaluations, practical interventions, and planning (as described in the introduction).
    - Delivery by a range of oral healthcare professionals, under the supervision of a suitably trained general dentist or a specialist, based on the complexity of each case.
    - Establishing clear and effective communication channels between the oral healthcare team and the patient, as well as between healthcare professionals (both medical and dental).
- Refrain from using adjunctive approaches to subgingival instrumentation when managing recurrence of periodontitis during supportive periodontal care (Grade B↓, Consensus).
- There is currently no evidence suggesting clinical disadvantages associated with regular long-term supportive periodontal care (SPC), such as gingival recession or clinical attachment loss. However, it is essential to inform patients about the possibility of these side effects as part of their informed consent process (Grade 0↔, Strong Consensus).
- We recommend that regular long-term supportive periodontal care (SPC) in specialist practice may lead to improved periodontal stability and tooth survival compared to SPC provided in general practice. The cost-effectiveness of long-term supportive periodontal care (SPC) remains uncertain when considering both direct and indirect costs (Grade 0↔, Strong Consensus).

- Impact Of Periodontal Treatment on Systemic Health and Quality of Life
    - Treatment of periodontitis may lead to improvements in systemic inflammation and cardio-metabolic risk biomarkers even in individuals without reported systemic co-morbidities (Grade 0↔, Strong Consensus).

- Currently, there is insufficient evidence to determine if the treatment of periodontitis improves "hard" outcomes or complications of non-communicable diseases (NCDs) in patients with periodontitis and co-existing NCDs (Grade 0↔, Consensus).
- The treatment of periodontitis should aim to reduce systemic inflammation, lower cardiovascular risk, and improve metabolic control in patients with co-morbid non-communicable diseases (NCDs). However, treatment protocols should take into account the overall health status of the patient, including consideration of whether to approach treatment by quadrant or full mouth (Grade B↑, Consensus).
- The evidence regarding whether treatment of periodontitis during pregnancy reduces the risk of pre-term births (<37 weeks) or other adverse pregnancy outcomes is currently inconclusive and uncertain (Grade 0↔, Strong Consensus).
- We suggest that individuals with partial edentulism involving at least 5 teeth, including those affected by periodontitis, should undergo rehabilitation to enhance their quality of life (Grade A↑↑, Strong Consensus).
- The use of tooth-supported fixed or removable prostheses for the rehabilitation of partial edentulism is recommended as it can significantly improve the individual's quality of life (Grade A↑↑, Strong Consensus).
- The use of implant-supported prostheses for the rehabilitation of partial edentulism is also recommended as it has been shown to enhance the individual's quality of life (Grade A↑↑, Strong Consensus).
- Fully edentulous patients, including those who have lost teeth due to periodontitis, should be provided with complete conventional removable prostheses in one or both arches as a treatment option to enhance their quality of life (Grade A↑↑, Strong Consensus).
- Consider implant-supported full-arch removable dental prosthesis (overdenture) as a treatment option for fully edentulous individuals, including those affected by periodontitis, instead of conventional full-arch removable prostheses, to enhance their quality of life (Grade B↑, Strong Consensus).
- Provide prosthetic treatment for fully edentulous individuals to enhance their nutritional status (Grade A↑↑, Unanimous Consensus).
- The potential impact of treating full edentulism on frailty, cognitive function, and other systemic health benefits is currently unknown and requires further research (Grade A↑↑, Unanimous Consensus).

1.1.6 European Federation of Periodontology: Prevention and Treatment of Peri-Implant Diseases—The EFP S3 Level Clinical Practice Guideline (2023)

*Please refer to **Section 1.3** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

Evidence levels and recommendation grades are similar to those outlined in tables 3 and 4 above. The following recommendations are provided by the European Federation of Periodontology on the Prevention and Treatment of Peri-Implant Diseases[11]:

- In patients awaiting implant placement,
    - Conduct a comprehensive assessment of the patient's risk profile to identify and address modifiable risk factors and indicators for peri-implant diseases (Grade A↑↑, Unanimous Consensus).
    - Ensure that any existing gingivitis or periodontitis is treated in accordance with the guidelines until reaching a stable endpoint. Additionally, adherence to a supportive care program prior to implant placement is essential (Grade A↑↑, Unanimous Consensus).
- Treatment planning for three-dimensional implant positioning should consider the following conditions:
    - Sufficient buccal/lingual bone thickness to enable the implant to be placed in a prosthetically guided position with good primary stability, surrounded by bone (Grade A↑↑, Strong Consensus).
    - Adequate mesio-distal distance between the implant and adjacent tooth/implant to allow enough space for prosthetic components and access for oral hygiene aids (Grade A↑↑, Strong Consensus).
    - Proper apical-coronal position of the implant platform (shoulder) to provide enough space for prosthetic components and prevent an excessively deep mucosal sulcus ("tunnel" effect) (Grade A↑↑, Strong Consensus).
- To promote effective plaque control around implants and prevent peri-implant diseases, prosthetic treatment planning should consider:
    - Providing good access for oral hygiene aids used by the patient to remove plaque effectively (Grade A↑↑, Unanimous Consensus).
    - Ensuring good access for professional monitoring, such as peri-implant probing, and professional mechanical plaque removal during follow-up visits (Grade A↑↑, Unanimous Consensus).

    - Designing a prosthesis with a favorable emergence angle and profile to facilitate optimal plaque control (Grade A↑↑, Unanimous Consensus).
- The following guidelines are recommended for peri-implant probing to assess and monitor implant health (Grade A↑↑, Strong Consensus):
    - Perform baseline probing within 3 months of prosthesis delivery.
    - Re-probe at every clinical examination.
    - Use a probe with a 0.5-mm diameter tip and apply a light probing force of 0.2 N.
    - Record peri-implant probing depths at multiple sites (ideally 6 sites) circumferentially around the implant, and also assess bleeding on probing (BOP).
    - Evaluate and record the width of the keratinized attached peri-implant mucosa.
- Obtain a baseline intra-oral radiograph to document marginal bone levels after the completion of physiological remodelling. At subsequent visits, if there is an increase in probing depth along with the presence of BOP or suppuration, an intra-oral radiograph should be taken to evaluate the marginal bone levels (Grade A↑↑, Strong Consensus).
- Glycemic control is recommended in patients with diabetes who have healthy peri-implant tissues, in order to maintain peri-implant health (Grade A↑↑, Consensus).
- Regular supportive peri-implant care for patients with healthy peri-implant tissues is recommended. This approach helps reduce the risk of developing peri-implant diseases and emphasizes the significance of adhering to supportive peri-implant care visits and maintaining proper home care (Grade A↑↑, Consensus).
- In patients with healthy peri-implant tissues, validated smoking cessation interventions, following established guidelines are recommended. This approach is crucial in reducing the risk of peri-implant diseases and promoting long-term implant success (Grade A↑↑, Strong Consensus).
- In patients with dental implants who lack sufficient keratinized/attached mucosa and experience discomfort during brushing, it may be considered to increase the width of peri-implant keratinized/attached mucosa. This approach aims to promote peri-implant health and improve patient comfort in maintaining oral hygiene around the implant (Grade 0↔, Consensus).

