NHS Education for Scotland

Prevention and Treatment of Periodontal Diseases in Primary Care

Dental Clinical Guidance

Second Edition

Amended November 2025

SDCEP Scottish Dental Clinical Effectiveness Programme

February 2024

Scottish Dental Clinical Effectiveness Programme

The Scottish Dental Clinical Effectiveness Programme (SDCEP) is an initiative of the National Dental Advisory Committee (NDAC) in partnership with NHS Education for Scotland. The Programme provides user-friendly, evidence-based guidance on topics identified as priorities for oral health care.

SDCEP guidance aims to support improvements in patient care by bringing together, in a structured manner, the best available information that is relevant to the topic and presenting this information in a form that can be interpreted easily and implemented.

Supporting safe, effective, sustainable, person-centred prevention and care

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Amendments

Changes to the guidance following publication in February 2024 are noted below:

Date	Section	Details of update
November 2025	4.6.1	Advice on the provision of local anaesthesia by dental hygienists and dental therapists has been updated to reflect the amended Human Medicines Regulations (Schedule 17; 2024)
November 2025	5.3.3	The text in this section previously suggested that Step 1 of therapy is equivalent to initial periodontal treatment, which is not the case. This has been corrected.

Summary of key recommendations

This summary lists the key recommendations provided within the guidance. The key recommendations were developed through a considered judgement of the evidence. The summary is not comprehensive and for a full appreciation of the recommendations, the basis for making them and other points for consideration, it is necessary to read the whole guidance.

Periodontal assessment [Refer to Section 2]

- When carrying out a risk assessment, use a structured approach to assess the patient's medical, dental and social history, any relevant risk factors and the outcome of the clinical examination, to inform future treatment and recall.
- For patients who are at increased risk of periodontitis, provide information about their periodontal risk, how it affects them and the ways that they can reduce this risk (e.g. provide oral hygiene instruction or advice on smoking cessation) as part of a strategy to encourage behaviour change.

Planning periodontal treatment [Refer to Section 4]

- For patients with a diagnosis of periodontitis, perform professional mechanical plaque removal (PMPR) using either a full mouth or quadrant approach, taking into account patient factors and preferences and clinician skills, experience and preferences.

Components of periodontal treatment [Refer to Section 5]

Managing risk factors

- Advise patients (and their carers, where appropriate) to regularly remove plaque biofilm using a toothbrush, and interdental aids where required, as an effective regime to prevent and facilitate management of plaque-induced gingivitis and periodontitis.
- Use behaviour change methods when providing oral hygiene instruction for patients who have sub-optimal oral hygiene.
- Advise patients to regularly clean their teeth and gums, using either a manual or rechargeable powered toothbrush, and that an effective technique should be employed.
- Advise patients with a diagnosis of periodontitis to clean interdentally every day, using appropriately sized interdental brushes where the interdental space allows, and floss in interdental spaces too small to allow interdental brush use.
- Advise patients without a diagnosis of periodontitis but who have gingival inflammation to clean interdentally as required to control their inflammation. The method and frequency of cleaning should be tailored to individual patients.

- Advise all patients to use a toothpaste containing 1350-1500 ppm fluoride to prevent dental caries.

PMPR and principles of periodontal instrumentation

- For patients with a diagnosis of periodontitis, use either powered instruments, manual instruments, or a combination of both, to carry out subgingival professional mechanical plaque removal (PMPR) to a high standard; base the choice of instrument on clinician and patient preferences, the clinical situation and the goal of treatment.

Antimicrobial medication

- Local antimicrobials are not recommended for the routine care and management of patients with a diagnosis of periodontitis.
- Do not use adjunctive systemic antibiotic therapy for the routine care and management of patients with a diagnosis of periodontitis.
- Consider referral to a specialist or advanced care practitioner for those patients who may benefit from adjunctive systemic antibiotic therapy, such as those whose level of disease suggests a high susceptibility (e.g. younger patients with Grade C periodontitis and who show little or no improvement after non-surgical treatment).

Host modulation therapy

- The use of host modulation therapy is not recommended for the routine care and management of patients with a diagnosis of periodontitis.

Dentine sensitivity

- For patients who experience post-PMPR dentine sensitivity, consider the use of a desensitising agent.
    - At-home treatments (e.g. desensitising toothpaste) should be tried initially, with professionally-applied desensitising agents used for persistent sensitivity.

Management of plaque-induced periodontal diseases [Refer to Section 6]

- For patients with a diagnosis of periodontal health, prioritise personalised oral hygiene instruction over professional mechanical plaque removal (PMPR) to encourage effective oral self-care.
- For patients with a diagnosis of gingivitis, provide personalised oral hygiene instruction. In addition, assess levels of plaque and calculus and deliver professional mechanical plaque removal (PMPR) at required sites, especially where inflammation is present, to enable and encourage oral hygiene self-care.

- For patients with a diagnosis of periodontitis, carry out subgingival professional mechanical plaque removal (PMPR) in order to reduce probing pocket depth, gingival inflammation, bleeding on probing (from the base of the pocket) and the number of diseased sites.
- For teeth with Grade I furcation involvement, provide non-surgical treatment with the aim of achieving medium/long term retention of the tooth.
- For teeth with Grade II or III furcation involvement, especially those that are holistically assessed as being of ongoing value to the patient and their dentition, provide non-surgical treatment with the aim of achieving medium/long term retention of the tooth.
    - Referral and/or surgical management might be appropriate for some patients.
    - Furcation involvement alone is not an indication for extraction.
- For patients with diabetes and periodontitis, provide periodontal treatment, including oral hygiene instruction and supra- and subgingival professional mechanical plaque removal (PMPR), with the aim of reducing oral inflammation and improving diabetes control.
- For patients with periodontitis and with systemic conditions that may be related to periodontitis, provide periodontal treatment, including oral hygiene instruction and supra- and subgingival professional mechanical plaque removal (PMPR), with the aim of reducing oral inflammation.

Long-term periodontal care [Refer to Section 7]

- For patients with a diagnosis of periodontitis who have completed active periodontal therapy, provide regular* supportive periodontal care to maintain stability of the patient's disease status.

  *Suitable recall intervals range from 3 to a maximum of 12 months, with the frequency determined by the patient's clinical history, an assessment of their risk and the needs and wishes of the patient.
- For patients with a diagnosis of periodontitis who have completed active periodontal therapy, provide a comprehensive regime of supportive periodontal care that comprises updating patient histories, assessment of risk factor control, oral tissues and care needs, and treatment, where necessary.

Management of patients with dental implants [Refer to Section 8]

- For patients with a diagnosis of periodontitis who are considering dental implants, ensure they are aware that they are at increased risk of peri-implant disease.
- Prior to placing implants in patients with a diagnosis of periodontitis, stabilise any periodontal disease around teeth which are to be retained, address modifiable risk factors (e.g. inadequate oral hygiene, smoking, systemic disease) and explain the need for ongoing periodontal and implant maintenance care after placement to reduce the risk of peri-implant disease.

- For patients with dental implants, provide implant-specific maintenance care to reduce the risk of peri-implant disease.
- For patients with peri-implant mucositis, the routine use of adjunctive or alternative measures to professional mechanical plaque removal is not recommended.
- The routine use of local or systemic antibiotics for the treatment of peri-implant mucositis in primary care is not recommended.
- For patients with peri-implantitis, the routine use of adjunctive or alternative measures to professional mechanical plaque removal is not recommended.
- The routine use of local or systemic antibiotics for the treatment of peri-implantitis in primary care is not recommended.

1 Introduction

1.1 What are periodontal diseases?

Periodontal diseases (gingivitis and periodontitis) are a group of inflammatory conditions that affect the hard and soft supporting tissues of the teeth and can lead to poor aesthetics, tooth loss, loss of function, and reduced quality of life. Gingivitis affects the superficial tissues around the teeth while periodontitis is associated with loss of supporting bone.

Plaque biofilm is essential for the development of gingivitis and periodontitis. However, multiple risk factors affect an individual's susceptibility to disease initiation and progression. While gingivitis is reversible, damage to the periodontal tissues caused by periodontitis is irreversible. As well as leading to tooth loss, unstable, untreated or undertreated disease can negatively impact general health; for example, periodontitis is associated with several systemic diseases, including diabetes.[1]

1.2 Why this guidance has been developed

Periodontal health is the foundation of good oral health. However, periodontal diseases are prevalent in a large proportion of the UK population, with epidemiological studies suggesting that around half of dentate UK adults have evidence of current or historical periodontitis (periodontal pocketing ≥4 mm).[2] Similar levels of disease are observed globally,[3] the prevalence of severe disease is increasing[4] and periodontitis is acknowledged as one of the most common chronic inflammatory diseases.

Primary prevention of periodontal diseases (gingivitis and periodontitis) focuses on interventions to prevent disease occurring in those who are susceptible and includes control of plaque biofilm as well as other risk factors, such as tobacco use. In addition, secondary and tertiary prevention of disease in patients with a diagnosis of gingivitis or periodontitis relies on early detection and management of disease progression by providing appropriate treatment, controlling risk factors and supporting those patients at higher risk.

Members of the dental team play a vital role in detecting disease, carrying out dental treatments to manage and prevent disease, supporting patients to develop effective oral hygiene self-care routines to control dental plaque biofilm and addressing other relevant risk factors, such as tobacco use or sub-optimally controlled diabetes.

Although most periodontal diseases can be, and are, managed in primary care, interviews with dental professionals suggest that some lack the confidence to treat more advanced periodontal diseases in this setting.[5] Recognising the need for accessible guidance in this area, the Scottish Dental Clinical Effectiveness Programme first published clinical guidance on the *Prevention and Treatment of Periodontal Diseases in Primary Care* in 2014. The guidance aimed to encourage a consistent approach to delivering preventive care and, where necessary treating periodontal diseases in primary care by providing recommendations and advice based on research evidence and expert opinion.

In this second edition, the guidance has been updated following a full review of the 2014 first edition, with a focus on aligning with the British Society of Periodontology and Implant Dentistry's *BSP implementation of European S-3 level evidence-based treatment guidelines for stage I-III periodontitis in UK*

clinical practice (**BSP-S3**)[6] and Public Health England's *Delivering Better Oral Health* (**DBOH**) toolkit.[7] The recommendations in the first edition of the guidance have been updated in line with current evidence and several new recommendations have been included. Information on classification and treatment has been brought together in one resource, with further advice on practical implementation of the recommendations in primary care dental practice.

The main changes in this edition are inclusion of:

- new advice on the assessment of risk (Section 2);
- updated information on diagnosis of periodontal diseases to reflect the *2018 Classification of Periodontal Diseases*[8] (Section 3);
- information that reflects the stepwise approach to periodontal therapy[6] and consideration of tooth prognosis (Section 4);
- expanded advice on the management of risk factors and assessing the response to periodontal treatment (Section 5);
- advice on the specific management of patients with furcation involvement and the management of patients with systemic conditions linked to periodontal disease (Section 6);
- expanded advice on the management of patients considering dental implants (Section 8);
- updates to the evidence and basis for the key recommendations (Sections 2-8);
- updates to the appendices.

The content of this guidance document is also presented within a dedicated website, SDCEP *Periodontal Care*, to aid accessibility, navigation and updating.

Although this guidance has been developed to support improvements in oral health care in Scotland, these recommendations are likely to be relevant in other countries, taking local differences in the organisation of dental services into consideration.

1.3 Why follow this guidance

There is a significant volume of research evidence to inform the prevention and treatment of periodontal diseases. Consequently, the Key Recommendations in this guidance are based on research evidence, including guidelines developed by specialist societies, and agreed by the Guidance Development Group via a consensus process. Where evidence is lacking, the recommendations reflect the consensus view of expert and experienced practitioners. If the prevention and treatment strategies presented in this guidance are followed by the dental team, patients at risk of developing periodontal diseases who attend for dental care are more likely to be recognised early and appropriate care (both preventive and treatment-based) can be provided to improve their oral, and some cases general, health.

1.4 Scope of this guidance

The second edition of the *Prevention and Treatment of Periodontal Diseases in Primary Care* guidance aims to assist and support the dental team to:

- identify and manage patients at risk of and with periodontal diseases in primary care;
- improve the understanding of periodontal diagnoses based on the *2018 Classification of Periodontal Diseases;*[8]
- improve the quality of decision making in treatment planning;
- improve the overall oral health of the population.

The guidance focuses on the screening and management of risk factors, support for patients at risk of disease to control these risk factors, and non-surgical management of periodontal diseases in primary care. The guidance adopts the Stepwise approach to periodontal therapy advocated by the European Federation of Periodontology and the British Society of Periodontology and Implant Dentistry. Information on diagnosis has been updated to reflect the 2018 *Classification of Periodontal Diseases*.[8] There is also advice on the management of patients with dental implants, including advice on periodontal aspects of pre-implant placement assessment and the prevention and treatment of peri-implant diseases. Advice on appropriate referral and record keeping is included. The surgical treatment of periodontal and implant diseases and the management of patients by periodontal specialists or in a secondary care setting are beyond the scope of this guidance and are not discussed in detail.

The guidance is largely based on existing guidelines, including those from the British Society of Periodontology and Implant Dentistry,[6] the European Federation of Periodontology[9,10] and Public Health England.[7] Additionally, relevant systematic reviews, research evidence and the opinion of experts and experienced practitioners have informed several of the recommendations and advice within this guidance.

The guidance is applicable to patients of all ages in all population groups in primary care.

1.5 Who should use this guidance

The guidance is primarily directed at all clinicians who are involved in the detection, prevention and management of periodontal diseases in primary care. These include dentists, dental therapists, dental hygienists and oral health educators in general dental practice, and the public dental service. The guidance is also of relevance to the hospital dental service, those involved in dental education and undergraduate trainees. General medical practitioners and medical specialists will also find parts of the guidance relevant. Patients and carers may also refer to the guidance and use the accompanying patient information, available at SDCEP *Periodontal Care*.

1.6 Development and presentation of the guidance recommendations

The recommendations presented in this guidance were developed by a multidisciplinary guidance development group that included dental practitioners and specialists along with a patient representative. The group considered the available evidence, clinical experience, balance of benefits and risks, patient and practitioner perspectives, and the acceptability and feasibility of treatment options.

Further details about the updating of this guidance are given in Appendix 1. Details of these considered judgements are provided in the *Prevention and Treatment of Periodontal Diseases in Primary Care Methodology (2024),* available at SDCEP *Periodontal Care*.

Key recommendations in the guidance are indicated by a key symbol. The strength of each key recommendation is stated directly after the recommendation with a rating of the certainty of the evidence,* following the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) approach (www.gradeworkinggroup.org).

A strong recommendation is one where it is considered, based on all the available information and weighing up the balance of benefits versus risk, that almost all individuals would choose this option. A conditional recommendation is one where there is a finer balance between the options, and it is likely that the majority, but not all, would choose the recommended option. In the case of a conditional recommendation, the dental practitioner should expect to spend more time discussing the treatment management options so that the patient can make an informed decision.

The basis for each recommendation, including a brief overview of the evidence, is provided in the accompanying text. Further details can be found in Appendix 1 and at SDCEP *Periodontal Care*.

Other **clinical practice advice** in this guidance is based on consensus, expert opinion and best practice as identified in the accompanying text. These advice points are indicated with molar bullet points ( ).

Note that the FDI World Dental Federation tooth notation is used throughout this guidance.[11]

1.7 Supporting tools

Tools to support the implementation of the guidance are provided and include:

- advice on monitoring plaque and bleeding levels (Appendix 2);
- a tool to facilitate risk assessment (Appendix 3);
- advice on treatment prescriptions for referral to dental hygienists and therapists (Appendix 4);
- advice on raising the issue of smoking cessation (Appendix 5) and alcohol consumption (Appendix 6) with patients;
- information for other healthcare professionals (e.g. General Medical Practitioners, diabetologists and diabetic nurses) on the most common medical conditions and medications associated with the development of periodontal diseases (Appendix 7);
- the updated Oral Hygiene TIPPS behaviour change strategy (Appendix 8);
- patient information leaflets (available to download from SDCEP *Periodontal Care*).

1.8 Environmental considerations and sustainability

Climate change, caused by the accumulation of greenhouse gases in the atmosphere, represents a major threat to both human health and the health of our planet. It is now widely recognised that we should all strive to minimise the impact we have on the environment.

* Previously referred to as evidence quality.

National Health Services in the UK are committed to reduce greenhouse gases and their environmental impact.[12-14] SDCEP aims to contribute to this ambition, promoting more sustainable oral healthcare through the provision of clinical guidance.

The overarching principles set out in the second edition of the *Prevention and Treatment of Periodontal Diseases in Primary Care* guidance align with efforts to reduce the environmental impact of oral healthcare. Specifically, this guidance:

- promotes the prevention of periodontal diseases and encourages the early identification and treatment of disease. Prevention is widely recognised as a fundamental pillar of sustainable healthcare, as it avoids the need for more complex care, which has associated environmental and health costs. Similarly, early intervention aims to minimise the need for more complex treatment.
- provides strategies for the dental team to encourage and empower patients to take an active role in maintaining their own oral health, which is crucial for periodontal health.
- advocates a risk-based approach to periodontal care that underpins planning of appointments at intervals tailored to clinical need, thereby avoiding unnecessary travel to attend and unnecessary use of resources.
- gives practical advice on how to efficiently deliver care that is effective in maintaining and improving patients' periodontal health.
- recommends against interventions that are not supported by evidence, thereby avoiding unnecessary, and therefore wasteful, care.