- The effectiveness of increasing soft tissue thickness through procedures to prevent peri-implant diseases is uncertain due to the lack of evidence supporting this association (Grade B↓, Consensus).
- For patients with dental implants, provide personalized oral hygiene instructions to minimize the risk of developing peri-implant diseases (Grade A↑↑, Unanimous Consensus).
- There is insufficient evidence to determine whether controlling bruxism or parafunctional habits in patients with healthy peri-implant tissues reduces the risk of developing peri-implant diseases (Grade 0↔, Strong Consensus).
- We recommend providing Supportive Peri-Implant Care (SPIC) to patients to reduce the risk of peri-implantitis recurrence and potential implant loss. Emphasizing the significance of adhering to SPIC visits and maintaining proper home care is essential in this regard (Grade A↑↑, Unanimous Consensus).
- After non-surgical treatment of peri-implantitis, we recommend providing Supportive Peri-Implant Care (SPIC) every 3-4 months for the first 12 months, starting 3 months after treatment. Subsequently, the frequency of SPIC should be adjusted based on patient, implant, and restoration-related risk factors (Grade B↑, Unanimous Consensus).
- Following surgical treatment of peri-implantitis, we suggest SPIC to be provided every 3-4 months for the initial 12 months, starting 3 months after surgery. Afterward, the frequency of SPIC should be personalized based on patient, implant, and restoration-related risk factors. (Grade B↑, Unanimous Consensus).
- Implementing a patient-centered Supportive Peri-Implant Care (SPIC) protocol should include the following components (Grade A↑↑, Unanimous Consensus):
    - Interview: Update medical, social, and oral history, perform risk assessment, and gather patient feedback.
    - Oral assessment: Evaluate oral and peri-implant tissue health, examine prosthetic components, and assess the patient's ability to perform oral hygiene.
    - Reinforce risk factor control: Address factors like smoking, oral dryness, and glycemic control to reduce risks.
    - Professional intervention: Create an individualized oral healthcare plan, provide oral hygiene coaching, and perform professional mechanical plaque removal for both natural teeth and implants.

    - Determine next recall interval: Tailor the recall interval based on patient, implant, and restoration-related risk factors.

- The most effective PMPR (peri-implant maintenance and prevention of recurrence) regime for reducing the risk of recurrent peri-implantitis remains uncertain. However, there are several approaches for dental implant biofilm removal, based on periodontal literature and indirect evidence. These methods can be used alone or in combination and include (Grade 0 ↔, Strong Consensus):
    - Area-specific curettes made of titanium or stainless steel
    - Ultrasonic/sonic instruments
    - Rubber cups or brushes
    - Air-polishing devices using glycine powder or erythritol, either separately or in combination.
- The most effective oral hygiene (OH) method for reducing the risk of recurrent peri-implantitis is currently unknown. However, based on information from periodontal literature, indirect evidence, and expert opinion, we suggest individually tailored care for the patient and prosthesis, including at least (Grade 0 ↔, Unanimous Consensus):
    - Brushing dental implants and teeth twice daily using either manual or rechargeable power brushes.
    - Daily use of interproximal brushes of an appropriate size.
- We recommend that patients demonstrate their OH methods to the oral healthcare professional, and these techniques should be periodically reinforced (Grade A↑↑, Unanimous Consensus).
- We recommend avoiding the professional application of adjunctive local antimicrobial agents in supportive peri-implant care (SPIC) to reduce the risk of recurrent peri-implantitis (Grade B↓, Strong Consensus).
- Recommendations For the Management of Peri-Implant Mucositis
    - Clinicians are to consider the following endpoints for peri-implant mucositis treatment at implant level: ≤1 point of bleeding on probing (BOP) and absence of suppuration (Grade A↑↑, Unanimous Consensus).
    - We also suggest that clinicians evaluate these endpoints 2–3 months after the intervention. If ≥2 BOP sites, or ≥1 sites with profuse BOP, or suppuration are still present, re-treatment should be considered (Grade A↑↑, Unanimous Consensus).

- In patients with peri-implant mucositis, we recommend a combination of self-performed effective oral hygiene practices along with professional mechanical plaque removal (PMPR) (Grade A↑↑, Unanimous Consensus).
- In patients with peri-implant mucositis, the self-use of oral irrigation devices with water may be considered as a supplementary method alongside professional mechanical plaque removal (PMPR) (Grade 0 ↔, Consensus).
- In patients with peri-implant mucositis, ultrasonics with plastic coated tips or air-polishing devices with glycine powder, titanium curettes, or chitosan brushes may be considered as single modes of professional mechanical plaque removal (PMPR) (Grade 0 ↔, Consensus).
- In patients with peri-implant mucositis, we recommend not adding air-polishing devices to conventional professional mechanical plaque removal (PMPR) using curettes, ultrasonics, or both, despite the effectiveness of air-polishing as a single mode of treatment. Similarly, in patients with peri-implant mucositis, we suggest not adding diode lasers to conventional PMPR using curettes, ultrasonics, or both (Grade B↓, Consensus).
- In patients with peri-implant mucositis, reevaluate the effectiveness of professional mechanical plaque removal (PMPR) within 3 months after its initial administration. If the desired end points of therapy have not been achieved, a repeat of PMPR should be considered. The specific end points and evaluation times may be adjusted based on the patient's oral hygiene, risk factor profile, and the ease of cleaning the prosthesis (Grade A↑↑, Unanimous Consensus).
- In patients with peri-implant mucositis, if the implant-supported prosthesis does not allow for effective self-performed and/or professional cleaning, we recommend considering cleaning, removal, or modification of the prosthesis to improve its cleansability. This step is crucial to effectively manage and prevent further progression of peri-implant mucositis (Grade A↑↑, Unanimous Consensus).
- In patients with peri-implant mucositis, avoid the use of locally administered antibiotics as a treatment option (Grade A↓↓, Unanimous Consensus).
- In patients with peri-implant mucositis, we recommend not using locally administered agents such as antiseptics, 'postbiotics', or desiccant gel as adjuncts to PMPR (professional mechanical plaque removal) (Grade B↓, Strong Consensus).

- In patients with peri-implant mucositis, photodynamic therapy is not recommended as an adjunct to PMPR (professional mechanical plaque removal) (Grade B↓, Strong Consensus).
- In patients with peri-implant mucositis, the short-term use of oral rinse antiseptics (such as chlorhexidine and herbal-based products) as an adjunct to PMPR (professional mechanical plaque removal) may be considered (Grade 0 ↔, Strong Consensus).
- In patients with peri-implant mucositis, the supervised self-administration of probiotics may be considered as an additional treatment alongside professional mechanical plaque removal (PMPR) (Grade 0 ↔, Consensus).
- Due to concerns about patient's health and the impact of systemic antibiotic use on public health, in patients with peri-implant mucositis, it is not recommended to use systemic antibiotics as part of the treatment (Grade A↓↓, Unanimous Consensus).

- Recommendations For Non-Surgical Management of Peri-Implantitis
  - In patients with peri-implantitis, we recommend prioritizing therapy to retain an individually acceptable implant/ prosthesis as the primary approach. The treatment should begin with a non-surgical step, followed by re-evaluation, and based on the outcomes, it may progress to the surgical step or supportive peri-implant care (SPIC) (Grade A↑↑, Strong Consensus).
  - The non-surgical step of peri-implantitis treatment should include the following interventions (Grade A↑↑, Strong Consensus):
    - Oral hygiene instructions and motivation to improve the patient's self-care practices.
    - Control of risk factors that may contribute to peri-implantitis.
    - Cleaning, removal, or modification of the prosthesis, with a focus on eliminating biofilm retentive factors and assessing prosthesis components when necessary and feasible.
    - Supramarginal and sub-marginal instrumentation to remove bacterial deposits and promote healing.
    - Concomitant periodontal therapy as needed, addressing any periodontal issues that may be affecting the peri-implant tissues.
  - To evaluate the effectiveness of the non-surgical step of peri-implantitis treatment, monitor residual inflammation, suppuration, and probing depths. Additionally, patient satisfaction, good oral hygiene, and

prosthesis cleansability should be taken into account (Grade A↑↑, Unanimous Consensus).

- As therapy endpoints at implant level, achieve residual probing depths ≤5 mm with no bleeding on probing at multiple points and no suppuration (Grade A↑↑, Unanimous Consensus).
- If these therapy endpoints are not met, considering additional treatment options is recommended (Grade A↑↑, Unanimous Consensus).
- Re-evaluate the outcome of the non-surgical step of therapy after 6-12 weeks. Frequent monitoring during the healing process may also be beneficial (Grade A↑↑, Unanimous Consensus).
- In patients with peri-implantitis, use curettes and/or sonic/ultrasonic devices to perform non-surgical supra- and sub-marginal instrumentation (Grade A↑↑, Strong Consensus).
- Recommend against using lasers, either as an adjunct or as monotherapy, for non-surgical sub-marginal peri-implant instrumentation in patients with peri-implantitis (Grade B↓, Unanimous Consensus).
- Recommend against using air polishing for non-surgical sub-marginal peri-implant instrumentation in patients with peri-implantitis (Grade B↓, Consensus).
- Recommend against using antimicrobial photodynamic therapy either as an adjunct to sub-marginal instrumentation or as monotherapy in non-surgical peri-implantitis therapy (Grade B↓, Unanimous Consensus).
- Recommend against using a desiccant antiseptic gel either as an adjunct to sub-marginal instrumentation or as monotherapy in non-surgical peri-implantitis therapy (Grade B↓, Unanimous Consensus).
- Recommend against using locally administered antimicrobials, either as an adjunct to sub-marginal instrumentation or as monotherapy, in non-surgical peri-implantitis therapy (Grade B↓, Consensus).
- Do not recommend routine use of systemic antibiotics as an adjunct to non-surgical treatment in patients with peri-implantitis due to concerns about patients' health and the potential impact on public health (Grade A↓↓, Strong Consensus).

    - Suggest not to use probiotics as an adjunct to sub-marginal instrumentation in non-surgical peri-implantitis therapy (Grade B↓, Strong Consensus).
- Recommendations For the Surgical Management of Peri-Implantitis
    - Recommend not performing surgical treatment of peri-implantitis in patients who are not achieving and maintaining adequate levels of self-performed oral hygiene (Grade A↓↓, Strong Consensus).
    - Dental teams offering implant therapy should have the professional expertise to manage peri-implantitis. As surgical treatment of peri-implantitis is complex, it should be provided by dentists with specific training or by specialists (Grade A↑↑, Strong Consensus).
    - To verify disease resolution at implant level, clinicians should use the following clinical parameters: ≤1 point of BOP, absence of suppuration, probing depth (PD) ≤ 5 mm, and absence of progressive bone loss compared to pre-treatment bone levels (Grade A↑↑, Strong Consensus).
    - Clinical parameters should be recorded 6 months after treatment, and radiographs should be obtained at 12 months to monitor the progress and assess the success of the treatment (Grade A↑↑, Strong Consensus).
    - In the long-term evaluation of treatment outcomes, it is suggested to include complication-free survival of the implant and implant-supported prosthesis, as well as patient satisfaction, such as aesthetic appreciation. These factors play a crucial role in determining the overall success of the treatment (Grade A↑↑, Strong Consensus).
    - Before proceeding with surgical therapy for peri-implantitis, adjust implant-supported prostheses that do not allow proper access for self-performed oral hygiene. This step is essential to improve the efficacy of the subsequent treatment (Grade A↑↑, Unanimous Consensus).
    - If possible, it is suggested that implant-supported prostheses be removed during surgical treatment of peri-implantitis. This removal will facilitate better access for the surgical procedures and support peri-implant tissue healing for improved outcomes (Grade A↑↑, Consensus).
    - In patients with peri-implantitis who have not achieved the desired end points of non-surgical therapy (probing depth ≤ 5 mm and ≤ 1 point of bleeding on probing), proceed with surgical therapy (Grade A↑↑, Consensus).
    - In patients with peri-implantitis where the desired end points of non-surgical therapy (probing depth ≤ 5 mm and ≤ 1 point of bleeding on probing) have not been achieved, consider access flap or resective

surgery, as both modalities have shown to be effective (Grade A↑↑, Consensus).

- In the surgical management of osseous defects in peri-implantitis patients, both access flap with or without reconstructive procedures may be considered. However, there is no evidence demonstrating the superiority of any specific surgical technique (Grade O ↔, Consensus).
- Reconstructive procedures should be preferably applied at intra-osseous defects with a depth of ≥3 mm in peri-implantitis patients (Grade B↑, Consensus).
- Bone grafts, with or without barrier membranes, may be considered in reconstructive procedures (Grade O ↔, Consensus).
- There is currently insufficient evidence to determine whether a submerged or transmucosal healing protocol would have any significant influence on the outcomes of reconstructive procedures (Grade O ↔, Strong Consensus).
- It is recommended to avoid using air-polishing or Er:YAG laser for decontamination of the implant surface during surgical treatment of peri-implantitis (Grade B↓, Consensus).
- As an alternative or adjunct to standard decontamination, titanium brushes may be considered (Grade B↓, Consensus).
- Currently, there is insufficient evidence to provide a specific recommendation regarding the use of implantoplasty in this context (Grade B↓, Consensus).
- During surgical therapy for peri-implantitis, it is suggested not to use chlorhexidine or photodynamic therapy for implant surface decontamination (Grade B↓, Consensus).
- The use of systemic antibiotics as an adjunct to surgical therapy for peri-implantitis is not recommended due to concerns about patients' health and the potential impact on public health, as well as inconsistent evidence supporting its efficacy (Grade A↓↓, Consensus).
- The evidence is currently insufficient to make any recommendation on the use of local antibiotics as adjuncts in the surgical treatment of peri-implantitis (Statement, Unanimous Consensus).

1.1.7 NICE Guidelines of Gingivitis and Periodontitis (2018)

*Please refer to **Section 1.4** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

Only Available to UK Users[16].

1.1.8 Scottish Dental Clinical Effectiveness Program (SDCE): Prevention and Treatment of Periodontal Diseases in Primary Care (2014)

*Please refer to **Section 1.5** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

There are no new updates. The recommendations of this guideline remain unchanged[12].