Following the recommendations and clinical advice in this guidance is one means by which dental professionals can contribute to reducing their carbon footprint. For more general advice on other strategies the dental team can follow towards achieving more sustainable healthcare, refer to the SDCEP *Practice Support Manual*.[15]

1.9 Statement of intent

This guidance is based on careful consideration of the available evidence, expert opinion and other resources and has been developed with the direct involvement of experts, end-users and patients (see Appendix 1). As guidance, the information presented does not override the healthcare professional's right, and duty, to make decisions appropriate to each patient, with the patient's valid consent. However, it is advised that significant departures from this guidance, and the reasons for this, are fully documented in the patient's clinical record.

2 Periodontal assessment

All dentate patients should be screened for periodontal disease at every routine recall examination. Periodontal assessment comprises four inter-related phases:

- detection of systemic and local risk factors which make an individual more susceptible to disease or which make disease control more complex;
- discussion with the patient of any symptoms of disease, their dental history, current dental habits and oral hygiene routines;
- examination of tissues for signs of disease;
- appropriate radiographic assessment.

A structured assessment involves discussion with the patient regarding their history of periodontal symptoms and risk factors along with a clinical examination to determine the current periodontal status.

2.1 Patient history

Details from the history of individual symptoms (e.g. bleeding gums on brushing, swollen gums, bad breath, loose or drifting teeth) will help the clinician identify what, if any, problems need to be addressed for the patient. In addition, collecting an up-to-date medical, social and dental history for each patient enables risk factor identification and can inform an assessment of the patient's risk of developing periodontal disease or of existing disease progressing. Knowledge of risk factors can also be used to inform a patient's future care.

Some of this information can be collected before a dental appointment using specific dental questionnaires and medical history forms. Patients might require assistance with this.

To inform an assessment of the patient's risk for periodontal disease development or progression:

- Collect or update the patient's dental (e.g. toothbrushing frequency, use of interdental aids), social (e.g. smoking status, alcohol intake) and medical history (e.g. current medication and medical conditions).
- Identify and record any factors that might impact the risk of developing periodontal disease or worsen existing disease (see Section 2.2).

2.2 Risk factors for periodontal diseases

Plaque biofilm is necessary for the development of periodontitis. However, there are multiple factors, both systemic and local, which increase the probability of periodontal disease developing or progressing for an individual patient. These may be modifiable (i.e. something the patient can change) or non-modifiable (i.e. something the patient cannot change).

Both the *BSP implementation of European S3 – level evidence-based treatment guidelines for stage I-III periodontitis in UK clinical practice* (**BSP-S3**)[6] and the *Delivering Better Oral Health* (**DBOH**)[7] toolkit note that smoking, diabetes and plaque biofilm are well established risk factors for periodontal diseases. The

guidelines also note that there are possible associations with other systemic conditions, although the evidence for these is less clear.

The **BSP-S3** guideline[6] recommends risk factor control interventions as part of the first step of therapy in periodontitis patients. To facilitate this, risk factors must be identified and discussed with the patient (see Section 2.5).

2.2.1 Systemic risk factors

Systemic risk factors can be identified by collecting information on patient demographics, and their medical and social history, with a focus on identifying the following potential risk factors.

Smoking

Smoking is a well-established risk factor for periodontitis. Patients who smoke do not respond to periodontal treatment as well as non-smokers and are also more likely to lose teeth.[16] The risk is dose-related, with a patient who regularly smokes ≥10 cigarettes per day considered to be at higher risk than patients who smoke <10 cigarettes per day.[17] The reduced blood flow caused by smoking can suppress the signs and symptoms of disease activity. The use of other forms of tobacco, such as chewing tobacco, also carries a higher risk of periodontitis.

The use of e-cigarettes, or vaping, may also be associated with worse periodontal outcomes,[18] but the overall risk appears lower than in those who currently smoke. Many people who vape are former smokers and their periodontal health may still be affected by their previous smoking habit.

E-cigarettes are viewed as a helpful transition to cessation for smokers and a Cochrane Review found that e-cigarettes increase quit rates compared to nicotine replacement therapy.[19] However, these devices are not risk-free and may have the potential to cause harm. There is increasing concern about the uncertain risks to the growing number of individuals, especially young people, who have taken up vaping for purposes other than smoking cessation, particularly regarding the use of unlicensed products.

Diabetes

Patients with sub-optimally controlled diabetes and pre-diabetes have an increased risk of developing periodontitis.[1,20] Diabetes also has an adverse effect on wound healing; together these factors make management of disease in these patients more difficult. In addition to local improvements in periodontal status, there is moderate certainty evidence that successful non-surgical periodontal treatment can improve glycaemic control.[21]

While well-controlled diabetes is not a risk factor, many people oscillate between different levels of control and an increased risk of periodontal diseases should be assumed for anyone who has diabetes. The National Institute of Health and Care Excellence (NICE) guidelines on management of diabetes now recognise this increased risk of periodontitis in patients with diabetes and have produced guidance on the advice which should be given to these patients in medical and dental settings.[22,23] In addition, NHS England has produced a *Commissioning Standard* to ensure that people with diabetes can access effective oral healthcare services with the aim of improving their general and oral health and to ensure that these services are available.

Other risk factors for periodontitis

A family history of periodontitis increases the risk of an individual developing periodontitis. This has a genetic basis with a complex, multifactorial mechanism.

Other factors potentially related to an increased risk of periodontitis include:

- stress, diet, obesity, osteoporosis, rheumatoid arthritis – currently there is limited evidence concerning these relationships;
- socio-economic status – periodontal diseases are more prevalent in lower socio-economic groups;
- ethnicity – certain ethnic groups (e.g. Afro-Caribbean) may have an increased risk of more severe periodontitis (e.g. Grade C disease in younger age groups) but it is unclear whether this is related to genetic phenotype or other factors.

Risk factors for gingival inflammation and enlargement

The systemic factors which are clearly related to an increased risk of gingival inflammation and/or enlargement include:

- pregnancy – hormonal changes and modified immune response implicated in gingivitis and gingival enlargement;
- puberty – hormonal changes can cause increased inflammatory response to plaque, causing gingivitis and gingival enlargement;
- medications – calcium channel blockers for hypertension, phenytoin for epilepsy and ciclosporin, an anti-rejection drug, which can also be prescribed for some autoimmune disorders, may increase the risk of gingival enlargement.

In addition, a large number of medications may cause reduced salivary flow (e.g. tricyclic antidepressants, beta blockers) leading to increased plaque accumulation and risk of disease.

2.2.2 Local risk factors

Plaque biofilm

Dental plaque is the community of microorganisms found on a tooth surface as a biofilm, embedded in a matrix of polymers of host and bacterial origin.[24,25] The biofilm provides protection for the microorganisms from both the inflammatory and immune systems and from chemical agents. The presence of plaque biofilm* is necessary for the development of periodontal diseases.

* The phrase ‘plaque biofilm’ is used in this guidance, in preference to other descriptors such as dental biofilm, to encompass wording that is familiar to patients (i.e. plaque) and to describe the structurally and functionally organised community of microorganisms and supporting matrix adhering to the tooth surface (i.e. biofilm).

Plaque retentive factors

Factors which increase the retention of plaque biofilm or make it more difficult for a patient to remove, such as calculus, dental crowding, overhanging restorations and partial dentures, may increase the risk of periodontal diseases.

2.3 Clinical examination

Clinical examination involves:

- a visual examination of the oral tissues to assess signs of periodontal disease (e.g. gingival inflammation; gingival recession, especially interdentally; crowded, malpositioned or drifted teeth; halitosis) and levels of plaque biofilm and calculus;
- a specific periodontal examination which includes probing of the periodontal tissues to assess the presence of bleeding or suppuration on probing, the depth of any gingival or periodontal pockets which are present.

This basic clinical examination for disease is a regular part of care for all patients during recall examination and maintenance care. Patients who show signs of more advanced disease, or those who have had periodontal disease treated in the past, will require more detailed and specific examination (see Section 2.4) to either inform the diagnosis or to monitor stability.

2.3.1 Visual examination

Before periodontal probing takes place, the oral tissues should be examined visually to assess the patient's level of oral hygiene to identify other local risk factors (e.g. calculus, malpositioned teeth, overhanging restorations and partial dentures) and to detect signs of gingival inflammation or periodontitis. Interdental recession at any site in the mouth is considered a sign of periodontitis and indicates that a full periodontal examination is required rather than simple screening.

Conduct and record a visual examination of the patient's oral tissues and assess:

- recession on smooth and interdental surfaces;
- gingival inflammation;
- crowded, drifting or malpositioned teeth;
- restorations/prostheses (if present);
- levels of dental plaque biofilm (see Section 2.3.2: Assessing plaque biofilm and bleeding);
- presence of calculus deposits, both supra- and subgingival;
- presence of dental sinuses or suppuration;
- occlusion (see Section 2.4.4: Occlusal examination).

2.3.2 Periodontal probing

Basic periodontal examination

The Basic Periodontal Examination (BPE), developed by the British Society of Periodontology, is a simple and rapid screening tool for the assessment of adult patients.[26] A simplified BPE is used to screen children and adolescents (see Section 2.3.2: BPE screening of children and adolescents <18 years).[27] The BPE does not itself provide a diagnosis of periodontal disease but provides basic guidance on treatment need and indicates the level of further examination needed.

The BPE is not suitable for reassessment following periodontal treatment as it does not provide information about how individual sites respond to treatment or give an assessment of periodontal attachment levels. It is also not suitable for the screening of dental implants (see Section 8.3).

The BPE is performed using a WHO BPE probe (see figure. 2.1). The BPE should form part of the routine examination of all patients at initial presentation and, with a few exceptions, at recall visits.

During examination the specific WHO BPE probe should be 'walked' around the gingival margin and used to detect areas of periodontal pocketing, bleeding on probing, plaque or calculus accumulations. The results of the examination should be recorded in the patient notes.

Bleeding on probing is a result of inflammation of the periodontal tissues that occurs in response to the presence of dental plaque biofilm; this may be less prominent in smokers where the inflammatory response is suppressed.

In non-smokers, an absence of bleeding on probing suggests that the periodontal tissues are healthy.

In non-smoking patients with a diagnosis of periodontitis, an absence of bleeding on probing suggests that the tissues are now stable or the disease is in remission.

BPE screening of adults

- Carry out a BPE screen for all new adult patients, and all adult patients without a diagnosis of periodontitis at each recall appointment. For patients with a diagnosis of periodontitis, see Section 2.4.1.
- Explain to the patient the reason for the examination.
- Divide the dentition into 6 sextants (i.e. 17-14, 13-23, 24-27, 47-44, 43-33, 34-37).
- Examine all teeth in each sextant (excluding third molars unless first and/or second molars are missing) using a WHO BPE probe (see figure 2.1) and light probing force equivalent to the force required to blanch a fingernail (see figure 2.2).
    - 'Walk' the probe around the gingival margin of each tooth in the sextant.

  N.B. A sextant must include at least two teeth; if only one is present then include it with the neighbouring sextant.

- Record the highest score for each sextant, including any furcation involvement (noted as * beside the sextant score), as illustrated in table 2.1 and figure 2.3.
  - For example, a sextant where the black band enters the pocket but is still partially visible plus furcation involvement would be scored 3*.
  - If any tooth in a sextant is given the score 4, continue to examine all sites in the sextant. This will help to gain a fuller understanding of the periodontal condition and will make sure that furcation involvements are not missed.
- For patients with a BPE score of 3, 4 or * carry out a full periodontal examination and record the findings in the patient's clinical notes.
  - For patients with a BPE score of 3, full charting of the affected sextant should be carried out after initial treatment.
  - For patients with a BPE score of 4, full charting of the whole dentition should be performed before treatment begins.

Figure 2.1 WHO BPE probe

The WHO BPE probe has a 0.5 mm diameter ball end and black banding between 3.5 and 5.5 mm and between 8.5 and 11.5 mm.

A light probing force of 20-25 g (0.2-0.25 N), equivalent to the force required to blanch a fingernail, is used when probing the periodontal tissues (see figure 2.2).

Figure 2.2 Probing force

Table 2.1 Basic periodontal examination scoring codes

Probing depth	Observation	BPE score
Black band completely visible	No probing depths >3.5 mm, no calculus/overhangs, no bleeding after probing, no plaque present	**0**
Black band completely visible	No probing depths >3.5 mm, no calculus/overhangs, but bleeding after probing	**1**
Black band completely visible	No probing depths >3.5 mm, but supra- or subgingival calculus/overhangs present	**2**
Black band partially visible	Probing depth(s) of at least 4 mm present	**3**
Black band no longer visible	Probing depth(s) of at least 6 mm present	**4**
N/A	Furcation involvement	*

Figure 2.3 Probing depths observed at sites with BPE scores 0, 1, 2, 3, 4 and *

BPE 0 **BPE 1** **BPE 2**

BPE 3 **BPE 4** ***Furcation**

Note the small fibroepithelial polyp on the attached gingiva adjacent to tooth 12 in the BPE 3 image. In addition, while furcation involvement was identified with a BPE probe, the image shows the degree of furcation involvement being assessed with a Nabers probe.

The score for each sextant is recorded in a 2 x 3 box chart, with any missing sextant denoted by an X, as shown in figure 2.4.

Figure 2.4 Box chart with charting of adult BPE scores

3	1	X
3	2	4*

BPE screening of children and adolescents <18 years

Periodontal screening for children and adolescents aged 7 to 17 years assesses six index teeth using a simplified BPE.[27]

- Explain to the patient the reason for the examination.
- Examine 16, 11, 26, 36, 31, 46 using a WHO BPE probe and light probing force equivalent to the force required to blanch a fingernail (see figure 2.2).
- Record the highest score for each tooth as illustrated in table 2.1.
  - BPE codes 0 – 2 are used for 7- to 11-year-olds (mixed dentition stage) to screen for bleeding and the presence of local plaque retentive factors.
  - The full range of codes, including any furcation involvement, can be used in 12- to 17-year-olds (permanent teeth erupted).
- Refer any child with evidence of periodontitis or unexplained gingival enlargement to a consultant in paediatric dentistry, consultant in restorative dentistry or specialist periodontist.

The score for each tooth is recorded in a 2 x 3 box chart (with a missing tooth denoted by an X) as shown in figure 2.5.

Figure 2.5 Box chart with charting of BPE scores for children

16 1	11 0	26 2
46 0	31 0	36 1

Interpretation of BPE scores

The BPE score for each sextant gives an indication of the care required in that sextant. Where a patient has recession and areas of periodontal attachment loss, more detailed examination is required (see Section 2.4.1) and treatment should not be based on a BPE score.

Advice on the interpretation of BPE scores, based on guidance from the British Society of Periodontology, is given in table 2.2.[26] In addition, individual factors unique to each patient may influence the need for further assessment and the treatment required.

Table 2.2 Interpretation of BPE scores

BPE score	Guidance on further assessment and treatment
0	Periodontal treatment is not required.
1	Oral hygiene instruction and other risk factor control advice.
2	As for code 1 plus removal of plaque retentive factors, including all supra- and subgingival calculus.
3	As for code 2 plus detailed periodontal charting of the affected sextant(s) at post-treatment re-evaluation.
4	As for code 3 but with full mouth detailed periodontal charting pre- and post-therapy. Post-therapy, assess the need for more complex treatment and consider whether referral to a specialist is required.
*	Indicates furcation exposure and need for further examination of that sextant. Treatment need will depend on the additional findings for that sextant and for the rest of the dentition. Assess the need for more complex treatment and consider referral to a specialist.

Based on the 2019 BSP Basic Periodontal Examination guidelines.[26]

N.B. Radiographs should be available for all Code 3 and Code 4 sextants. The type of radiograph used is a matter of clinical judgement but crestal bone levels should be visible. Periapical views or a panoramic radiograph for Code 4 sextants will allow assessment of bone loss as a percentage of root length and visualisation of the periapical tissues.

Assessing plaque biofilm and bleeding

Inflammation of the periodontal tissues occurs in response to the presence of dental plaque biofilm and results in bleeding. Bleeding from the gingival margin is mainly related to inadequate oral hygiene while bleeding from the base of the pocket may indicate that active periodontal disease is present.

The stepwise approach to treatment (see Section 4) advises regular and ongoing objective monitoring of plaque biofilm and marginal bleeding as an integral part of patient management. Charting plaque biofilm and marginal bleeding levels allows the clinician to understand the patient's initial levels of plaque control and inflammation. It subsequently enables the response to treatment to be objectively monitored and, in addition, can be helpful for motivating patients. While a full mouth assessment is useful in specific circumstances, charting plaque biofilm and marginal bleeding indices for index teeth (e.g. Ramfjord teeth) on a regular basis is more practical. However, be aware that partial mouth recording systems tend to underestimate disease and that an abbreviated bleeding score obtained from index teeth may underestimate the true bleeding score that would be obtained from a full mouth assessment.

Refer to Appendix 2 for examples of abbreviated plaque biofilm and marginal bleeding charts and how to record these.

- Monitor and record plaque biofilm and bleeding levels for all patients.
- Consider using plaque biofilm and marginal bleeding indices to monitor patients with inadequate oral hygiene and/or inflammation.
  - During treatment, the use of indices of plaque biofilm and marginal bleeding helps to objectively monitor ongoing levels of oral hygiene and inflammation.

2.4 Special tests

For patients with BPE scores of 3 and 4, those with furcation involvement or those with historical signs of periodontitis, further assessment is required to determine the extent of the disease and to allow for a diagnosis to be made.

2.4.1 Full periodontal examination

A full periodontal examination is a more detailed assessment of disease extent and the information obtained can be used to:

- determine a diagnosis;
- educate the patient;
- inform treatment choice;
- monitor treatment outcomes;
- assess periodontal status and prognosis on an annual basis for patients with periodontitis during maintenance.