1.1.9 American Dental Association Evidence-Based Clinical Practice Guideline on Antibiotic Use for The Urgent Management of Pulpal- And Periapical-Related Dental Pain and Intraoral Swelling (2019)

*Please refer to **Section 1.6** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

There are no new updates. The recommendations of this guideline remain unchanged[13].

1.1.10 Scottish Dental Clinical Effectiveness Program (SDCEP): Management of Acute Dental Problems Guidance for Healthcare (2013)

*Please refer to **Section 1.7** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

There are no new updates. The recommendations of this guideline remain unchanged[17].

1.1.11 Treatment of Plaque-Induced Gingivitis, Chronic Periodontitis, and Other Clinical Conditions (Endorsed by The American Academy of Pediatric Dentistry, 2004)

*Please refer to **Section 1.8** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

There are no new updates. The recommendations of this guideline remain unchanged[18].

1.1.12 British Society of Periodontology: The Good Practitioner's Guide to Periodontology (2016)

*Please refer to **Section 1.9** of CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.*

There are no new updates. The recommendations of this guideline remain unchanged[7].

1.2 New Guidelines

This part typically includes the added guidelines to the previous CHI Periodontitis and Necrotizing Ulcerative Gingivitis report, along with their recommendations.

There are no new guidelines to add to the previous CHI Periodontitis and Necrotizing Ulcerative Gingivitis Report.

Section 2.0 Drug Therapy in Periodontitis and Necrotizing Ulcerative Gingivitis

This section comprises four subsections: the first contains the newly recommended drugs, the second covers drug modifications, the third outlines the drugs that have been withdrawn from the market, and the fourth details drugs that have been approved by the FDA and/or EMA but are not SFDA registered.

2.1 Additions

There are no new drugs added to the treatment of Periodontitis and Necrotizing Ulcerative Gingivitis. The drugs used in the management of Periodontitis and Necrotizing Ulcerative Gingivitis are still the same.

2.2 Modifications

The European Federation of Periodontology's 2019 Guidelines for Effective Prevention and Dossier on Periodontal Diseases has been divided into four new guidelines, which include the 2020 Dossier on Periodontal Diseases, the S3 level clinical practice guidelines on the Treatment of stage I–III periodontitis (2020), the Treatment of stage IV periodontitis (2022), and the Prevention and treatment of peri-implant diseases (2023). Moreover, the following guideline is no longer available, except if accessing in the UK: 2018 NICE guidelines of Gingivitis and Periodontitis.

It is recommended to remove the prescribing edit "Prior Authorization (PA)" from the antibiotics mentioned in the previous CHI report, and these include the following

antibiotics: Metronidazole, Amoxicillin, Penicillin V, Azithromycin, Clarithromycin, and Clindamycin.

2.3 Delisting

The following medications that are no longer SFDA registered, and the recommendation is to remove them from CHI drug formulary[19]. *Please refer to* ***Drug Therapy in Periodontitis and Necrotizing Ulcerative Gingivitis- Section 2*** *of CHI Periodontitis and Necrotizing Ulcerative Gingivitis original clinical guidance:*

- Chlorhexidine Mouthwash
- Hydrogen Peroxide Mouthwash

2.4 Other Drugs

2.4.1 Doxycycline Hyclate (Atridox) 10%

This drug was FDA-approved September 1998 for chronic adult periodontitis[6]. It aims to improve clinical attachment, reduce probing depth, and decrease bleeding on probing[6]. Atridox is administered as a subgingival controlled-release product through a two-syringe mixing system[6]. The dosage varies based on the size, shape, and number of pockets being treated[6]. Atridox gained FDA approval through two rigorous nine-month trials involving 831 patients with chronic adult periodontitis[6]. Atridox was more effective than Vehicle Control and Oral Hygiene, and it met the requirement of being at least 75% as good as Scaling and Root Planing[6]. Another study with 45 subjects demonstrated that Atridox significantly reduced specific bacteria in plaque samples after one treatment, without promoting harmful organisms[6]. Nonetheless, like other antibiotics, Atridox might encourage the growth of non-susceptible organisms, including fungi[6].

Section 3.0 Key Recommendations Synthesis

- Consider Scaling and Root Planning (SRP) as the initial treatment for patients with chronic periodontitis (Strength: In Favor) (ADA, 2015)
- Consider systemic sub antimicrobial-dose doxycycline (20mg twice a day for 3-9 months) as an adjunct to SRP, for patients with moderate to severe chronic periodontitis, with a small, expected net benefit (Strength: In Favor) (ADA, 2015).
- Consider systemic antimicrobials as an adjunct to SRP, for patients with moderate to severe chronic periodontitis, with a small, expected net benefit (Strength: Weak) (ADA, 2015).

- Consider locally delivered chlorhexidine chips as an adjunct to SRP for patients with moderate to severe chronic periodontitis, with a moderate expected net benefit (Strength: Expert Opinion For) (ADA, 2015)
- Consider locally delivered doxycycline hyclate gel, and minocycline microspheres as an adjunct to SRP for patients with moderate to severe chronic periodontitis, but the net benefit is uncertain (Strength: Expert Opinion For) (ADA, 2015)
- For adults 18-30 years of age: (Strength Not Mentioned) (CDA, 2013)
    - Instruct the patient to use a prescription antibacterial chlorhexidine 0.12% mouthwash twice a day for oral hygiene.
    - Manage pain with analgesics such as ibuprofen three times a day.
    - Consider prescribing antibiotics (amoxicillin and/or metronidazole) for immunocompromised patients or cases of systemic involvement (fever, malaise, lymphadenopathy).
- Treatment of stage I–III periodontitis—The EFP S3 level clinical practice guideline[9]
    - Second Step: Cause-Related Therapy:
    - Local administration of statin gels (atorvastatin, simvastatin, rosuvastatin) as adjuncts to subgingival instrumentation is not recommended (Grade A-↓↓, Strong Consensus).
    - The use of probiotics as an adjunct to subgingival instrumentation is not recommended (Grade B-↓, Consensus).
    - The use of a systemic sub-antimicrobial dose doxycycline (SDD) as an adjunct to subgingival instrumentation is not recommended (Grade B-↓, Consensus).
    - The use of a locally delivered bisphosphonate (BP) gels or systemic BPs as an adjunct to subgingival instrumentation is not recommended (Grade A-↓↓, Strong Consensus).
    - The use of systemic or local non-steroidal anti-inflammatory drugs (NSAIDs) are not recommended as adjunct to subgingival instrumentation (Grade A-↓↓, Strong Consensus).
    - Omega-3 PUFAs are not recommended as an adjunct to subgingival instrumentation (Grade A-↓↓, Consensus)
    - The local administration of metformin gel is not recommended as adjunct to subgingival instrumentation (Grade A-↓↓, Strong Consensus)

- In specific cases during periodontitis therapy, adjunctive antiseptics like chlorhexidine mouth rinses can be considered for a limited duration, as an adjunct to mechanical debridement, to complement the treatment (Grade 0 ⇿, Consensus).
- May consider locally administered sustained release chlorhexidine as an adjunct to subgingival instrumentation in periodontitis patients (Grade 0 ⇿, Consensus).
- May consider specific locally administered sustained-release antibiotics as adjuncts to subgingival instrumentation in patients with periodontitis (Grade 0⇿, Consensus).
- Routine use of systemic antibiotics as an adjunct to subgingival debridement in patients with periodontitis is not recommended due to concerns about patient health and the potential impact on public health (Grade A-⇣⇣, Consensus).
- The adjunctive use of specific systemic antibiotics may be considered for certain patient categories, such as young adults with generalized Stage III periodontitis (Grade 0 ⇿ Consensus).
- Supportive Periodontal Care
    - The use of adjunctive antiseptics may be considered in supportive periodontal care for periodontitis patients to help control gingival inflammation in specific cases (Grade 0 ⇿, Consensus).
    - The effectiveness of other adjunctive agents, such as probiotics, prebiotics, anti-inflammatory agents, and antioxidant micronutrients, in controlling gingival inflammation in patients receiving supportive periodontal care is not yet known (Grade 0, Consensus).
    - For adjunctive use of an antiseptic dentifrice formulation in supportive periodontal care for periodontitis patients, consider products that contain chlorhexidine, triclosan-copolymer, and stannous fluoride-sodium hexametaphosphate. These ingredients have shown efficacy in controlling gingival inflammation and can be beneficial in maintaining periodontal health in this context (Grade B-↑, Consensus).
    - For adjunctive use of an antiseptic mouth rinse formulation in supportive periodontal care for periodontitis patients, consider products that contain chlorhexidine, essential oils, and cetylpyridinium chloride. These ingredients have demonstrated

effectiveness in controlling gingival inflammation and can be beneficial in maintaining periodontal health in this context (Grade B-↑, Consensus).

- It is suggested not to use adjunctive methods (sub-antimicrobial dose doxycycline, photodynamic therapy) to professional mechanical plaque removal (PMPR) in supportive periodontal care (Grade B-↓, Strong Consensus).

- Prevention and treatment of peri-implant diseases—The EFP S3 level clinical practice guideline11
  - Recommendations for the Prevention of Peri-Implant Diseases: avoid the professional application of adjunctive local antimicrobial agents in supportive peri-implant care (SPIC) to reduce the risk of recurrent peri-implantitis (Grade B↓, Strong Consensus).
  - Recommendations For the Management of Peri-Implant Mucositis
    - In patients with peri-implant mucositis, avoid the use of locally administered antibiotics as a treatment option (Grade A↓↓, Unanimous Consensus).
    - In patients with peri-implant mucositis, we recommend not using locally administered agents such as antiseptics, 'postbiotics', or desiccant gel as adjuncts to PMPR (professional mechanical plaque removal) (Grade B↓, Strong Consensus).
    - In patients with peri-implant mucositis, the short-term use of oral rinse antiseptics (such as chlorhexidine and herbal-based products) as an adjunct to PMPR (professional mechanical plaque removal) may be considered (Grade 0 ↔, Strong Consensus).
    - In patients with peri-implant mucositis, the supervised self-administration of probiotics may be considered as an additional treatment alongside professional mechanical plaque removal (PMPR) (Grade 0 ↔, Consensus).
    - Due to concerns about patient's health and the impact of systemic antibiotic use on public health, in patients with peri-implant mucositis, it is not recommended to use systemic antibiotics as part of the treatment (Grade A↓↓, Unanimous Consensus).
  - Recommendations For Non-Surgical Management of Peri-Implantitis

    - Recommend against using antimicrobial photodynamic therapy either as an adjunct to sub-marginal instrumentation or as monotherapy (Grade B↓, Unanimous Consensus).
    - Recommend against using a desiccant antiseptic gel either as an adjunct to sub-marginal instrumentation or as monotherapy (Grade B↓, Unanimous Consensus).
    - Recommend against using locally administered antimicrobials, either as an adjunct to sub-marginal instrumentation or as monotherapy, (Grade B↓, Consensus).
    - Do not recommend routine use of systemic antibiotics as an adjunct to non-surgical treatment in patients with peri-implantitis due to concerns about patients' health and the potential impact on public health (Grade A↓↓, Strong Consensus).
    - Suggest not to use probiotics as an adjunct to sub-marginal instrumentation (Grade B↓, Strong Consensus).
- Necrotizing Ulcerative Gingivitis and Periodontitis: As an adjunct to local measures, metronidazole is the drug of first choice where there is systemic involvement or persistent swelling despite local measures (Strength: Not mentioned) (SDCEP, 2014)
- Recommend the use of either 6% hydrogen peroxide or 0.2% chlorhexidine mouthwash until the acute symptoms subside (Strength: Not mentioned) (SDCEP, 2014).
- Full Mouth Disinfection (FMD) is a treatment involving two visits within 24 hours, cleaning all periodontal pockets, and using chlorhexidine mouthwash and gel. It aims to prevent bacterial re-infestation in cleaned pockets, but current evidence suggests no extra benefits compared to cleaning alone. (Strength: Not mentioned) (SDCEP, 2014)
- Prescribing local or systemic antimicrobials is not recommended for the treatment of chronic periodontitis (Strength: Not mentioned) (SDCEP, 2014).
- Refer patients with a diagnosis of aggressive periodontitis to a specialist (Strength: Not mentioned) (SDCEP, 2014).
- Only prescribe an anti-plaque mouthwash, such as 0.2% chlorhexidine gluconate, for patients where pain limits mechanical plaque removal (e.g., following sub-gingival instrumentation or for patients with acute conditions) (Strength: Not mentioned) (SDCEP, 2014).

- In urgent dental situations where immediate options like pulpotomy, pulpectomy, nonsurgical root canal treatment, or abscess drainage aren't available on the same visit:
    - In cases of pulp necrosis and acute apical abscess with systemic involvement in immunocompetent adults, prescribe oral amoxicillin or oral penicillin V potassium. Provide an urgent referral for dental treatment, and if the condition worsens or if there are concerns about a more serious infection, immediate evaluation is advised (Good Practice Statement) (ADA, 2019).
- In urgent dental situations where immediate options like pulpotomy, pulpectomy, nonsurgical root canal treatment, or abscess drainage are available on the same visit:
    - Perform urgent DCDT along with prescribing oral amoxicillin or penicillin for immunocompetent adults with pulp necrosis and acute apical abscess with systemic involvement (Good Practice Statement) (ADA, 2019).
- General Notes:
    - Amoxicillin is preferred over penicillin for its effectiveness against various bacteria and fewer side effects.
    - Alternatives are suggested for patients with penicillin allergies.
    - For patients with penicillin allergies, dentists can consider prescribing oral cephalexin or, for severe allergies, oral azithromycin, or clindamycin. If initial treatment doesn't work, additional antibiotics like metronidazole can be considered.
    - For non-allergic patients, complementary antibiotics can be added or oral amoxicillin and clavulanate can be prescribed.
    - If patients with severe allergies don't respond, adding metronidazole can be considered.
- Effective patient-performed oral hygiene is crucial for success. Regular advice and encouragement are needed for long-term change (Strength: Not mentioned) (BSP, 2016).
- Regular removal of attached plaque biofilms and non-attached microflora is necessary. Plaque-retentive factors like calculus and restoration overhangs should be eliminated (Strength: Not mentioned) (BSP, 2016).
- Patients may experience sensitivity after root surface instrumentation. Over-the-counter products can reduce dentine sensitivity. Antiplaque agents like

chlorhexidine can be useful during difficult cleaning periods (Strength: Not mentioned) (BSP, 2016).