It can also be used to show, from a medico-legal standpoint, that you have recognised, diagnosed and treated the condition appropriately.

The findings of the full periodontal examination should be recorded in the patient's clinical notes.

What should be recorded

Historically, full periodontal charting before, during and after treatment included comprehensive recording of multiple periodontal parameters. Although this process is time consuming, it gives extensive information that may be useful in some cases, for example where recession or increased tooth mobility is recognised as a problem.

The British Society of Periodontology and Implant Dentistry (BSP) recognise less comprehensive charting for routine use in patients who have BPE scores of 3 and 4. This involves assessing probing pocket depth and bleeding on probing at 6 sites around each tooth. Recording is required for all sites where probing pocket depths are ≥4 mm and for all sites which bleed on probing.

While it is now accepted that extensive periodontal charting may not be required for all patients at every visit, the recording of all periodontal parameters at baseline is advised for those with BPE scores of

3 and 4 so that a full understanding of the clinical situation is obtained. The recording of the additional features such as tooth mobility, recession, furcation involvement and suppuration will allow the dentist to determine tooth prognosis and case management, particularly in complex periodontal disease (see Table 2.3).

Interim charting during treatment or maintenance is a matter of clinical judgement, but as a minimum should include assessment of pocket depths and bleeding on probing, with probing pocket depths at sites of ≥4 mm and sites which bleed on probing recorded in the patient's clinical notes (see Table 2.3). This is in addition to assessing plaque biofilm and bleeding levels and the patient's oral hygiene status.

In addition, a radiographic record of bone levels supplements periodontal charting (see Section 2.4.3) to give a complete understanding of the patient's periodontal status and prognosis.

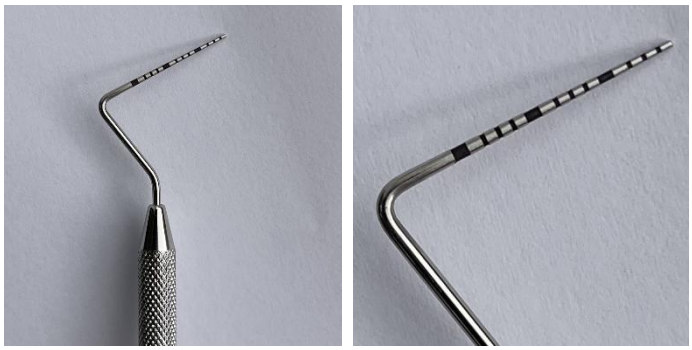
Table 2.3 Full periodontal charting at baseline and review

Baseline charting
Required at baseline (in addition to assessing plaque biofilm levels): • Assess probing pocket depths and bleeding on probing at 6 points around each tooth. • Record probing pocket depths at sites of ≥4 mm. • Record sites which bleed on probing. • Record sites with furcation involvement. • Record sites with suppuration. • Record tooth mobility. • Record gingival recession, where this is present.
Review charting
Required for review charting (in addition to assessing plaque biofilm levels): • Assess probing pocket depths and bleeding on probing at 6 points around each tooth. • Record probing pocket depths at sites of ≥4 mm. • Record sites which bleed on probing. **Recommended for review charting:** (These parameters may be useful to monitor treatment outcomes, periodontal status and prognosis in the long term.) • Charting of furcation involvement. • Charting of suppuration. • Charting of tooth mobility. • Charting of gingival recession (where this is present).

Tools

A full periodontal examination is performed using a calibrated periodontal probe, such as the 15 mm University of North Carolina (UNC) probe (see figure 2.6). The WHO BPE probe is not suitable for recording measurements in a full periodontal examination.

Figure 2.6 UNC 15 calibrated periodontal probe



The UNC 15 probe has markings at 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 mm.

Baseline charting for diagnosis

- Record any missing teeth.
- Measure probing pocket depth, in millimetres, at six sites around each tooth (i.e. mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual and distolingual). Record probing pocket depth measurements at any sites ≥4 mm, with or without bleeding.
  - Use a light probing force, equivalent to the force required to blanch a fingernail (see figure 2.2).
  - 'Walk' the probe around the gingival margin of each tooth (see figure 2.8) and record measurements for the greatest probing depth at each of the six sites for each tooth.
- Record the absence or presence (0 or 1) of bleeding on probing from the base of the pocket (see Section 2.4.1: Bleeding on probing).
- Record any suppuration observed when probing.
- Record any furcation involvement for multi-rooted teeth, with an indication of the severity (see Section 2.4.1: Measurement of furcation involvement).
- Record the degree of tooth mobility or its absence (see Section 2.4.1: Tooth mobility).
- Record at least one measure of the greatest extent of gingival recession observed, in millimetres, for both the buccal and lingual surfaces of each tooth (see Section 2.4.1: Measuring gingival recession).
- Consider recording any other observations, such as presence of dental caries, occlusal discrepancies or problems with restorations.

- Consider whether a radiographic examination to assess alveolar bone levels is appropriate (see Section 2.4.3).

Review charting for ongoing monitoring of patients with a diagnosis of periodontitis:

- Record any missing teeth.
- Measure probing pocket depth, in millimetres, at six sites around each tooth (i.e. mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual and distolingual) at least annually for patients for a diagnosis of periodontitis. Record probing pocket depth measurements at any sites ≥4 mm, with or without bleeding.
  - Use a light probing force, equivalent to the force required to blanch a fingernail (see figure 2.2).
  - 'Walk' the probe around the gingival margin of each tooth (see figure 2.8) and record measurements for the greatest probing depth at each of the six sites for each tooth.
- Record the absence or presence (0 or 1) of bleeding on probing from the base of the pocket (see Section 2.4.1: Bleeding on probing).
- Consider recording any suppuration observed when probing.
- Consider recording any furcation involvement for multi-rooted teeth, with an indication of the severity (see Section 2.4.1: Measurement of furcation involvement).
- Consider recording the degree of tooth mobility or its absence (see Section 2.4.1: Tooth mobility).
- Consider recording at least one measure of the greatest extent of gingival recession observed, in millimetres, for both the buccal and lingual surfaces of each tooth (see Section 2.4.1: Measuring gingival recession).
- Consider recording any other observations, such as presence of dental caries, occlusal discrepancies or problems with restorations.
- Consider whether a radiographic examination to assess alveolar bone levels is appropriate (see Section 2.4.3).

Bleeding on probing

In a full periodontal charting, bleeding from the base of the pocket is measured and indicates that active, progressive disease may be present. While measuring bleeding on probing, the specific presence and site of any suppuration on probing can also be recorded.
In non-smokers, an absence of bleeding on probing at any site suggests that active or progressing periodontal disease is absent. In people who smoke, the absence of bleeding on probing is not a reliable indicator that disease is not active or progressing.

Probing depth

Probing depth is the distance from the gingival margin to the base of the pocket (see figure 2.7). The position of the gingival margin can change due to swelling or recession therefore probing depth measurement alone is not recommended for assessment of changes in periodontal support over time. However, changes in probing depth give a good indication of the response to periodontal treatment in the short term.

The probe should be inserted parallel to the root surface into the periodontal pocket and 'walked' around the gingival margin (see figure 2.8). Probing depth should be measured at six sites per tooth.

Figure 2.7 Simplified longitudinal section through a periodontal pocket.

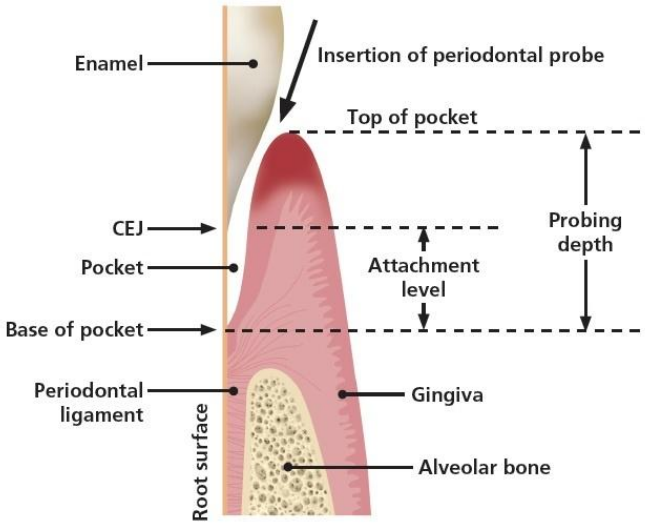


Figure 2.8 'Walking' the probe

A PCP 12 probe is 'walked' around the gingival margin of the tooth.

Measuring gingival recession

It can be difficult to accurately measure the position of the gingival margin in relation to the cementoenamel junction (CEJ) when the CEJ is not exposed. When measuring gingival recession (see figure 2.9), it is acceptable to record one measure of the greatest extent of gingival recession for both the buccal and lingual surfaces of the tooth.

Gingival margin position

The normal position of the gingival margin is coronal to the cementoenamel junction (CEJ; see figure 2.7). Where the gingival margin is apical to the CEJ it is described as gingival recession. When recording the position of the gingival margin, indicate whether the margin is apical or coronal to the CEJ (i.e. if the patient has gingival hyperplasia or recession).

Figure 2.9 Measurement of recession

The markings on the PCP 12 probe show that the recession is 2.5 mm.

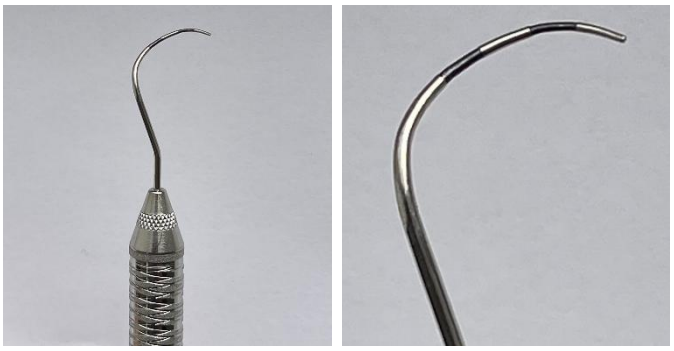
Clinical attachment loss

The clinical attachment level (CAL) combines the measurements of probing pocket depth and any gingival recession to give an overall indication of where the periodontal tissues attach to the root surface. It is measured from a fixed point, usually the CEJ, to the base of the periodontal pocket. This is considered the best measure of changes in residual periodontal support over time. If the CEJ is obscured, by for example a restoration margin, then another fixed reference point can be used to measure the relative clinical attachment loss. Most computerised clinical systems will calculate CAL automatically if measurements of probing pocket depth and recession are entered.

Measurement of furcation involvement

Damage from periodontitis can lead to furcation involvement of multi-rooted teeth. This can be measured using a furcation probe (see figure 2.10) and graded depending on the severity of the furcation involvement[28] (see table 2.4).

Figure 2.10 Nabers furcation probes



The Nabers furcation probe has colour banding between 3 to 6 mm and 9 to 12 mm.

Table 2.4 Grading of furcation involvement

Grade	Description
1	Initial furcation involvement. The furcation opening can be felt on probing but the involvement is less than one third of the tooth width.
2	Partial furcation involvement. Loss of support exceeds one third of the tooth width but does not include the total width of the furcation.
3	Through-and-through involvement. The probe can pass through the entire furcation.

Tooth mobility

Tooth mobility is assessed both horizontally and vertically. Horizontal mobility is measured by applying gentle pressure in a buccal-lingual direction, using two rigid instrument handles on either side of the tooth, and assessing the level of displacement (see figure 2.11). Vertical mobility is measured by applying gentle pressure on the crown of the tooth with a rigid instrument handle in a vertical direction.

Figure 2.11 Measuring horizontal tooth mobility

Horizontal tooth mobility measured using two rigid instrument handles.

Mobility is graded as shown in table 2.5.[29]

Table 2.5 Grading of tooth mobility

Grade	Description
0	'Physiological' mobility measured at the crown level.
1	Increased mobility of the crown of the tooth to at the most 1 mm in a horizontal direction.
2	Increased mobility of the crown of the tooth exceeding 1 mm but less than 2 mm in a horizontal direction.
3	Mobility of the crown of the tooth in both horizontal and vertical directions.

2.4.2 Full mouth plaque biofilm assessment

While the use of plaque biofilm and marginal bleeding indices which monitor specific teeth can be helpful for monitoring the ongoing response to treatment, a full mouth plaque assessment can be performed as part of the full periodontal examination (see Appendix 2).

Plaque disclosing tablets or solutions can aid in the detection of plaque biofilm and act as a visual demonstration of plaque levels for patients. Plaque charts can be used to assist with oral hygiene instruction.

2.4.3 Use of radiographs

It is essential to perform a clinical examination and full mouth periodontal assessment where clinical signs indicate it is necessary. This is supplemented by radiographic examination to provide information to aid classification and treatment planning where clinically indicated (see figures 2.12 and 2.13). Radiographs allow the practitioner to assess:

- root length and morphology;
- the level of alveolar bone and remaining bone support;
- the periodontal ligament space and periapical region;
- furcation involvement of molar and premolar teeth;
- restorations/caries and sometimes subgingival calculus.

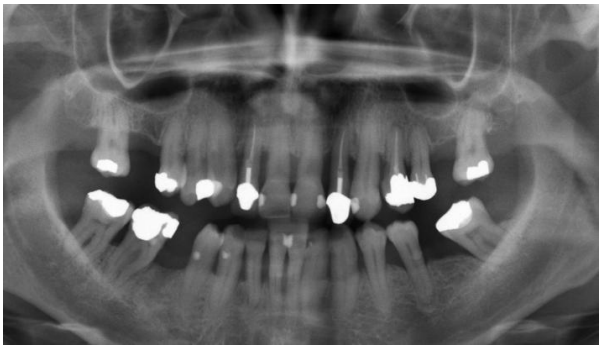
Periapical radiographs are considered the gold standard for periodontal assessment as they provide extensive information about the extent of bone loss, apical status, endodontic-periodontal lesions, root fractures and deposits on root surfaces. However, reviewing existing bitewings or panoramic radiographs, taken as part of the patient's ongoing general care, may be useful to confirm whether further periapical radiographic investigation is required.

Figure 2.12 Periapical radiographs

A B

These periapical radiographs, taken using the long cone paralleling technique, show:
A. horizontal bone loss of up to 50% of root length in the upper right quadrant; calculus on root surfaces 17D/18M; inadequate root canal treatment 15.
B. horizontal bone loss 26D/27M of 15% of root length; overhanging restorations 26M, 26D, 27M; fractured restoration/secondary caries 27D.

Figure 2.13 Panoramic radiograph



This panoramic radiograph shows a heavily restored dentition with >50% generalised horizontal bone loss; multiple infrabony defects; furcation involvement of the lower molars.

If radiographs are indicated:

- After the clinical examination, consider whether radiographs are required to inform the diagnosis, classification and management of the patient.
  - Consider the use of existing radiographs for this purpose.
- Where previous radiographs are not available, consider what information is required before taking any new radiographs to ensure appropriate views are recorded.
  - Periapical radiographs are considered the gold standard for periodontal assessment, but other radiographic views can also provide useful information.
  - Take into consideration the presence of recession and attachment loss when deciding if bitewing radiographs will capture the position of the bone crest.
  - Where clinical examination indicates that staging and grading of the disease is not possible without visualisation of the full length of the root, periapical or panoramic views will be needed.

- For uniform probing depths ≥4 and <6 mm (maximum BPE Code 3 in any sextant) and little or no recession, consider whether bitewing radiographs will give the information required to make a diagnosis or whether periapical radiographs are required to show the full extent of the root. If the anterior teeth are affected, take intra-oral periapical views using the long cone paralleling technique.
- For probing depths ≥6 mm (BPE Code 4), consider which radiographic views will give the necessary information for diagnosis and treatment planning (e.g. vertical bitewings, intraoral periapical views or a panoramic radiograph).
- For irregular probing depths, consider if bitewing radiographs will show the extent of bone defects or whether periapical radiographs will give better information for diagnosis and treatment planning.
- If an endo-perio lesion is suspected, take an intra-oral periapical radiograph using the long cone paralleling technique.
- Where large numbers of intra-oral periapical radiographs are needed, particularly where additional information about other aspects of the dentition is required, consider taking a panoramic radiograph if there is access to a good quality/low dose panoramic machine. Note that this may need to be supplemented by periapical views of the anterior teeth if these are not clearly seen on the panoramic radiograph.
- While cone beam computed tomography (CBCT) is not indicated as a routine method of imaging periodontal bone support, if CBCT images which include the teeth have been obtained for other reasons, the periodontal bone levels should be reported as part of the clinical evaluation.[30]

Radiographic periodontal report

A thorough assessment of any radiographs should be recorded in the patient's clinical record. This includes standard records of the justification for radiographs, doses used and the operator who took the views. In addition specific periodontal information includes:

- the degree of bone loss - if the apex is visible this should be recorded as a percentage of the root surface affected;
- the type of bone loss - horizontal or angular/infrabony defects;
- distribution/extent of bone loss – localised or generalised (where radiographic views of multiple teeth are available);
- the presence of any furcation defects;
- the presence of subgingival calculus;
- other features including endodontic-periodontal lesions, widened periodontal ligament spaces, abnormal root length or morphology, overhanging restorations, root fillings, caries.

The SDCEP *Practice Support Manual*[15] provides further information on the use of radiography in dental practice.

2.4.4 Other diagnostic tools

Study models, either conventional or digital, can be useful in the monitoring of gingival recession. Clinical photographs, calibrated by the inclusion of a probe, can also be a useful way of monitoring gingival recession (see figure 2.9).

Occlusal examination

Occlusal trauma does not cause periodontitis but may, in some circumstances, accelerate periodontal bone loss or increase tooth mobility. Where teeth are drifting or increasing in mobility, occlusal examination is particularly important to investigate the causes of this and to inform a management plan. Occlusal examination and therapy is complex and in many cases will require extended examination and skills.