Section 4.0 Conclusion

This report serves as **an annex to the previous CHI Periodontitis and Necrotizing Ulcerative Gingivitis report** and aims to provide recommendations to aid in the management of Periodontitis and Necrotizing Ulcerative Gingivitis. It is important to note that these recommendations should be utilized to support clinical decision-making and not replace it in the management of individual patients with Periodontitis and Necrotizing Ulcerative Gingivitis. Health professionals are expected to consider this guidance alongside the specific needs, preferences, and values of their patients when exercising their judgment.

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Section 6.0 Appendices

Appendix A. Prescribing Edits Definition

I. Prescribing Edits (ensure consistent use of abbreviations, e.g., CU, ST)

Some covered drugs may have additional requirements, rules, or limits on coverage. These requirements and limits may include:

Prescribing edits Tools	Description
AGE (Age):	Coverage may depend on patient age
CU (Concurrent Use):	Coverage may depend upon concurrent use of another drug
G (Gender):	Coverage may depend on patient gender
MD (Physician Specialty):	Coverage may depend on prescribing physician's specialty or board certification
PA (Prior Authorization):	Requires specific physician request process
QL (Quantity Limits):	Coverage may be limited to specific quantities per prescription and/or time period
ST (Step Therapy):	Coverage may depend on previous use of another drug
EU (Emergency Use only):	This drug status on Formulary is only for emergency use
PE (Protocol Edit):	Use of drug is dependent on protocol combination, doses, and sequence of therapy

II. Adult and Pediatric Quantity Limit?

This is either the adult or pediatric maximum amount of a drug that can be administered per day based on a maximum daily dose. If there is no clinical evidence supporting the quantity limit for that relevant indication, this column will be left as Blank.

III. What information is available in the notes?

"Notes" section provides details of the prescribing edits, extra important drug information and special warning and precautions.

IV. Drug interactions

- A: No known interaction
- B: No action needed
- C: Monitor therapy
- D: Consider therapy modification
- X: Avoid combination

V. Defined Daily Dose

The Defined Daily Dose (DDD) is to be set based on the WHO recommendations https://www.whocc.no/ddd/definition_and_general_considera/

VI. REMS

A Risk Evaluation and Mitigation Strategy (REMS) is a drug safety program that the U.S. Food and Drug Administration (FDA) can require for certain medications with serious safety concerns to help ensure the benefits of the medication outweigh its risks.

Appendix B. Periodontitis and Necrotizing Ulcerative Gingivitis Scope

Comparison of the 2020 and the 2023 Report

2020	Changes Performed	2023	Rationale
Section 1.0 Periodontitis and Necrotizing Ulcerative Gingivitis Clinical Guidelines			
1.1 Evidence-based clinical practice guideline on the nonsurgical treatment of chronic periodontitis by means of scaling and root planning with or without adjuncts [2015 American Dental Association][8]	**N/A**	**N/A**	
1.2 Managing patients with necrotizing ulcerative gingivitis [Canadian dental association 2013][9]	**N/A**	**N/A**	

1.3 Guidelines for Effective Prevention and Dossier on Periodontal Diseases [European Federation of Periodontology] 2019	**Updated**	**Dossier on Periodontal Diseases 2020**[14]	To add the following sections:
			• Diagnosis of periodontal disease
			• Prevention of Periodontal Disease
			• Treatment of Periodontal Diseases:
			  ○ Gingivitis
			  ○ Periodontitis: (two phases of treatment)
			• Follow-Up
			No new drugs introduced.

		Treatment of stage I–III periodontitis—The EFP S3 level clinical practice guideline[10]	To add the following sections: 1. Diagnosis and Classification: a. Insert tables 7 and 8 on staging and grading of periodontitis. b. Clinical pathway for a diagnosis: i. Identifying a patient suspected of having periodontitis. ii. Confirming the diagnosis iii. Staging the case iv. Grading the case c. Differential Diagnosis: 2. Sequence for the treatment of periodontitis stages I, II and III (Strong Consensus): a. **First Step:** Behavior Change and Risk Factor Control b. **Second Step:** Cause-Related Therapy: Aims to control subgingival biofilm and calculus through adjunctive physical or chemical agents, host-modulating (local or systemic) agents, subgingival locally delivered antimicrobials, or systemic antibiotics. i. Local administration of statin gels (atorvastatin, simvastatin, rosuvastatin) as adjuncts to subgingival instrumentation is

			advised against (Grade A-↓↓, Strong Consensus). ii. The use of probiotics as an adjunct to subgingival instrumentation is not recommended (Grade B-↓, Consensus). iii. The use of a systemic sub-antimicrobial dose doxycycline (SDD) as an adjunct to subgingival instrumentation is not recommended (Grade B-↓, Consensus). iv. The use of a locally delivered bisphosphonate (BP) gels or systemic BPs as an adjunct to subgingival instrumentation is not recommended (Grade A-↓↓, Strong Consensus). v. The use of systemic or local non-steroidal anti-inflammatory drugs (NSAIDs) are not recommended as adjunct to subgingival instrumentation (Grade A-↓↓, Strong Consensus). vi. Omega-3 PUFAs are not recommended

			as an adjunct to subgingival instrumentation (Grade A-↓↓, Consensus) vii. The local administration of metformin gel is not recommended as adjunct to subgingival instrumentation (Grade A-↓↓, Strong Consensus) viii. In specific cases during periodontitis therapy, adjunctive antiseptics like **chlorhexidine mouth rinses** can be considered for a limited duration, as an adjunct to mechanical debridement, to complement the treatment (Grade 0 ↔, Consensus). ix. May consider **locally administered sustained release chlorhexidine** as an adjunct to subgingival instrumentation in periodontitis patients (Grade 0 ↔, Consensus). x. May consider specific **locally administered sustained-release**

			antibiotics as adjuncts to subgingival instrumentation in patients with periodontitis (Grade 0⇿, Consensus). xi. Routine use of systemic antibiotics as an adjunct to subgingival debridement in patients with periodontitis is not recommended due to concerns about patient health and the potential impact on public health (Grade A-↓↓, Consensus). xii. The adjunctive use of specific systemic antibiotics may be considered for certain patient categories, such as young adults with generalized Stage III periodontitis (Grade 0 ⇿ Consensus). c. **Third Step**: Treating Non-Responsive Areas: d. **Supportive Periodontal Care** i. The use of adjunctive **antiseptics** may be considered in supportive periodontal care for periodontitis

			patients to help control gingival inflammation in specific cases (Grade 0 ⇿, Consensus). ii. The effectiveness of other adjunctive agents, such as probiotics, prebiotics, anti-inflammatory agents, and antioxidant micronutrients, in controlling gingival inflammation in patients receiving supportive periodontal care is not yet known (Grade 0, Consensus). iii. For adjunctive use of an **antiseptic dentifrice** formulation in supportive periodontal care for periodontitis patients, consider products that contain chlorhexidine, triclosan-copolymer, and stannous fluoride-sodium hexametaphosphate. These ingredients have shown efficacy in controlling gingival inflammation and

			can be beneficial in maintaining periodontal health in this context (Grade B-↑, Consensus). iv. For adjunctive use of an antiseptic mouth rinse formulation in supportive periodontal care for periodontitis patients, consider products that contain chlorhexidine, essential oils, and cetylpyridinium chloride. These ingredients have demonstrated effectiveness in controlling gingival inflammation and can be beneficial in maintaining periodontal health in this context (Grade B-↑, Consensus). v. It is suggested not to use adjunctive methods (sub-antimicrobial dose doxycycline, photodynamic therapy) to professional mechanical plaque removal (PMPR) in supportive periodontal care (Grade B-↓, Strong