Testing for the presence of fremitus (i.e. vibration or movement of a tooth when teeth come into contact) may be helpful during the initial examination.

Trauma from the occlusion can increase the complexity of management and periodontal or prosthodontic specialist referral may be necessary.

Further information about occlusal examination and management is beyond the scope of this guidance.

Sensibility testing with cold/hot/EPT

Pulp sensibility tests (both thermal and electric) can be used to determine the status of the dental pulp when pulpal disease is suspected. Sensibility testing may be useful when periodontal bone loss is severe or where an endodontic-periodontal lesion is suspected (see Section 6.4.5).

2.5 Assigning patient risk

The **BSP-S3** guideline[6] recommends risk factor control interventions as part of the first step of therapy. To facilitate this, risk factors must be identified and discussed with the patient.

Carrying out this risk assessment combines clinical judgement along with knowledge of the patient's history and periodontal status to identify risk factors that may affect the development or progression of oral disease. The individual patient's risk level is part of the information used to determine the level of ongoing care required by the patient and the appropriate recall interval.

While the importance of risk assessment to inform a patient's care is accepted, it is acknowledged that risk assessment itself is an imperfect science. Approaches to risk assessment may be structured (i.e. using a validated risk assessment tool) or unstructured (i.e. making a subjective judgement based on known risk factors). A structured approach to risk assessment, which incorporates a series of questions or examinations to assess a range of factors associated with periodontal disease, may allow for a more objective judgement of risk.

KEY RECOMMENDATION

When carrying out a risk assessment, use a structured approach to assess the patient's medical, dental and social history, any relevant risk factors and the outcome of the clinical examination, to inform future treatment and recall.

(Conditional recommendation; low certainty evidence)

Various tools that enable a formal structured approach to risk assessment are available and evidence suggests that they can be effective at predicting periodontitis progression and/or tooth loss.[31] The evidence is considered low certainty due to the observational nature of the data and substantial heterogeneity. Predictors common to these tools include age, smoking status, systemic disease status (most notably diabetes), pocket depth, furcation involvement and bone loss in relation to age.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Appendix 3 includes a basic risk assessment tool which might be helpful when determining the risk of disease initiation/progression in an individual patient and to inform the appropriate recall interval.

- Assign a risk level, based on the patient's medical history, an assessment of risk factors and the outcome of the clinical examination, to inform future treatment and recall interval (see Appendix 3).
  - A structured approach to risk assessment that documents age, smoking status (including whether the patient uses e-cigarettes), oral hygiene status, systemic disease status (e.g. diabetes) and pocket depth may be helpful when assigning a risk level.
  - Relevant social factors include a family history of early tooth loss or periodontitis, non-attendance and socio-economic status.
  - Other clinical factors that may be considered are bleeding on probing, furcation involvement, bone loss in relation to age, the presence of periapical bone lesions and marginal restorations.

Once a risk level has been assigned to a patient, it is important that the patient is aware of that risk. The **BSP-S3** guideline[6] notes that following a diagnosis of periodontitis and prior to potential therapy, initial discussions with patients should include information on the causes of the condition and risk factors for disease progression.

KEY RECOMMENDATION

For patients who are at increased risk of periodontitis, provide information about their periodontal risk, how it affects them and the ways that they can reduce this risk (e.g. provide oral hygiene instruction or advice on smoking cessation) as part of a strategy to encourage behaviour change.

(Conditional recommendation; low certainty evidence)

While there is limited evidence that informing patients about their periodontal risk results in behaviour changes to reduce their risk,[32] there is more evidence that interventions to promote improved oral hygiene, smoking cessation and diabetes control have some success in changing patient behaviour.[33-36] The certainty of the evidence is considered to be low due to risk of bias, heterogeneity and indirectness. However, ensuring patients' understanding of their risk is considered part of ongoing informed consent.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

- Explain to patients who smoke the effect smoking can have on their oral health and general health. Direct patients who express a desire to stop smoking to smoking cessation services (see Section 5.1.1: Smoking cessation and Appendix 5).
- Explain to patients who have diabetes that sub-optimally controlled blood sugar levels increase the risk of developing periodontitis or worsening existing periodontitis (see Section 5.1.1: Control of diabetes). Consider communicating with their GMP if necessary.
- Explain to patients with diabetes and periodontitis that periodontal inflammation can interfere with their glycaemic control.
- Explain to all patients the benefits of a healthy, balanced diet and regular exercise to their overall health and oral health in particular (see Section 5.1.1: Other modifiable risk factors).
- Ensure that patients who are pregnant are aware of their increased risk of developing pregnancy gingivitis or, if they have a diagnosis of periodontitis, worsening existing disease. Highlight the possible need for more frequent visits for professional mechanical plaque removal (PMPR; see Section 5.2) or, if required, periodontal maintenance care during pregnancy (see Section 6.5.2).

3 Making a diagnosis

Diagnosis is based on the findings of the periodontal assessment, incorporating information from both the patient's history and the clinical examination. Making a periodontal diagnosis, either of health or disease, is key to understanding an individual's periodontal condition and will inform both discussions with the patient about their periodontal status, treatment options and their care.

3.1 Classification of periodontal diseases

The 2018 *World Workshop on the Classification of Periodontal Diseases*[8] recognised several types of periodontal condition. The British Society of Periodontology and Implant Dentistry subsequently published their implementation of the Classification[37] (table 3.1) which aimed to be more appropriate for use in UK general dental practice, where most periodontal diseases are diagnosed and managed. The 2018 Classification system now recognises:

- periodontal health and gingivitis;
- periodontitis;
- other conditions affecting the periodontal tissues.

Once periodontitis has been recognised in a patient, the 2018 Classification allows for a more accurate description of the disease present. Note that staging and grading only identify historical disease experience and indicate the likelihood of future disease risk. Staging and grading do not provide any information on treatment need, which is based on assessment of disease activity, probing pocket depths and bleeding on probing.

The principal differences between the updated 2018 Classification and the previous disease classification are:

- the removal of the terms chronic and aggressive periodontitis;
- the incorporation of a system (**STAGING**) that assesses the severity of periodontal breakdown as a function of bone levels around the teeth at presentation;
- the incorporation of a system (**GRADING**) that assesses the rate of periodontal breakdown;
- the recognition of **risk factors** which make a patient more susceptible to disease and may make control more challenging;
- the **extent of disease** is described;
- a **descriptor of disease stability** indicated by levels of bleeding on probing and periodontal probing pocket depth.

Table 3.1 Basic classification of periodontal diseases and conditions[8,37]

Periodontal health, gingival disease and conditions
Periodontal health (intact periodontium)
Periodontal health (reduced periodontium*)
Gingivitis: dental biofilm-induced (intact periodontium)
Gingivitis: dental biofilm-induced (reduced periodontium*)
Gingival disease and conditions: non biofilm-induced
Periodontitis
Periodontitis**
Necrotising periodontal diseases
Periodontitis as a manifestation of systemic disease
Other conditions affecting the periodontium
Systemic diseases or conditions affecting the periodontal supporting tissues
Periodontal abscesses and endodontic-periodontal lesions
Mucogingival deformities and conditions
Traumatic occlusal forces
Tooth and prosthesis related factors

*Reduced periodontium due to causes other than periodontitis e.g. crown lengthening surgery, endodontic-periodontal lesions, recession due to toothbrushing, etc.

**All patients with evidence of historical or current periodontitis should be staged/graded at initial consultation.

3.2 Establishing a periodontal diagnosis

A diagnostic statement formalises the periodontal status and should be recorded in the case notes for all patients. This includes those patients with a diagnosis of periodontal health or gingivitis.

3.2.1 Periodontal health

A diagnosis of periodontal health is characterised by minimal bleeding on probing (<10% of sites), erythema, oedema and patient symptoms, with no attachment loss or and bone loss (see figure 3.1).[38]

A diagnosis of periodontal health can be applied to patients where no bone loss has occurred (an intact periodontium) and those where there is evidence of bone loss **only when** bone has been lost for reasons other than periodontitis, for example crown lengthening surgery or recession due to overbrushing (a reduced periodontium).

Figure 3.1 Periodontal health

This image shows a patient with gingival and periodontal health.

The 2018 Classification defines periodontal health as <10% bleeding on probing and all sites with probing depths ≤3 mm on an intact periodontium or a periodontium that is reduced for reasons other than periodontitis.[8] While the patient may be healthy at the time of the diagnosis, relevant risk factors should be noted as part of the diagnosis as these may impact the patient's prognosis and risk of developing future disease.

An example of a diagnostic statement for a patient with periodontal health is:

Periodontal health, risk factor: social smoker (<20 cigarettes/week)

3.2.2 Gingivitis

Gingivitis is characterised by the presence of bleeding on probing, erythema and oedema, but no loss of attachment or bone loss (see figure 3.2).

Figure 3.2 Gingivitis

This image shows a patient with inadequate oral hygiene and gingivitis around the crowns in the upper anterior region.

A diagnosis of gingivitis can be applied to patients with an intact periodontium and those with a reduced periodontium for reasons other than periodontitis (e.g. crown lengthening surgery; recession due to overbrushing).

The 2018 Classification defines gingivitis as ≥10% bleeding on probing and all sites with probing depths ≤3 mm on an intact periodontium or a periodontium that is reduced for reasons other than periodontitis.[8] Patients with gingivitis can be further stratified by the extent of disease, with localised gingivitis defined as 10-30% bleeding sites and generalised gingivitis defined as >30% bleeding sites.

Dental plaque-associated gingivitis can be modified by systemic or local risk factors (e.g. hyperglycaemia, pregnancy, medication, dental crowding).

A separate category of non plaque-induced gingival diseases include those associated with genetic/ developmental disorders, specific infections and inflammatory/immune conditions.[38]

An example of a diagnostic statement for a patient with gingivitis is:

> *Localised gingivitis; risk factor: sub-optimally controlled diabetes*

3.2.3 Periodontitis

Periodontitis is characterised by the loss of gingival and periodontal tissues (see figure 3.3). Patients present with a variety of signs including interproximal recession, increased periodontal probing depths, bleeding on probing, mobility of teeth, drifting or loss of teeth and signs of infection with pus on probing. Periodontitis is a result of plaque-induced inflammation that results in loss of periodontal attachment.[17]

The 2018 *Classification of Periodontal Diseases* defines periodontitis as interdental clinical attachment loss detected at ≥2 nonadjacent teeth.*[17] Typically, patients with periodontitis will present with pockets ≥4 mm and/or evidence of interdental recession.

A diagnosis of periodontitis should include identification of the disease type§ and extent, the stage and grade of the disease, the current periodontal status and a risk factor profile. Patients with evidence of historical periodontitis (signs of interdental recession or radiographic bone loss) should also have the stage and grade of their disease assessed and a diagnostic statement recorded.

An example of a diagnostic statement for a patient with periodontitis is:

> *Generalised periodontitis; Stage II, Grade B; currently unstable; risk factor: current smoker <10 cigarettes/day*

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* As CAL can be associated with clinical conditions other than periodontitis, the requirement for CAL to be detected at ≥2 non-adjacent teeth is intended to increase diagnostic accuracy and avoid a diagnosis of periodontitis being made on the basis of atypical sites.

§ Three different forms of periodontitis have been identified; periodontitis, necrotizing periodontitis and periodontitis as a direct manifestation of systemic diseases. The latter two forms are discussed in more detail in Section 3.2.4.

Figure 3.3 Periodontitis

A

B

C

A: Image of a patient with generalised periodontitis and significant gingivitis.
B: Patient with drifted tooth 22 secondary to periodontitis (image C) but no gingivitis.

Staging

The Stage of periodontitis reflects the historical severity of disease. The Stage of disease is diagnosed using radiographs, ideally those showing the full extent of the root length, and reflects the severity of bone loss at the worst affected site in the mouth (see figure 3.4).

To Stage disease, the worst affected tooth in the mouth is identified radiographically.[¥] The amount of bone loss at that worst affected tooth is then calculated as a percentage of the tooth's total root length. This percentage bone loss is used to determine the Stage (i.e. I – IV) of periodontal disease for that patient overall (see table 3.2). Expressing bone loss as a percentage makes this aspect of diagnosis more objective and allows for easier communication between clinicians and patients.

Where radiographs are not available, or where only bitewing radiographs that do not show the full extent of the root are available, estimates derived from measurements of clinical attachment loss (CAL) relative to the cemento-enamel junction (CEJ) can be used if there is no other clinical indication to take another radiograph.

[¥] The bone loss at this site should be due to periodontitis and not for other reasons, such as a root fracture or a previous surgical intervention (for example, wisdom tooth removal).[37]

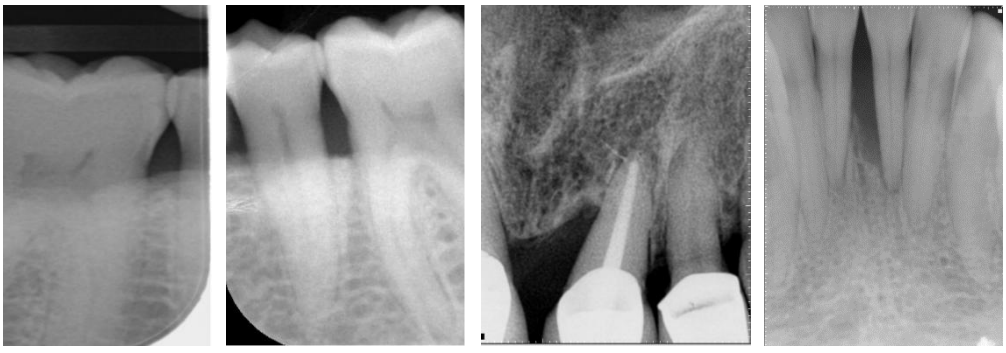
Table 3.2 Staging periodontal disease[37]

Stage	Description	Amount of bone loss*
I	Early/mild	<15% (Alternatively, >2 mm but <4 mm bone loss on bitewing or, if radiographs not available, <2 mm CAL from CEJ)
II	Moderate	Coronal third of root
III	Severe	Mid third of root
IV	Very severe	Apical third of root

*Bone loss must be due to periodontitis, i.e. not due to root fracture, third molar removal etc.

Where a patient is known to have lost teeth due to advanced periodontal bone loss, then a stage IV classification may be immediately assigned.

Figure 3.4 Radiographs showing the stages of periodontitis



A B C D

Radiographs showing A: <15% bone loss between 46 and 45; B: bone loss within the coronal third of the root at 35, 36; C: middle third bone loss on mesial aspect of 21; D: apical third bone loss interdentally at 31, 41.

Diagnosis of early-stage periodontitis may be difficult, and overdiagnosis of disease can be an issue, especially if only bitewing radiographs are available. In these cases, a diagnosis of Stage I periodontitis is assigned if there is >2 mm bone loss but not more than 4 mm. If radiographs are not available, % bone loss can be estimated using CAL from the CEJ; a diagnosis of Stage I periodontitis is assigned if CAL is <2 mm from CEJ.

Grading

The Grade of periodontitis is a measure of the rate at which bone loss has occurred and reflects the patient's susceptibility to disease.

The Grade is determined by dividing the percentage bone loss observed at the worst affected site by the age of the patient in years (see table 3.3).

This can be quickly estimated using the following rule of thumb: assign grade A if the maximum % bone loss is less than half the patient's age in years, grade C if the % bone loss is more than the patient's age and grade B for all other patients. For example, a patient aged 45 with 50% bone loss at the worst site in their mouth would be grade C.

Table 3.3 Grading periodontal disease[37]

Grade	Ratio of % bone loss to age in years*	Explanation
A	<0.5	Slow progression (% bone loss < half of patient's age in years)
B	0.5-1.0	Moderate progression
C	>1.0	Rapid progression (% bone loss > half of patient's age in years)

*N.B. The UK implementation[37] simplified the Grading of periodontitis. In the BSP interpretation, the Grade of periodontitis is based solely on the percentage of bone loss at the worst affected site in the mouth.

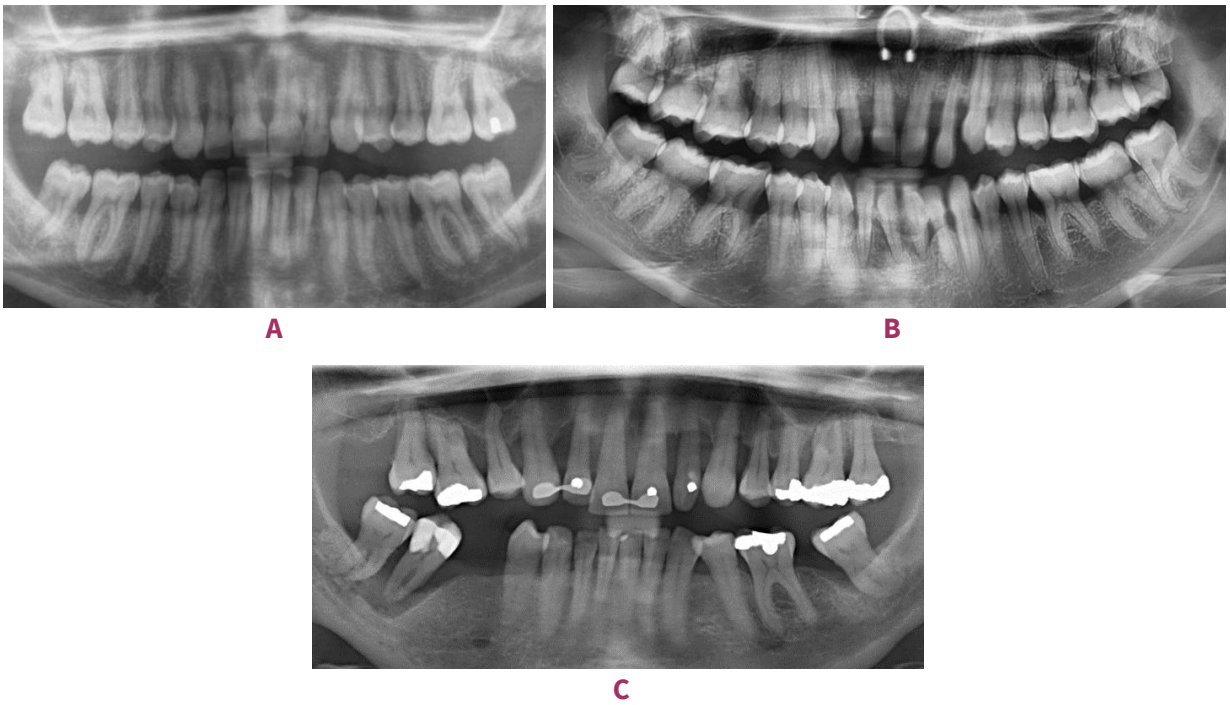
Extent/distribution

The extent/distribution of disease is a measure of how many teeth in the dentition have been affected by periodontitis (see figure 3.5). It is determined by assessing what proportion of teeth in the dentition have lost supporting bone (see table 3.4).

Table 3.4 Extent/distribution of bone loss[37]

Description of extent	Distribution of affected teeth
Localised periodontitis	<30%
Generalised periodontitis	>30%
Periodontitis molar/incisor pattern	Molar/incisor

Figure 3.5 Extent/distribution of disease



A: Radiograph showing localised bone loss. B: Radiograph showing molar incisor pattern bone loss. C: Radiograph showing generalised periodontitis with >30% of teeth affected by bone loss.

Stability

The stability of disease is a reflection of the current level of disease activity. Assessing the stability of disease relies on measuring both the extent of bleeding on probing (BoP) and the level of probing pocket depth across the dentition (see table 3.5).

Determining current disease status is important to monitor the response to previous periodontal treatment and for onward treatment planning. Stability is a dynamic state; a patient with a diagnosis of periodontitis who is assessed as stable remains a periodontitis patient for life, as sub-optimal maintenance of the disease and uncontrolled risk factors can cause the disease to recur.

Table 3.5 Stability[37]

Current disease status	Definition
Stable	BoP <10%; PPD ≤4 mm; no BoP at 4 mm sites
Remission	BoP ≥10%; PPD ≤4 mm; no BoP at 4 mm sites
Unstable	PPD ≥5 mm (or ≥4 mm with bleeding at those sites)

N.B. Probing depths of 5 or 6 mm in the absence of bleeding on probing (BoP) may not represent active disease, particularly in patients who have recently received periodontal treatment. This should be taken into account when deciding whether to provide additional treatment such as further instrumentation or surgery at those sites.

Risk factors

Identifying risk factors for disease allows assessment of features which impact a patient's current status and their risk of disease progression, and which may also impact their response to treatment and future prognosis.

Risk factors should be identified as part of the diagnostic statement. The BSP suggest that the risk factor profile should be documented alongside the diagnosis and provide examples of relevant risk factors (e.g. smoking and diabetes).

For systemic risk factors, the highest certainty evidence relates to smoking and diabetes. However, this list is not exhaustive and emerging evidence suggests other relevant systemic risk factors, for example stress and obesity, may play a role. Local risk factors, for example crowded teeth or marginal overhangs, may also be important and their recognition as part of the diagnosis will inform treatment planning (see Section 2.2).

Refer to Section 5.1 for more information on the control of risk factors.

3.2.4 Other periodontal conditions

Other conditions that can affect the periodontium include necrotising periodontal diseases, periodontitis as a direct manifestation of systemic disease, endodontic-periodontal lesions and periodontal abscesses. While these are not discussed in detail in this guidance, some conditions of note are described below.

Necrotising periodontal diseases

Necrotising periodontitis is characterised by marginal gingival ulceration with loss of the interdental papillae and a grey sloughing on the surface of the ulcers (see figure 3.6). It is distinguished from necrotising gingivitis by the presence of bone loss around affected teeth. It can be accompanied by a characteristic halitosis and is usually painful[39] (for more information, see Section 6.4.6: Necrotising gingivitis and periodontitis).

Figure 3.6 Necrotising ulcerative gingivitis

Image shows the right buccal view of a patient with necrotising ulcerative gingivitis illustrating blunting of the interdental papillae and sloughing of the gingival tissues.

Periodontitis as a direct manifestation of systemic disease

Periodontitis as a direct manifestation of systemic disease encompasses numerous systemic disorders and certain medications which can affect the periodontal attachment apparatus and cause loss of periodontal attachment and alveolar bone.[40] For the purposes of diagnosis, it is recommended to follow the classification of the primary disease according to the respective *International Statistical Classification of Diseases and Related Health Problems (ICD)* codes.[17]

Endodontic-periodontal lesions

Endodontic-periodontal (endo-perio) lesions occur as a result of a pathologic communication between the pulpal and periodontal tissues (see figure 3.7). Several classifications of endodontic-periodontal lesions exist. Risk factors for the development of endo-perio lesions are advanced periodontitis, trauma and iatrogenic events (e.g. root perforation). In all cases, both endodontic and periodontal treatment will be required.

Figure 3.7 Radiograph showing endo-perio lesion

A periapical radiograph taken using the long cone paralleling technique shows tooth 36 with a endo-perio lesion involving both root apices and the furcation, mild horizontal bone loss of less than 10% of root length and a mesially impacted 38.

In an attempt to link the lesion present to the prognosis of the tooth (with those teeth with root damage having a poorer prognosis than those where the lesion was primarily periodontal), the 2018 *Classification of Periodontal Diseases* assigned a diagnosis on the basis of whether root damage was present and whether the patient has a diagnosis of periodontitis (see table 3.6).[39]

Table 3.6 Classification of endodontic-periodontal lesions[39]

Endodontic-periodontal lesion with root damage	Endodontic-periodontal lesion without root damage
Root fracture or cracking	Endo-periodontal lesion in patient with periodontitis
Root canal or pulp chamber perforation	Endo-periodontal lesion in patient without periodontitis
External root resorption	

Endo-perio lesions may occur in an acute or a chronic form and are characterised by deep periodontal pockets and/or negative/altered response to pulp sensibility tests.[41] There may be evidence of damage to the root surface. Other signs and symptoms may include history of trauma or root canal treatment, spontaneous pain or pain on palpation/percussion, pus, tooth mobility, sinus tract/fistula, and crown and/or gingival colour alterations. Radiographic investigation is required to determine if there is root damage (e.g. root perforation or fracture) and also to determine the site and extent of periodontal bone loss. The prognosis of the involved tooth is dependent on several factors (for more information, see Section 6.4.5).

Periodontal abscesses

Periodontal abscesses are lesions associated with localised accumulation of non-draining pus within the gingival wall of the periodontal pocket associated with rapid tissue destruction.[41] Signs and symptoms include localised pain and swelling, bleeding and/or suppuration on probing, deep periodontal pocket and increased tooth mobility (for more information, see Section 6.4.6: Periodontal abscess).

3.3 Clinical assessment and diagnosis

- Take a history and examine the patient's oral tissues.
- Perform a BPE screen.

  N.B. For a patient with an obvious history of periodontitis, as indicated by evidence of interdental recession, it is acceptable to omit the BPE screen and proceed directly to assessment of radiographs and full periodontal assessment.
- For a patient with BPE Code 0, 1 or 2 and no evidence of interproximal recession:
  - assess the extent of bleeding on probing to inform the diagnosis (health, localised gingivitis or generalised gingivitis);
  - assess modifiable risk factors (smoking status, sub-optimally controlled diabetes).
- For a patient with BPE Code 3:
  - assess the extent of bleeding on probing;
  - assess modifiable risk factors (smoking status, sub-optimally controlled diabetes);
  - make a preliminary periodontal diagnosis based on patient presentation;
  - at post-treatment review, carry out a full periodontal assessment including 6-point pocket chart at involved sextant(s) to determine if probing pocket depths have reduced and to confirm the periodontal diagnosis.
- For patients with BPE Code 4 and those with a history of periodontitis:
  - carry out a full periodontal assessment including comprehensive 6-point pocket chart of the whole dentition (see Section 2.4.1);
  - assess the extent of bleeding on probing;
  - assess modifiable risk factors (smoking status, sub-optimally controlled diabetes).

- For patients with a diagnosis of periodontitis:
  - take or assess appropriate radiographs for evidence of bone loss;
  - determine the extent/distribution from radiographs, based on the number and site of teeth affected by bone loss;
  - carry out staging and grading based on radiographic assessment of the site with the worst bone loss;
  - assess current disease status based on probing pocket depth and the percentage of sites in the mouth which bleed on probing;
  - assess modifiable risk factors (e.g. smoking status, uncontrolled diabetes).
- For all patients, make a definitive diagnosis, document the diagnostic statement in the clinical notes and establish a treatment plan based on your diagnosis.
  N.B. It is important to diagnose periodontal health and stable periodontitis and record this in the clinical notes.
- Inform the patient of their diagnosis and emphasise the importance of long-term care (see Section 7).
- For a patient with evidence of historical periodontitis (i.e. evidence of interdental recession and radiographic evidence of bone loss), assess the stage and grade of their disease (based on the extent of bone loss at the worst site) and make a diagnosis on the basis of how the patient presents when seen at consultation.

The British Society of Periodontology has published a flowchart detailing the steps of diagnosis.

4 Planning periodontal treatment

The aim of periodontal treatment is to:

- control patients' symptoms;
- reduce inflammation;
- provide advice on risk factor control to reduce the risk of ongoing or future disease;
- stabilise disease;
- support the patient after treatment is complete to either limit further tissue loss or prevent recurrence of disease.

4.1 Identifying potential treatment needs

Treatment goals

It is useful to consider at an early stage the goal of treatment for each individual and how this will be assessed. For example in a healthy patient, the goal may be to avoid the onset of disease and to maintain an intact periodontium.

In a patient with periodontitis, the goal may be to achieve:

- high levels of plaque control;
- complete resolution of gingival bleeding;
- probing pocket depths of ≤4 mm throughout the mouth;
- absence of bleeding at 4 mm sites.

However, this is not always achievable and individual patient wishes and oral hygiene skills should be considered 'holistically' along with the long-term goals for the dentition when setting a treatment goal. For example, there may be situations where long-term retention of teeth is the goal rather than complete disease resolution.

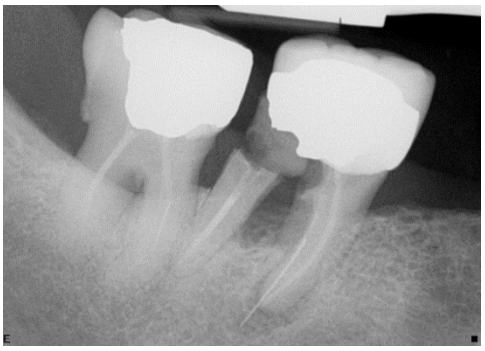
When ideal goals are not achieved, or the patient does not wish the advanced or complex treatment required to achieve these goals, it is important that the patient understands that their periodontitis may deteriorate and the potential consequences of this, including an increased risk of tooth loss.

The treatment goal can be used as the basis for monitoring the response to treatment and directing the care provided during the maintenance phase.

4.2 Assessing tooth prognosis

Before detailed planning of periodontal care commences, the teeth and dentition as a whole should be assessed with regard to tooth prognosis, the potential retention or loss of teeth and the benefits to be gained by providing treatment (see figure 4.1). This assessment is accompanied by a discussion with the patient about which teeth may be reliably retained, which teeth are more likely to need complex management, and which are at risk of being lost. Many teeth of uncertain prognosis can be retained in the early stages of management (in agreement with the patient), with their longer-term retention considered at a later stage.

Figure 4.1 Assessing tooth prognosis



Tooth 47 is affected by periodontitis extending into the furcation, is heavily restored and has an inadequate root filling. Tooth 46 has Stage III periodontitis with a Grade III furcation lesion, extensive caries beneath a full coverage crown and a mesial periapical radiolucency. Tooth 46 is unsaveable due to the multiple problems and the extent of caries and periodontitis when considered together. However, despite its compromised prognosis, tooth 47 may be useful tooth to retain following periodontal and endodontic treatment if there is a need or a desire to avoid a free end saddle situation or to provide distal occlusal support.

Assessment of tooth prognosis includes consideration of factors which are likely to affect the ability to successfully control periodontal disease, along with factors related to the condition and site of the tooth itself. It also takes into consideration the likelihood of stabilising the tooth so that it can be maintained in a functional way. The assessment of tooth prognosis is not straightforward and current research suggests that parameters for determining tooth prognosis may not accurately predict the chance of successful treatment.

Prognosis is an ongoing, dynamic process and the following factors can be considered at different stages of management.

- Patient related factors, for example:
  - oral hygiene (which may change in response to motivation and education);
  - the presence of systemic risk factors (e.g. smoking or diabetes);
  - behavioural and biological response to treatment.
- Tooth related factors, for example:
  - the degree of bone support;
  - probing pocket depth;
  - the presence of furcations, root grooves or dental anomalies;
  - the presence of periapical pathology;
  - the presence of large restorations or caries;
  - tooth position and occlusion;
  - pulp vitality;
  - the strategic value of the tooth.

- Consider the strategic value of periodontally-involved teeth when assessing management options.
- Assess the prognosis of periodontally-involved teeth, taking into account tooth-related factors (e.g. furcation involvement, pulpal status, periapical status, the presence of restorations/caries, tooth position) and patient-related factors (e.g. risk factors, patient preferences, access to specialist support).
- Consider advising the extraction of teeth which are unrestorable, impairing function (e.g. hypermobile where splinting or occlusal management is not possible) or persistently infected despite treatment (i.e. periodontitis or endodontic abscess).
  - Note that some severely affected teeth can often be retained successfully for many years.

4.3 Stepwise approach to periodontal therapy

The *BSP implementation of European S3 - level evidence-based treatment guidelines for stage I-III periodontitis in UK clinical practice* (**BSP-S3**)[6] advocates a stepwise approach to periodontal therapy, organising treatment into four steps which incorporate these components in a structured way.

4.3.1 Step 1: Building foundations for optimum treatment

The first step of therapy, which is relevant to all patients, aims to build the foundations for optimum treatment in terms of risk factor control and behaviour change. For some patients (i.e. those with a diagnosis of health or gingivitis), this step of therapy may be all that is required. However, for patients with periodontitis, it is the start of the process of stabilising disease.

The following components are included in Step 1:

- Explaining to the patient their disease status and risk factors, along with a discussion on the risks and benefits of treatment or no treatment;
- Explaining the importance of patient-performed oral hygiene to control inflammation and providing instruction/coaching in effective toothbrushing and use of appropriate interdental aids;
- Building patient motivation and confidence to adhere to daily oral hygiene (and any other lifestyle changes that might be needed, including quitting smoking and diabetes control) and attendance for professional visits;
- Reducing risk factors (e.g. smoking and diabetes control interventions; removal of plaque retentive factors);
- Professional mechanical plaque removal (PMPR; see Section 5.2), including both supra- and subgingival plaque biofilm and calculus removal from the clinical crown.
  N.B. It is acceptable to remove accessible calculus from root surfaces as part of Step 1 of treatment.
- Ongoing monitoring of the response to treatment by assessing plaque levels, gingival bleeding and patient engagement.

Once this first phase of treatment is complete and adequate time has passed, reassessment of the patient's condition using appropriate outcome measures is performed to inform further management. The time period between the first phase of treatment and reassessment will depend on the initial presentation of disease, the anticipated response to treatment and also on clinician and patient preferences and could range from a few weeks to a few months.

4.3.2 Step 2: Subgingival instrumentation

The second step of therapy aims to control inflammation and subgingival plaque biofilm and calculus in patients with a diagnosis of periodontitis where complete calculus removal has not been possible during Step 1 of therapy, by providing further, targeted subgingival PMPR (see Section 5.2). Ongoing support for, and reinforcement of, risk factor control messages (e.g. oral hygiene instruction, smoking cessation, diabetes control) is also provided where necessary. Additionally, ongoing support for motivation is likely to be needed for many patients, including identifying and discussing real or perceived barriers.

Prior to undertaking Step 2 of therapy, the likely benefits of further active treatment should be assessed based on the outcome of Step 1. Repetition of Step 1, rather than moving to Step 2 of therapy, may be more appropriate for some patients, for example those who lack motivation for further treatment, as Step 2 is time consuming and will fail if plaque control is not optimised.

Step 2 of therapy is followed by an assessment of the response to treatment. If the goals of treatment, for example improved plaque control and reduced probing pocket depths (see Section 4.1), have been reached, then the patient can progress to Step 4 of therapy (i.e. maintenance). However, if treatment has not controlled disease in the desired way, then the clinician can consider repeating Step 1 of therapy or, alternatively, moving to Step 3 of therapy.

4.3.3 Step 3: Managing non-responding sites

The third step of therapy aims to treat non-responding sites i.e. pockets with residual deep probing depths which have failed to resolve with Steps 1 and 2 of therapy.

During this phase, further subgingival PMPR at non-responding sites may be provided, or alternatively, referral for specialist care may be considered.

As with Step 2, ongoing support for, and reinforcement of, risk factor control messages (e.g. oral hygiene instruction, smoking cessation, diabetes control) is provided where necessary. During this phase, the motivation of the patient for further treatment or referral, and the availability of specialist referral services when developing a treatment plan, should be considered.