			Consensus). No new medications introduced.
		Treatment of stage IV periodontitis: The EFP S3 level clinical practice guideline[15]	To add the following sections: • Phenotypic variation and identification of clinical case types: Four major stage IV periodontitis phenotypes lead to specific clinical case types: • Specific treatment pathways according to the different stage IV periodontitis case types
		Prevention and treatment of peri-implant diseases—The EFP S3 level clinical practice guideline[11]	Recommendations for the Prevention of Peri-Implant Diseases: • We recommend avoiding the professional application of adjunctive local antimicrobial agents in supportive peri-implant care (SPIC) to reduce the risk of recurrent peri-implantitis (Grade B↓, Strong Consensus). Recommendations For the Management of Peri-Implant Mucositis • In patients with peri-implant mucositis, avoid the use of locally administered antibiotics as a treatment option (Grade A↓↓, Unanimous Consensus). • In patients with peri-implant mucositis, we recommend not using locally administered agents such as antiseptics, 'postbiotics', or desiccant gel as adjuncts to PMPR (professional mechanical plaque removal) (Grade B↓, Strong Consensus). • In patients with peri-implant mucositis, the short-term use of oral rinse antiseptics (such as chlorhexidine and herbal-based

			products) as an adjunct to PMPR (professional mechanical plaque removal) may be considered (Grade 0 ⇿, Strong Consensus). • In patients with peri-implant mucositis, the supervised self-administration of probiotics may be considered as an additional treatment alongside professional mechanical plaque removal (PMPR) (Grade 0 ⇿, Consensus). • Due to concerns about patient's health and the impact of systemic antibiotic use on public health, in patients with peri-implant mucositis, it is not recommended to use systemic antibiotics as part of the treatment (Grade A↓↓, Unanimous Consensus). Recommendations For Non-Surgical Management of Peri-Implantitis • Recommend against using antimicrobial photodynamic therapy either as an adjunct to sub-marginal instrumentation or as monotherapy in non-surgical peri-implantitis therapy (Grade B↓, Unanimous Consensus). • Recommend against using a desiccant antiseptic gel either as an adjunct to sub-marginal instrumentation or as monotherapy in non-surgical peri-implantitis therapy (Grade B↓, Unanimous Consensus). • Recommend against using locally administered antimicrobials, either as an adjunct to sub-marginal instrumentation or as monotherapy, in non-surgical peri-implantitis therapy (Grade

			B↓, Consensus). • Do not recommend routine use of systemic antibiotics as an adjunct to non-surgical treatment in patients with peri-implantitis due to concerns about patients' health and the potential impact on public health (Grade A↓↓, Strong Consensus). • Suggest not to use probiotics as an adjunct to sub-marginal instrumentation in non-surgical peri-implantitis therapy (Grade B↓, Strong Consensus). Recommendations For the Surgical Management of Peri-Implantitis • During surgical therapy for peri-implantitis, it is suggested not to use chlorhexidine or photodynamic therapy for implant surface decontamination (Grade B↓, Consensus). • The use of systemic antibiotics as an adjunct to surgical therapy for peri-implantitis is not recommended due to concerns about patients' health and the potential impact on public health, as well as inconsistent evidence supporting its efficacy (Grade A↓↓, Consensus). • The evidence is currently insufficient to make any recommendation on the use of local antibiotics as adjuncts in the surgical treatment of peri-implantitis (Statement, Unanimous Consensus).
1.4 NICE guidelines of		**Only available to users in the**	

Gingivitis and periodontitis 2018		**UK**[16]	
1.5 Prevention and Treatment of Periodontal Diseases in Primary Care Scottish Dental Clinical Effectiveness Programme [SDcep 2014][12]		**N/A**	
1.6 Evidence-based clinical practice guideline on antibiotic use for the urgent management of pulpal- and periapical-related dental pain and intraoral swelling A report from the American Dental Association[13] 2019		**N/A**	
1.7 Scottish Dental Clinical Effectiveness Programme [SDcep 2013] Management of Acute Dental Problems Guidance for healthcare[17]		**N/A**	
1.8 Treatment of Plaque-induced Gingivitis, Chronic Periodontitis, and Other Clinical		**N/A**	

Conditions[18] Endorsed by the American Academy of Pediatric Dentistry 2004			
1.9 The Good Practitioner's Guide to Periodontology[7] [2016 British Society of Periodontology]		**N/A**	
<u>FDA-Approved Drug 1999: NOT SFDA-Approved</u>: Atridox (doxycycline hyclate) 10%[6] indicated for use in the treatment of chronic adult periodontitis.			

Appendix C. PubMed Search Strategy: MeSH Terms and Boolean Operators

The following is the result of the PubMed search conducted for guideline search:

Query	Filters	Search Details	Results
(((((Gingivitis[MeSH Terms]) OR (Gingivitides[Title/Abstract]))) OR (Fusospirillosis[Title/Abstract])	Guideline, in the last 5 years, English	("gingivitis"[MeSH Terms] OR "Gingivitides"[Title/Abstract]) AND ((y_5[Filter]) AND (guideline[Filter]) AND (english[Filter]))	1
((((((((((Gingivitis, Necrotizing Ulcerative[MeSH Terms]) OR (Vincent Infection[Title/Abstract])) OR (Vincent's Infection[Title/Abstract])) OR (Fusospirillosis[Title/Abstract])) OR (Vincent's Stomatitis[Title/Abstract])) OR (Acute Membranous Gingivitis[Title/Abstract])) OR (Fusospirillary Gingivitis[Title/Abstract])) OR (Phagedenic Gingivitis[Title/Abstract])) OR (Vincent's Gingivitis[Title/Abstract])) OR (Trench Mouth[Title/Abstract])) OR (Acute Necrotizing Ulcerative Gingivitis[Title/Abstract])) OR (Vincent Angina[Title/Abstract])) OR (Stomatitis, Ulcerative[Title/Abstract])	Guideline, in the last 5 years, English	("gingivitis, necrotizing ulcerative"[MeSH Terms] OR "vincent infection"[Title/Abstract] OR "vincent s infection"[Title/Abstract] OR "vincent s stomatitis"[Title/Abstract] OR (("Acute"[All Fields] OR "acutely"[All Fields] OR "acutes"[All Fields]) AND "membranous gingivitis"[Title/Abstract]) OR ("Fusospirillary"[All Fields] AND "Gingivitis"[Title/Abstract]) OR (("phagedaenic"[All Fields] OR "phagedenic"[All Fields]) AND "Gingivitis"[Title/Abstract]) OR "vincent s gingivitis"[Title/Abstract] OR "trench mouth"[Title/Abstract] OR "acute necrotizing ulcerative gingivitis"[Title/Abstract] OR "vincent angina"[Title/Abstract] OR "stomatitis ulcerative"[Title/Abstract]) AND ((y_5[Filter]) AND (guideline[Filter]) AND (english[Filter]))	0