If referral to specialist or enhanced services is not a management option, then subgingival instrumentation at deep sites should be repeated with the aim of achieving as much improvement as possible, followed by progression to Step 4 of therapy.

4.3.4 Step 4: Maintenance

The fourth step of therapy encompasses a programme of supportive periodontal care (SPC) which aims to prevent deterioration in the periodontal condition, maintain stability, and identify and manage any sites which show deterioration at an early stage. It combines aspects of both prevention and treatment

and relies on the patient's ongoing efforts with oral hygiene, and risk factor control, along with monitoring of disease status by the dental team.

In patients where further treatment is unlikely to result in improvement, the transition from Step 3 to Step 4 is not well defined. However, if it has not been possible to achieve periodontal stability, Step 4 of therapy aims to maintain the patient at a steady state while accepting that some residual sites with probing depth >4 mm may persist.

The recall interval and level of care provided during maintenance is based on the individual patient's periodontal status and risk profile and will likely range between intervals of 3-12 months. If initial disease or recurrence is detected, (re)treatment should be considered (see Section 7.3.3) and provided as appropriate in agreement with the patient. Longer term, the recall interval can be varied in response to individual patient risk and presentation (see Appendix 3).

4.4 Establishing a treatment plan

The management of periodontal disease is a continuous process of assessment, treatment and re-assessment. As a result, treatment plans may be adapted depending on the response to treatment and the wishes of the patient.

The **BSP-S3** guideline[6] advises a stepwise approach to periodontal therapy in patients with a diagnosis of periodontal health, gingivitis or periodontitis. The various treatment elements are organised into steps 1-4 in a structured manner (see Section 4.3); some or all of these steps may be employed throughout treatment depending on the disease status of the patient.

Patients with a diagnosis of periodontal health

Patients with a diagnosis of periodontal health will require Step 1 of therapy as part of the prevention and early detection of periodontal diseases (see table 4.1), with recall intervals based on an assessment of their risk and ongoing treatment need.

Patients with a diagnosis of gingivitis

Patients with a diagnosis of gingivitis will require Step 1 of therapy to address risk factors which increase their susceptibility to periodontal diseases and professional mechanical plaque removal (PMPR) to control inflammation (see table 4.1), with recall intervals based on an assessment of their risk and ongoing treatment need.

Patients with a diagnosis of periodontitis

Patients with a diagnosis of periodontitis require lifelong periodontal treatment and maintenance care (see table 4.1). In addition to Step 1 of therapy to address risk factors and remove supragingival calculus, patients with periodontitis will require subgingival PMPR (Step 2 of therapy) to control inflammation at deeper sites. They may in addition require further treatment at sites that fail to respond to Steps 1 and 2 of therapy (Step 3 of therapy) before entering a programme of maintenance (Step 4 of therapy), with recall intervals based on an assessment of their risk and ongoing treatment need.

Table 4.1 Planning periodontal care

Diagnosis	Treatment need
Periodontal health	Step 1 of therapy (see Section 4.3.1). • Assess level of oral hygiene and bleeding and identify modifiable risk factors. • Required interventions may include building motivation, oral hygiene instruction, risk factor control and PMPR to allow for effective plaque control. • Set a recall interval based on risk assessment (see Appendix 3).
Gingivitis	Step 1 of therapy (see Section 4.3.1). As for Periodontal Health with additional consideration of: • Supra- and subgingival instrumentation for teeth with pocket depths ≥4 mm where subgingival deposits are present or which bleed on probing. • Reinforce oral hygiene instruction, risk factor control, behaviour change. • Set a recall interval based on risk assessment.
Periodontitis	Stepwise approach to periodontal therapy as described in Section 4.3.

When planning treatment for an individual patient:

- Take into account the findings of the patient history, the basic periodontal examination, any further in-depth periodontal examination and patient-specific risk factors when planning treatment (see Section 2).
- Make a periodontal diagnosis and inform the patient of the diagnosis and any relevant risk factors. Record the diagnostic statement in the patient's clinical record (see Section 3).
- Explain to the patient what treatment options are available, what these involve and the potential benefits and risks of treatment, for example stabilisation of the disease and reduced risk of tooth loss but potential post treatment recession. Also explain what the consequences of no treatment may be, for example progression of disease and increased risk of tooth loss.
- Make a personalised treatment plan with defined therapeutic goals that addresses the causes of disease and includes:
  - holistic assessment of the prognosis of individual teeth and the dentition as a whole;
  - control of systemic and local risk factors;
  - encouraging effective home care and oral hygiene behaviour change;
  - removal of plaque biofilm and calculus deposits from the tooth and root surface to allow healing of inflamed tissues;

- reassessment to arrange further active treatment or ongoing maintenance care.

N.B. the treatment plan may need to be revisited depending on patient motivation and response to treatment.

- Ensure consent from patient is obtained to either proceed with treatment or decline treatment.
  N.B. The SDCEP *Practice Support Manual*[15] includes information on obtaining consent.

- For patients with complex disease, consider consulting a colleague or a specialist for advice to assist with diagnosis and treatment planning.

- When planning the schedule for professional mechanical plaque removal (PMPR), assess the level of deposits, extent of disease along with patient preference and operator preference and skill to determine the number and length of appointments required for thorough debridement.

- If treatment involves referral to specialist or enhanced care:
  - carry out Steps 1 and 2 of therapy;
  - encourage and support the patient to maintain effective plaque removal;
  - ensure that if the patient smokes you have discussed this with them and offered referral to smoking cessation support services (see Section 5.1.1: Smoking cessation);
  - where appropriate, discuss the impact of periodontitis on systemic disease (e.g. diabetes) and consider whether early liaison with the medical team is needed (see Section 5.1.1: Control of diabetes).

  See Section 9 for further information.

- Where possible, identify occlusal trauma during diagnosis (see Section 2.4.4: Occlusal examination).

- Where periodontally compromised teeth may be affected by occlusal trauma:
  - check the occlusion for the presence of fremitus or occlusal interference;
  - consider occlusal management as part of the periodontal treatment plan.

- Manage tooth mobility associated with periodontitis by non-surgical periodontal treatment in the first instance as part of an overall plan for the dentition.

- Ensure that periodontal disease is controlled before any advanced or complex procedures are planned (e.g. implant placement).

- Ensure that patients with a history of periodontitis who are considering dental implants are fully informed about the increased risk of peri-implantitis and implant loss due to their oral health history (see Section 8).

4.5 Planning appointments for PMPR

KEY RECOMMENDATION

For patients with a diagnosis of periodontitis, perform professional mechanical plaque removal (PMPR) using either a full mouth or quadrant approach, taking into account patient factors and preferences and clinician skills, experience and preferences.
(Strong recommendation; moderate certainty evidence)

A review of current evidence confirms that, in terms of clinical outcomes, there is no difference between providing PMPR over one or two long appointments within a 24 hour period (full mouth approach) or, alternatively, spreading PMPR over several shorter appointments (quadrant approach).[42] The evidence is considered to be of moderate certainty due to the consistency of findings across the included studies, which were judged to be at low or unclear risk of bias. Some clinicians have reported that providing treatment at fewer, longer appointments is more physically demanding.[43] Operator and patient fatigue, as well as the patient's preferences, need to be considered when planning appointments.

Accordingly, the **BSP-S3** guideline[6] suggests that subgingival periodontal instrumentation can be performed either using a traditional quadrant approach or a full mouth approach using a 1 or 2 stage technique within a 24-hour period.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

4.6 Providing treatment as a team

Periodontal treatment and care can be provided by multiple members of the dental team. Dental hygienists and dental therapists can either work independently, providing care within their scope of practice directly to patients, or under a treatment plan agreed with a dentist. Advice regarding oral health can be delivered by an oral health educator as part of a course of treatment. Irrespective of how periodontal treatment is planned and provided, the aim is always to care for and manage the patient effectively.

When working as part of a team caring holistically for a patient, the key to a successful clinical partnership between members of the dental team is excellent communication. In addition, good communication with the patient about the role of the dentist, dental hygienist, dental therapist or oral health educator in their care is important.

Where treatment is to be provided by a dental hygienist or dental therapist under a treatment plan/ prescription agreed with a dentist, it is vital that the referring dentist communicates in detail the nature of treatment required for each referred patient and what the review process should involve (i.e. who will review the outcomes of treatment and when). See Appendix 4 for more information.

During and after treatment, the dental hygienist, dental therapist or oral health educator should provide feedback about the patient's response to treatment, including compliance with oral hygiene behaviour change interventions and changes in levels of inflammation and probing pocket depths as appropriate to

their role. Comprehensive record keeping and discussions with other dental team members, where appropriate, will facilitate this (see Section 10).

4.6.1 Prescribing and administering local anaesthesia

Local anaesthesia may be beneficial for some patients during non-surgical periodontal therapy and dentists, dental hygienists and dental therapists are allowed, under their scope of practice, to administer it during treatment. As local anaesthetic is a prescription-only medicine, it must be prescribed by a doctor or dentist, or be administered by a dental hygienist or dental therapist trained under exemptions to the Human Medicines Regulations (Schedule 17)*.

Where a dental hygienist or dental therapist is not appropriately trained under the exemptions mechanism, a Patient Specific Direction (PSD), where a dentist prescribes local anaesthetic for use by the dental hygienist or dental therapist, is required.§ The PSD should be recorded in the case notes by the prescribing dentist and should include:

- type of anaesthesia (i.e. brand or generic name, strength);
- maximum dosage (i.e. maximum number of cartridges);
- frequency (e.g. as required);
- route of administration (e.g. by injection).

* The amended Human Medicines Regulations (Schedule 17; 2024) include an exemptions mechanism that allows for dental hygienists or therapists with appropriate training to independently provide local anaesthetic which can be used whilst treating their patient.

§ Previously, there was provision for local anaesthetic to be used by a dental hygienist or dental therapist under a Patient Group Direction (PGD), a written instruction which allowed listed healthcare professionals to sell, supply or administer named medicines in an identified clinical situation without the need for a written, patient-specific prescription from an approved prescriber. The introduction of the exemptions mechanism means that PGDs should no longer be used for the supply or administration of the listed medicines (i.e. local anaesthetic). Where a PGD is currently used to supply and administer local anaesthetic, practice owners should put in place plans to transition to working under Patient Specific Direction (PSD) or the exemptions mechanism. PGDs cannot be renewed or replaced for listed medicines once expired (maximum 3 years from authorisation).

If a patient is referred to a dental hygienist or dental therapist who is not working under direct access:

- Ensure the dental team are familiar with the most recent scope of practice for both dental hygienists and dental therapists.
- Ensure that an individualised treatment plan that is specific to the patient has been provided by the referring dentist.
  - Should treatment needs change or differ from the original treatment plan, the dental hygienist or dental therapist should liaise with the referring dentist to confirm any changes.
  - If local anaesthesia is required and the dental hygienist or dental therapist is not appropriately trained to independently provide this under the exemptions mechanism, the referring dentist should provide a valid prescription in the case notes so that the dental hygienist or dental therapist can administer it.
- Ensure that the patient is aware why they have been referred to the dental hygienist or dental therapist and what to expect during treatment.
- Ensure that arrangements for post treatment reassessment are agreed; reassessment can be performed by the dental hygienist, dental therapist or dentist.

5 Components of periodontal treatment

Patients with a diagnosis of periodontitis require lifelong periodontal treatment and maintenance care. Periodontal treatment encompasses several different components, some or all of which may be employed throughout treatment:

- control of risk factors which increase susceptibility to periodontal disease or complicate its management;
- support for effective patient oral hygiene and behaviour change, including provision of a personalised self-care plan;
- removal of plaque biofilm and calculus from crown and root surfaces;
- ongoing assessment of plaque biofilm levels, gingival and periodontal inflammation and probing pocket depths;
- periodontal surgery at sites which fail to respond to non-surgical management;
- ongoing maintenance once the patient's condition has improved as much as possible following treatment.

The *BSP implementation of European S3 - level evidence-based treatment guidelines for stage I-III periodontitis in UK clinical practice* (**BSP-S3**)[6] advocates a stepwise approach to periodontal therapy, organising treatment into four steps which incorporate these components in a structured way (see Section 4).

5.1 Managing risk factors

Both the prevention and management of periodontal inflammation and disease relies on managing individual risk factors and this is an integral part of all the steps of treatment. Note that this is a dynamic process and risk can change with time.

Individuals may have systemic or local risk factors which either predispose them to disease development or complicate the management and control of disease. These may be modifiable (i.e. something the patient can change) or non-modifiable (i.e. something the patient cannot change).

It is important to recognise and discuss these risk factors with a patient at an early stage, and then throughout their care if the situation requires, recognising that some risk factors (e.g. a genetic susceptibility) may not be something a patient can change.

Discussions about risk factors should be sympathetic to the individual patient's situation and should aim to engage them with personalised information, advice and support about preventing or controlling their disease.

5.1.1 Managing modifiable systemic risk factors

The main modifiable systemic risk factors for periodontitis are smoking and diabetes. Evidence is emerging on the role of other systemic factors which may modify the susceptibility to, or progression of, periodontitis including rheumatoid arthritis, obesity, nutritional deficiencies, and stress. Medications including calcium channel blockers and phenytoin predispose some patients to gingival enlargement. In

addition, a large number of medications may cause reduced salivary flow (e.g. tricyclic antidepressants, beta blockers) leading to increased plaque growth and risk of disease. If medications are affecting periodontal health, this should be discussed with the patient. It may be appropriate, with the patient's consent, to contact their doctor to request if alternative options are possible.

Current good practice is to address smoking and diabetes control. Other potential risk factors (e.g. stress, obesity) may be discussed as appropriate to the patient.

Smoking cessation

Smoking* is a widely-accepted risk factor for periodontitis and the risk is dose-related.[16,17] Individuals who smoke:

- are more likely to develop periodontal disease;
- do not respond to periodontal treatment as well as non-smokers;
- are more likely to lose teeth when compared with non-smokers.

Tobacco use is also a risk factor for oral cancer and is related to a number of other medical problems (e.g. cardiovascular disease and lung cancer).

Both the *Delivering Better Oral Health* toolkit (**DBOH**)[7] and the **BSP-S3** guideline[6] note that there is moderate certainty evidence that interventions for smoking cessation improve periodontal health[36] and include strong recommendations that such interventions should be implemented as part of periodontal treatment. Dentists and dental care professionals have been identified as being well-placed to help patients stop smoking due to the large proportion of the population that visit for regular check-ups, including key groups such as teenagers and those who are pregnant.

Dental professionals are not expected to provide detailed specialist support, as this is available from smoking cessation services, delivered by trained smoking cessation counsellors and within pharmacies. Dental professionals should provide brief advice, encouraging patients who smoke to consider the risks of smoking and the benefits of stopping. Evidence suggests that quit rates achieved by dental professionals in primary care following smoking cessation interventions are similar to other healthcare professionals.[34]

The use of tobacco in non-combustible forms is also of concern. Smokeless oral tobacco products (widely used by some minority ethnic groups) increase the risk of oral cancer.[44]

While vaping devices (e-cigarettes) do not contain tobacco, they do contain nicotine and other substances and evidence of the impacts on health is still emerging. For current tobacco users, vaping is a significantly less harmful alternative.[45,46] However, these devices are not risk-free and may have the potential to cause harm. These devices should only be used for stopping smoking and avoiding relapse to smoking.[47] They are not products for children or non-smokers.

* Although the terms 'smoking' and 'patients who smoke' are used here, the advice/information also applies to other forms of tobacco use.

Appendix 5 provides details of an intervention to encourage smoking cessation, based on a tool developed by the National Centre for Smoking Cessation and Training.[48] This *Very Brief Advice* intervention can be used when discussing smoking cessation with patients. Individuals may take several attempts to stop smoking or to stop using other nicotine-based agents and it is recommended that tobacco use is regularly reviewed with patients.

- Ask the patient if they (still) smoke (or use smokeless tobacco, e-cigarettes) and record the response.
- Advise the patient on the most effective way of stopping smoking.
  - Advise the patient that the best way of stopping smoking is with a combination of medication and specialist support and that you can refer them to a local smoking cessation service.
- Act on the patient's response
  - If the patient is interested, give them information and refer to a local smoking cessation service.
  - If the patient is not interested, let them know that help is always available if they change their mind. Re-assess at future visits.

Smoking cessation services are often available from pharmacies and specialist services are also offered by smoking cessation advisors.

Control of diabetes

Good long-term control of blood sugar levels is important in the management of both type 1 and type 2 diabetes and in preventing complications associated with the disease, including retinopathy, coronary heart disease and renal failure. Sub-optimally controlled diabetes is a known risk factor for periodontitis and also impairs the response to periodontal treatment. While well-controlled diabetes is not a risk factor, **DBOH** notes that many people oscillate between different levels of control and states that an increased risk of periodontal diseases should be assumed for anyone who has diabetes.

There is low certainty evidence that sub-optimally controlled diabetes substantially increases the risk of progression of periodontitis[20] and moderate certainty evidence that diabetes control improves periodontal health.[36] **DBOH** also notes that many patients with diabetes are unaware of the link between diabetes and periodontal health.[49] Accordingly, both the **DBOH** and **BSP-S3** guidelines recommend that patients with diabetes should be informed of their increased risk of periodontal disease and the ways in which this can be mitigated.

As well as regular testing by patients, blood glucose levels should be assessed by the patient's medical team.[22,23] Testing to determine the level of glycated haemoglobin (HbA1c) gives an indication of the average blood glucose level in the previous 8-to-12-week period. HbA1c levels of between 48 and 58 mmol/mol (6.5-7.5%) indicate that the patient has good control of their condition, with levels greater than 58 mmol/mol (7.5%) associated with an increased risk of diabetes-related complications.