((((((Gingivitis[MeSH Terms]) OR (Gingivitides[Title/Abstract]))) OR (Fusospirillosis[Title/Abstract]) AND ((y_5[Filter]) AND (guideline[Filter]) AND (english[Filter]))) AND ((((((((((((Gingivitis, Necrotizing Ulcerative[MeSH Terms]) OR (Vincent Infection[Title/Abstract])) OR (Vincent's Infection[Title/Abstract])) OR (Fusospirillosis[Title/Abstract])) OR (Vincent's Stomatitis[Title/Abstract])) OR (Acute Membranous Gingivitis[Title/Abstract])) OR (Fusospirillary Gingivitis[Title/Abstract])) OR (Phagedenic Gingivitis[Title/Abstract])) OR (Vincent's Gingivitis[Title/Abstract])) OR (Trench Mouth[Title/Abstract])) OR (Acute Necrotizing Ulcerative Gingivitis[Title/Abstract])) OR (Vincent Angina[Title/Abstract])) OR (Stomatitis, Ulcerative[Title/Abstract]) AND ((y_5[Filter]) AND (guideline[Filter]) AND (english[Filter]))))	Guideline, in the last 5 years, English	(("Gingivitis"[MeSH Terms] OR "Gingivitides"[Title/Abstract]) AND ("2018/08/03 00:00":"3000/01/01 05:00"[Date - Publication] AND "guideline"[Publication Type] AND "english"[Language]) AND (("gingivitis, necrotizing ulcerative"[MeSH Terms] OR "vincent infection"[Title/Abstract] OR "vincent s infection"[Title/Abstract] OR "vincent s stomatitis"[Title/Abstract] OR (("Acute"[All Fields] OR "acutely"[All Fields] OR "acutes"[All Fields]) AND "membranous gingivitis"[Title/Abstract]) OR ("Fusospirillary"[All Fields] AND "Gingivitis"[Title/Abstract]) OR (("phagedaenic"[All Fields] OR "phagedenic"[All Fields]) AND "Gingivitis"[Title/Abstract]) OR "vincent s gingivitis"[Title/Abstract] OR "trench mouth"[Title/Abstract] OR "acute necrotizing ulcerative gingivitis"[Title/Abstract] OR "vincent angina"[Title/Abstract] OR "stomatitis ulcerative"[Title/Abstract]) AND ("2018/08/03 00:00":"3000/01/01 05:00"[Date - Publication] AND "guideline"[Publication Type] AND "english"[Language]))) AND ((y_5[Filter]) AND (guideline[Filter]) AND (english[Filter]))	0

Appendix D. Treatment Algorithm

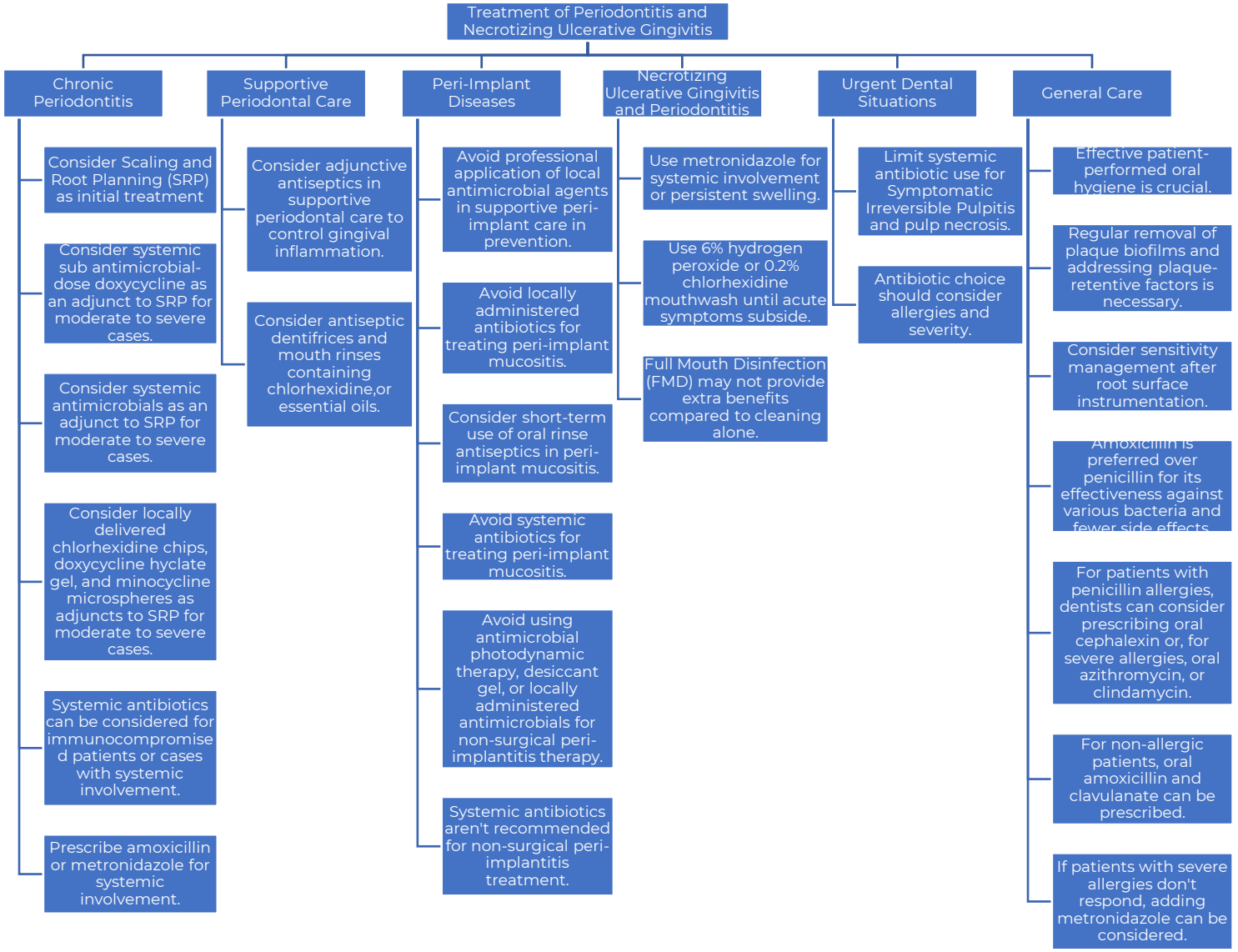

Figure 1. *Treatment Algorithm for the Management of Periodontitis and Necrotizing Ulcerative Gingivitis*