The National Institute of Health and Care Excellence (NICE) guidelines on management of type 1 diabetes (NG17)[22] and type 2 diabetes (NG28)[23] in adults were amended in 2022 to include updated recommendations on periodontitis. These recommendations address concerns that people with diabetes are often unaware of their risk of periodontal disease and may not be having regular oral health reviews. The guidelines recommend that adults with diabetes:

- have regular oral health reviews;
- are informed that they are at higher risk of periodontitis;
- are advised that if they do develop periodontitis, managing it can improve their blood glucose control and can reduce their risk of hyperglycaemia;
- are offered dental appointments to manage and treat their periodontal disease.

- Ensure that you have an up-to-date medical history for all patients.
  - If a patient states that they have diabetes, ask the patient if it is Type 1 or Type 2 and how their diabetes is controlled (e.g. by diet, medication or insulin).
  - If a patient presents with periodontitis or recurrent periodontal abscesses and you suspect undiagnosed diabetes (e.g. if the patient is overweight/obese or there is a family history of diabetes), advise the patient to use the Diabetes UK screening tool and to seek advice from their medical team.

- Ask patients who have diabetes:
  - "Is your diabetes well-controlled?";
  - "What was your last HbA1c reading? When was it measured?"
    (If patients are unsure about their HbA1c levels, encourage them to ask their medical team for this information);
  - "How often does your doctor check your diabetes control?";
  - "Do you have any of the complications of diabetes?".

  Record this information in the case records.

- Explain to patients who have diabetes that sub-optimally controlled blood sugar levels increase the risk of developing periodontal disease or worsening existing periodontal disease.

- Explain to patients with diabetes what periodontal diseases are and what causes them in general terms.

- Ensure that patients with diabetes understand the need for effective oral hygiene. Provide oral hygiene instruction where required.

- For patients who have both a diagnosis of periodontitis and diabetes, explain that treatment of their periodontal disease is likely to improve control of their diabetes. Encourage these patients to inform their medical team of their periodontitis diagnosis.

- Encourage patients with diabetes to attend for regular dental checks, and treatment where required.

Appendix 7 provides information for non-dental healthcare professionals on the links between periodontal disease and systemic health conditions.

Other modifiable risk factors

Links between rheumatoid arthritis and periodontal diseases have been proposed and investigated and emerging evidence indicates the true relationship between the diseases may be bi-directional. Several small studies have demonstrated that periodontal treatment may positively influence rheumatoid arthritis disease activity, but no definitive evidence is currently available.

Emerging evidence suggests that other factors which impact systemic health such as stress, diet, obesity and level of physical activity are associated with periodontitis and that diet may influence the outcome of periodontal therapy. However, evidence supporting lifestyle modifications to address these potential risk factors, such as physical exercise, dietary counselling and weight loss is inconsistent and low certainty at best and the **BSP-S3** guideline notes that further research is needed.

Patients should be encouraged to eat a healthy balanced diet which is high in vegetables, fruit, nuts, seeds and starchy foods and low in sugar, salt and saturated fats, to drink adequate water and to take regular exercise as advised within public health guidelines.[50,51]

DBOH notes that there is emerging low-certainty evidence that alcohol consumption is associated with periodontitis[52,53] and that possible mechanisms of action may be related to alcohol's negative impact on bone density and saliva secretion. In terms of general health, there is also convincing evidence that a high level of alcohol consumption is a risk factor for cancers of the mouth, larynx, pharynx and oesophagus, as well as many other chronic diseases. Alcohol brief interventions are recommended in primary care settings for harmful and hazardous drinkers, as evidence suggests these are effective in reducing alcohol consumption.[54] Guidance published by NHS Health Scotland details how the issue of alcohol can be raised with patients in a dental setting.[55]

Addressing lifestyle issues with a patient requires sensitivity and it may be useful to deliver advice in the context of how changes to their diet and/or alcohol consumption will help the patient care for their oral tissues and their general health.

- Be aware that emerging evidence suggests factors such as stress, rheumatoid arthritis, diet and exercise may impact an individual's susceptibility to periodontitis.
  - General health prevention advice emphasises the benefits of eating a healthy diet (including plenty of vegetables and fruit and meals based on wholegrain, starchy foods) and the benefits of regular exercise.[50,51]
  - The *Delivering Better Oral Health* toolkit[7] provides advice on healthy eating.
- Assess your patient's alcohol consumption. See Appendix 6 for advice on assessing alcohol consumption, details of recommended weekly limits and other related information.
- If a patient is drinking alcohol excessively and is willing to discuss this with you, outline the possible harmful effects of excessive alcohol consumption and advise the patient to see their general medical practitioner and/or to visit the NHS Inform website for further advice and help.

5.1.2 Managing local risk factors

Plaque biofilm

KEY RECOMMENDATIONS

Advise patients (and their carers, where appropriate) to regularly remove plaque biofilm using a toothbrush, and interdental aids where required, as an effective regime to prevent and facilitate management of plaque-induced gingivitis and periodontitis.
(Strong recommendation; moderate certainty evidence)

Use behaviour change methods when providing oral hygiene instruction for patients who have sub-optimal oral hygiene.
(Conditional recommendation; low certainty evidence)

Plaque biofilm is the principal local modifiable risk factor for development of gingival inflammation and periodontitis. Plaque biofilm retentive factors (e.g. calculus, local dental crowding, dentures, etc.) are also considered risk factors for disease initiation and progression as they increase the likelihood that oral hygiene will be compromised, and that plaque will accumulate. Consequently, regular removal of plaque biofilm and plaque retentive factors is essential in the prevention of periodontal diseases, and during treatment and maintenance care in those individuals with a diagnosis of periodontitis.

Both the **DBOH** and **BSP-S3** guidelines recommend that patients be advised of the best methods of plaque biofilm removal, primarily by toothbrushing with supplemental interdental cleaning advised to control gingival inflammation. This is informed by the well-established relationship between plaque biofilm and gingivitis and supported by evidence from a meta review of systematic reviews which found that toothbrushing is effective at removing plaque biofilm.[56] The evidence is considered to be of moderate certainty due to methodological issues with the systematic reviews included in the meta review. **DBOH** notes that professional intervention alone, in the form of dental professional delivered, in-surgery removal of plaque biofilm and calculus, is insufficient to prevent periodontal disease starting or deteriorating and recommends that patients be advised of the best methods of personal plaque biofilm removal to prevent gingivitis, and to achieve lowest risk of periodontitis and tooth loss.[57,58]

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

It is usual practice to discuss oral hygiene routines, the effect of inadequate plaque control and to provide oral hygiene instruction as part of periodontal management. While there has been much research into methods to support patient behaviour change with regard to oral hygiene, there is to date no robust evidence to support any particular type of behaviour change intervention. There is low to moderate certainty evidence that motivational methods result in a reduction in plaque levels[59] but very low to low certainty evidence with regard to a subsequent reduction in gingivitis. Factors affecting the certainty of the evidence include risk of bias, heterogeneity and limited study sizes. There is insufficient evidence to support the use of specific psychological interventions, such as motivational interviewing or cognitive behavioural therapy, to influence patients' compliance with oral hygiene practices.[33] However, building motivation and confidence are likely to be important components of successful behaviour change.

Accordingly, both the **DBOH** and **BSP-S3** guidelines state there is insufficient evidence to support the use of any *specific* oral hygiene behaviour change intervention. However, both guidelines note that behaviour change approaches are viewed as being important in improving patients' plaque control and recommend emphasizing the importance and benefits of effective oral hygiene to patients when discussing their oral health.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Oral hygiene instruction (also described as 'coaching'):

- should be individually tailored to suit each patient;
- should assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines;
- should be delivered in a manner that actively involves the patient in skill acquisition rather than passively delivering information, for example, giving the patient the opportunity to practice in their own mouth with support from the dental team.

Patients with a diagnosis of periodontitis will require additional advice and coaching on oral hygiene, including advice on the importance of cleaning interdentally.

Patients with inadequate oral hygiene may require more frequent reinforcement of oral hygiene messages and support to acquire the necessary skills during ongoing care.

It is important to appreciate that the motivation to change behaviour has to originate from the patient; patients must want to improve their oral hygiene, must understand why improvement is needed and the likely benefits, and must feel that they have the skills required to do this. Dental professionals have the knowledge and skills to support and encourage the patient to change and to teach the required plaque removal skills.

- Advise patients to regularly remove plaque biofilm using a toothbrush, and interdental aids where required.
- Provide oral hygiene instruction (coaching) to ensure patients can effectively remove plaque biofilm.
  - Assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines.
  - **Oral Hygiene TIPPS** (see Section 5.1.3 and Appendix 8) is an example of a behaviour change strategy that can be used to highlight the importance of effective plaque biofilm removal and to show the patient how they can achieve this.
  - For patients with extensive inflammation, begin with advice on toothbrushing then move on to advice on interdental cleaning.
  - Some patients, such as those with additional care needs, may need assistance and support in the use of oral hygiene aids.
  - Where patients have crowded teeth or dental appliances, specific help with cleaning of those areas and use of appropriate plaque biofilm removal devices will be necessary.

Plaque-retentive factors

Local plaque-retentive factors, such as calculus, mal-positioned teeth, overhanging restorations, crown and bridgework, partial dentures and fixed and removable orthodontic appliances can complicate or hinder plaque biofilm removal in the area, increase the risk of gingival and periodontal inflammation and are a risk factor for disease (see figure 5.1). Where supragingival calculus deposits are present, removal of these may be necessary for effective personal oral hygiene to be achieved.

- Explain to patients with local factors such as crowded teeth, partial dentures, bridgework and orthodontic appliances, the importance of plaque biofilm removal in these areas.
- Ensure that fixed and removable prostheses and appliances are well-designed and that they are a good fit.
- Give specific instruction on how to clean adequately around fixed and removable prostheses and fixed appliances.
- Remove calculus, modify overhanging or poorly contoured restorations or replace the restoration where it impedes effective oral hygiene.

Figure 5.1 Local plaque-retentive factors

Image shows crowded lower anterior teeth with supragingival calculus and staining.

Oral hygiene aids/tools for plaque biofilm control

Many different oral hygiene aids/tools are available and can work well. However, the certainty of the evidence to support the use of each individual aid/tool varies. Dental professionals are well placed to provide patients with information about which oral hygiene aids/tools will be of benefit to them.

Toothbrushes

KEY RECOMMENDATION

Advise patients to regularly clean their teeth and gums, using either a manual or rechargeable powered toothbrush, and that an effective technique should be employed. (Strong recommendation; moderate certainty evidence)

The **DBOH** and **BSP-S3** guidelines recommend the use of either a manual or powered toothbrush, with both considered to be effective provided that the correct technique is employed (see figure 5.2).

Research suggests that, for the general population powered toothbrushes can remove more plaque than manual toothbrushes but the size of difference is small and its clinical benefit unclear.[56,60-63] The evidence is considered to be of moderate certainty; despite the significant risk of bias in some studies due to methodological and reporting issues, there was consistency of findings for improved plaque removal in favour of powered toothbrushes. However, manual toothbrushes can remove plaque effectively and it is likely that the skill and technique used during tooth cleaning is more important that any particular difference between manual and powered brushes.

Figure 5.2 Toothbrushes

A simple manual toothbrush with a small head and medium texture (left) and a simple head for a powered toothbrush (right).

Both guidelines note that the choice of toothbrush should be made on an individual patient basis, taking into account the patient's abilities, needs, preferences, and manual dexterity.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Factors to consider when discussing toothbrushes include toothbrush head size, mode of operation, general design, cost, environmental impact and patient preference. **DBOH** recommends a small toothbrush head with medium texture, as there is low certainty evidence that hard textured brushes can result in gingival lesions.[64]

Irrespective of brush type chosen, an effective toothbrushing technique is required and this should be taught as part of oral hygiene instruction. In situations where a patient is struggling to clean effectively with a manual toothbrush, suggesting the use of a powered toothbrush might be of benefit.

- Advise patients that to prevent or control gingival inflammation (bleeding gums) they need to remove plaque with a toothbrush.
  - Highlight that to control inflammation, plaque should be removed from their teeth and from the margin where the gum and tooth meet.
- Advise patients to regularly clean their gums and teeth, using either a manual or rechargeable powered toothbrush, using an effective technique.
  - Discuss with the patient the most appropriate type of toothbrush to use, taking account of their abilities, needs, preferences and manual dexterity.
  - Manual and rechargeable powered toothbrush heads for daily use should be small, medium textured and of a simple design and should be changed when obvious signs of wear appear.
- Advise patients to brush all tooth surfaces and where the tooth and the gum meet twice a day for at least 2 minutes.
  - Adopting a methodical approach, cleaning the outside, inside and biting surfaces of the teeth, will ensure all surfaces are cleaned.
  - Spitting toothpaste out and not rinsing after brushing is beneficial for caries prevention.
  - Leaving an interval of at least 30 minutes between consuming acidic or erosive foods and/or drinks and toothbrushing will reduce the risk of enamel loss.
- Advise patients with gingival inflammation, periodontitis, orthodontic appliances and/or complex restorations, that effective toothbrushing is likely to take longer than two minutes.
- Advise patients that bleeding on brushing is a sign of gingival and periodontal inflammation and that they should not stop brushing if their gums bleed.
  - If bleeding on brushing has been present, resolution of this signifies a reduction in inflammation.

Interdental cleaning

KEY RECOMMENDATIONS

Advise patients with a diagnosis of periodontitis to clean interdentally every day, using appropriately sized interdental brushes where the interdental space allows, and floss in interdental spaces too small to allow interdental brush use.

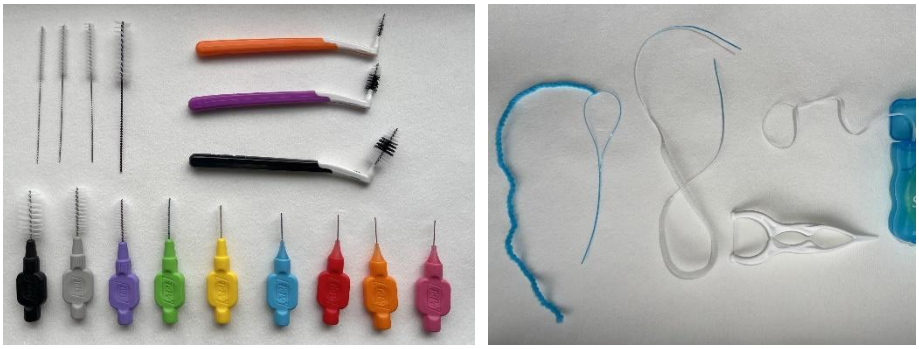
(Strong recommendation; moderate certainty evidence)

Advise patients without a diagnosis of periodontitis but who have gingival inflammation to clean interdentally as required to control their inflammation. The method and frequency of cleaning should be tailored to individual patients.

(Conditional recommendation; low to very low certainty evidence)

As toothbrushing does not adequately clean the approximal tooth surfaces, cleaning interdentally is important to ensure effective plaque removal. A systematic review[65] found that interdental cleaning using floss or interdental brushes may be more effective than toothbrushing alone to reduce gingivitis or plaque but noted that the overall effect sizes observed may not be clinically relevant. The authors observed that interdental brushes may be more effective than floss. The evidence is considered to be of low to very-low certainty due to risk of bias, substantial unexplained heterogeneity, and lack of precision in the effect estimates. Accordingly, **DBOH** recommends that patients clean interdentally daily, using an interdental brush where space allows, with dental floss/tape recommended for smaller spaces (see figure 5.3). **DBOH** also suggests that interdental cleaning takes place before toothbrushing, as there is some evidence that doing so can help patients form a lasting habit.[66]

Figure 5.3 Interdental cleaning aids



A B

Images showing various interdental cleaning aids. The choice of aid should be customised to the patient and the area to be cleaned, for example interdental brushes with longer handles and working brush (top left of image A) may be more suitable for posterior teeth.

In patients with a diagnosis of periodontitis, there is evidence from a systematic review that using interdental brushes in addition to manual toothbrushing is more effective at plaque removal than manual toothbrushing alone and that using interdental brushes in larger spaces where they fit is more effective than using dental floss.[67] The evidence is considered to be of moderate certainty; the review employed a network meta-analysis so some of the comparisons were indirect, most studies included in the review were at high risk of bias but there was consistency of results across studies. Accordingly, the **BSP-S3** guideline recommends that tooth brushing should be supplemented by the use of interdental brushes (where there is space for them) for patients in supportive periodontal care. It does not recommend floss as the first-choice method of interdental cleaning for these patients.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Advise patients with a diagnosis of periodontitis to clean interdentally every day.

- Appropriately sized interdental brushes should be used where the interdental space allows, with floss used in interdental spaces too small to allow interdental brush use.
- To be effective, the interdental brush should fit snugly into the interdental space without the wire rubbing against the tooth. More than one size of interdental brush may be required depending on the sizes of the interdental spaces present.

- Patients with negative architecture of the papillae should be advised to press gently into the shallow craters. A larger interdental brush may be required to clean effectively.

- Advise patients with gingival inflammation but who do not have a diagnosis of periodontitis to clean interdentally as required to control their inflammation.

- Instruct patients in the use of interdental aids appropriate to their particular situation, including their level of manual dexterity and ability to use each type of aid.

Toothpaste

KEY RECOMMENDATION

Advise all patients to use a toothpaste containing 1350-1500 ppm fluoride to prevent dental caries.

(Strong recommendation; moderate certainty evidence)

There is insufficient evidence to support the use of toothpastes with additional additives to control gingivitis and periodontitis on a routine basis.

While there is moderate certainty evidence (as assessed within **DBOH**) supporting the value of toothbrushing with a fluoride-containing toothpaste for the prevention of dental caries,[68] the evidence to support the use of specific toothpastes with additional additives to control gingivitis and periodontitis is less certain.

The **BSP-S3** guideline includes a conditional recommendation that adjunctive antiseptics, delivered either by toothpaste or mouthrinses, may be considered in specific cases to help control gingival inflammation for patients in maintenance care. However, no specific recommendation was made on the most effective toothpaste due to a lack of evidence.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

- Advise the patient that mechanical removal of plaque is of primary importance in the control of plaque biofilm and gingivitis. Toothpastes are considered an adjunct to this process and deliver fluoride, which is important in caries prevention.
  - Advise the patient to use a toothpaste containing 1350-1500 ppm fluoride and to ‘spit, don’t rinse’ during tooth cleaning.

- Advise the patient that there is no evidence to support the adjunctive use of antiseptics in toothpastes to control gingival inflammation and periodontitis on a routine basis.

Anti-plaque mouthwashes

The best way for patients to remove supragingival plaque is by effective use of a toothbrush and interdental cleaning aids.

Anti-plaque mouthwashes have bacteriostatic and bacteriocidal activity and inhibit the development of plaque biofilm. However, they have much less effect on established plaque biofilm and cannot prevent the progression of periodontitis. There is also no evidence that sporadic use has any benefit to patients. Anti-plaque mouthwashes can be used as a temporary primary oral hygiene measure or as an adjunct to toothbrushing and interdental cleaning for acute conditions as outlined below.

The **BSP-S3** guideline states that adjunctive antiseptics may be considered, specifically chlorhexidine mouth rinses for a limited period of time, in periodontitis therapy, as an adjunct to mechanical debridement, in specific cases. It also states that it is necessary to optimize mechanical plaque control before considering chlorhexidine as an adjunct to subgingival instrumentation. The guideline notes that the 0.2% formulation is intended to be used for a limited period (typically 1-2 weeks) for specific clinical reasons, such as following periodontal surgery or other situations where mechanical plaque control is compromised.

DBOH also notes that chlorhexidine mouthwash is advised for short term use only.

The **BSP-S3** guideline also states that antiseptic mouth rinses to control gingival inflammation in patients in supportive periodontal care can be considered. If used, formulations containing chlorhexidine, essential oils or cetylpyridinium chloride are suggested.

Note that chlorhexidine has been associated with a number of adverse effects, such as dry mouth and tooth staining. In addition, although rare, allergic reactions, including anaphylaxis, are a recognised adverse effect.

- Consider prescribing 0.2% chlorhexidine gluconate for patients where pain limits mechanical plaque removal (e.g. for patients with desquamative gingivitis or patients with necrotising gingivitis/periodontitis) or where toothbrushing should be temporarily avoided (e.g. following periodontal surgery).*
  N.B. Prescriptions should be short-term and for no more than 14 days.
- Advise the patient to leave an interval of 30 minutes between using the mouthwash and toothbrushing.

Other oral hygiene aids

Other oral hygiene aids, such as oral irrigators, woodsticks and rubber/elastomeric cleaning sticks, are available but the evidence to support their use is minimal and low certainty at best.[65,67]

5.1.3 Improving oral hygiene

Effective oral hygiene is an essential part of the prevention of periodontal diseases. It is also critical to the successful treatment and maintenance care of those individuals with a diagnosis of periodontitis. Where a patient has sub-optimal oral hygiene, support to achieve a more effective home care regime should be

* Refer to the SDCEP *Drug Prescribing for Dentistry* guidance[95] for further details.

provided. This may require a change in the patient's motivation to perform and maintain effective plaque biofilm removal and also in their behaviour in terms of tooth brushing and interdental cleaning.

Changing a patient's home care is complex and relies on both the patient and clinician being involved in the process. Successfully changing a patient's oral hygiene behaviour requires the clinician to have an understanding of the change(s) required, the challenges that may be faced by the patient and the support needed to make the desired change(s).

Oral hygiene behaviour change

Changing behaviour is a long-term, complex process that is dependent not only on an individual knowing what they have to do to change their behaviour, but also possessing the skills necessary to perform the behaviour. The COM-B model is a well-established theoretical model used to examine the factors influencing an individual's behaviour. COM-B proposes that for a behaviour to occur, an individual must have the Capability, Opportunity and Motivation to perform the Behaviour.

Consequently, discussing potential changes in oral hygiene with a patient requires more than a brief conversation about toothbrushing or interdental cleaning. The way in which information is delivered should be considered to ensure that it is personalised to each individual patient. In addition, skill acquisition should be encouraged and support for planning and motivation should be provided. For further information on the using the COM-B model to influence behaviour change, see Section 5.3.3.

Oral hygiene TIPPS

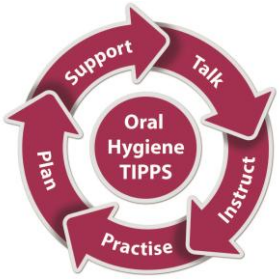
Advice on oral hygiene which is individualised, with the content tailored to suit each patient, has been shown to be effective and the use of action plans[69] or patient agreements may also help the patient change their oral hygiene behaviour. There are various approaches to providing oral hygiene instruction, one of which, the updated **Oral Hygiene-TIPPS**, is described here.

Oral Hygiene TIPPS is modelled on patient behaviour change strategies which have been shown to be effective at improving oral hygiene behaviour when carried out in primary care.[70] This approach starts with a conversation to find out about the patient's current understanding and habits regarding personal oral hygiene, to highlight the importance of effective plaque biofilm removal and to identify the support the patient needs to achieve this. It then includes observation of the patient's oral hygiene technique, a 'hands-on' demonstration and the patient practising with support from the dental team before jointly planning how to adopt an effective routine.

Oral Hygiene TIPPS aims to make patients feel more confident in their ability to perform effective plaque biofilm removal, supports them to learn the manual skills and helps them plan how and when they will look after their teeth and gums. This may involve identifying a trigger which will remind patients to perform oral hygiene tasks, for example, to brush their teeth and to clean interdentally before going to bed. This approach can be followed by any suitably qualified member of the dental team and should be revisited and built upon at each return appointment.

Oral Hygiene TIPPS comprises 5 steps:

TALK



- Ask the patient what their current homecare regime involves and if they have any concerns or challenges with it.
- Ask the patient what their understanding of the causes of periodontal diseases is.
- Listen to what the patient says, and provide information where explanation or support is needed.

INSTRUCT

- Ask the patient to demonstrate their oral hygiene routine and watch while they do so.
- Provide personalised instruction (coaching) on the best ways to perform effective plaque removal, concentrating not only on improving their understanding of why it is important but also the patient's skill to remove plaque biofilm from the gingival margin and tooth surface.

PRACTISE

- Ask the patient to practise removing plaque biofilm from the gingival margin and the tooth surface using a toothbrush and using the interdental cleaning aids while in the dental surgery and help them to improve their technique where needed.

PLAN

- Agree a plan which specifies how the patient will incorporate the new oral hygiene regime into their daily life.

SUPPORT

- Support the patient to continue to achieve effective plaque removal by following-up on the advice at subsequent appointments.

Delivering **Oral Hygiene TIPPS** will take several minutes, and this time will vary, depending on the patient. It is important to gauge the level of understanding of the patient and adjust your communication style and method to suit them. Further information about the **Oral Hygiene TIPPS** approach is provided in Appendix 8.

5.2 PMPR and principles of periodontal instrumentation

5.2.1 Professional mechanical plaque removal

Professional mechanical plaque removal (PMPR) is a term that describes the control of dental plaque biofilm and calculus and the management of the crown and root surface during periodontal care. It was previously described by terms including scale and polish, supra- and subgingival scaling, supragingival mechanical biofilm control, root planing, root surface debridement, scaling and curettage.

Supragingival PMPR

In this guidance, the cleaning of supragingival tooth surfaces is termed supragingival professional mechanical plaque removal (PMPR). This targeted intervention aims to remove accessible plaque biofilm and calculus deposits from the crown of the tooth. This is carried out in Step 1 of treatment.

Subgingival PMPR

In this guidance, the cleaning of subgingival tooth surfaces is termed subgingival professional mechanical plaque removal (PMPR) or, in some instances, subgingival instrumentation. This targeted intervention aims to remove plaque biofilm, endotoxin and calculus from the root surface of the tooth. This is generally carried out in Step 2 of treatment. However, where subgingival calculus is readily accessible and removable, it can be removed during Step 1 of treatment.

5.2.2 General principles of periodontal instrumentation

Instrument choice

KEY RECOMMENDATION

For patients with a diagnosis of periodontitis, use either powered instruments, manual instruments, or a combination of both, to carry out subgingival professional mechanical plaque removal (PMPR) to a high standard; base the choice of instrument on clinician and patient preferences, the clinical situation and the goal of treatment.

(Strong recommendation; high certainty evidence)

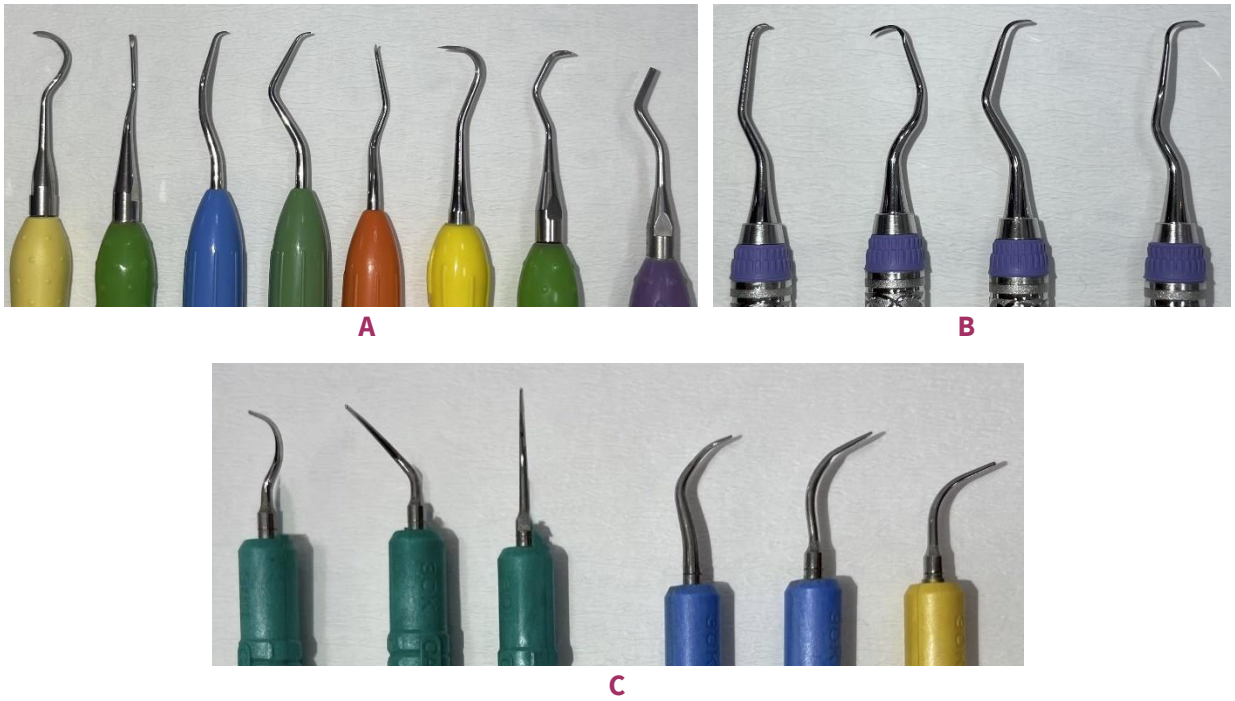
A review of current evidence confirmed that there is no difference in the quality of subgingival debridement achieved by using hand instruments or powered scalers if both methods are performed effectively.[42] The evidence is considered to be high certainty due to the due to consistency of findings across four RCTs, all of which were judged to be at low risk of bias. Accordingly, the **BSP-S3** guideline recommends that subgingival periodontal instrumentation is performed with hand or powered (sonic/ultrasonic) instruments, either alone or in combination (see figure 5.4). Successful utilisation of these instruments requires a thorough understanding of tooth and root anatomy, knowledge of how each particular instrument works and an awareness of which instrument works best in a particular area.

Air polishing devices can be used during periodontal instrumentation. There is some evidence that these devices are as effective at removing soft plaque biofilm deposits as hand or powered (sonic/ultrasonic) instruments.[71,72] Studies investigating the effectiveness of air polishing devices have largely focussed on

the use of these instruments in supportive care rather than during active therapy. In most situations, they have been shown to be effective at removing biofilm, particularly supragingivally, and are acceptable to patients. However, as these devices do not remove calculus, hand or powered instruments are also required for thorough debridement if calculus is present. Therefore, the use of air polishers is more applicable during Step 4 of therapy (Maintenance) and where calculus removal is not required. Use of air polishers around implant-supported restorations in healthy patients has been shown to be safe but care should be taken if inflammation is present.[10]

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Figure 5.4 Instruments for PMPR



A B C

Image A shows a variety of instruments suitable for supragingival PMPR. Image B shows site-specific Gracey curettes for subgingival PMPR. Image C shows various ultrasonic scaler inserts: green tips for removal of calculus from root surfaces or where minimal deposits are present; blue tips for supragingival PMPR; yellow tips (with appropriate plastic covering) for use around dental implants.

Irrespective of the method(s) of instrumentation employed, thorough mechanical removal of plaque biofilm and calculus from crown and root surfaces is key to effective treatment and resolution of inflammation.

The actual time required to adequately instrument each tooth will depend on the level of deposits, the tooth type, the depth of the pocket, whether there is furcation involvement, the presence of challenging anatomy and the location in the mouth. It takes several minutes of instrumentation to effectively debride the root surface. Although effective instrumentation by either method takes time, powered PMPR can be more efficient, taking 37% less time than debridement using hand instruments.[73,74]

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

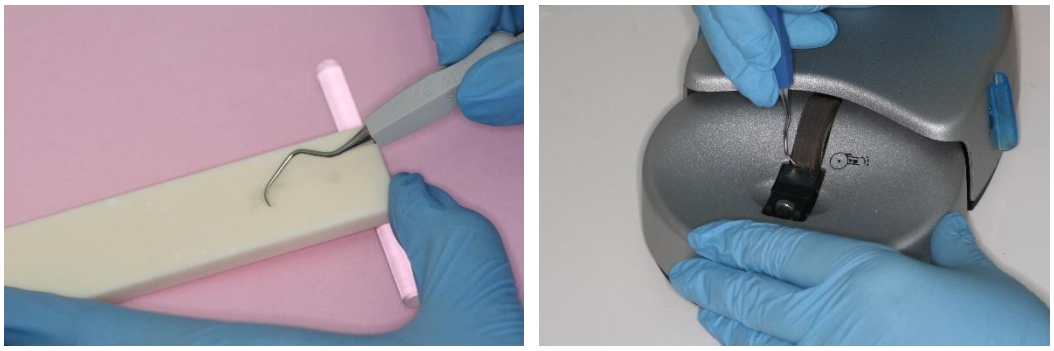
- Remove supra- and subgingival plaque, endotoxin, calculus and debris using hand or powered (sonic/ultrasonic) instruments, either alone or in combination.
  - The choice of instrument(s) should take account of patient preferences and operator ability and experience.
- Ensure that all instruments are used appropriately and that site-specific instruments are used where required (see figure 5.5).
  - Allow sufficient time to adequately instrument the root surface. For example, furcations around deep defects will require more time than a single rooted tooth.
  - Do not apply the pointed end of sonic and ultrasonic tips to the root surface; use only the sides of the working tip for debridement.
  - Use overlapping strokes to instrument all of the affected root surface.

Figure 5.5 Removal of subgingival calculus using a curette

Instrument maintenance

The effective removal of calculus using hand instruments results in a dulling of the cutting edge of the blade. Studies have shown that this can result in a less effective cutting edge after relatively few strokes. Hand instruments, therefore, require meticulous maintenance to ensure they remain fit for purpose (see figure 5.6). Sharpening of such instruments requires both skill and knowledge of the design characteristics of each type of instrument. Instruments can only be sharpened a finite number of times before they must be replaced due to the risk of fracture of the blade.

Figure 5.6 Instrument sharpening

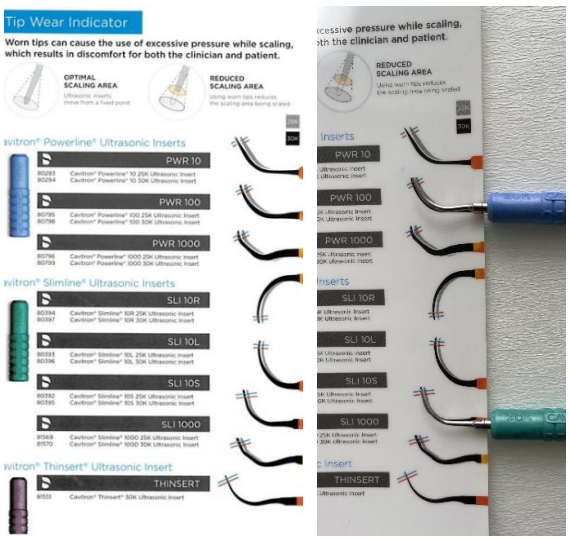


A B

Image A shows sharpening of a hand instrument using a sharpening stone. Image B shows sharpening of a hand instrument using a powered instrument sharpener.

Powered scalers also require frequent inspection to ensure optimum performance. The tips of powered instruments wear with use and should be checked regularly; it is estimated that approximately 2 mm of wear equates to around a 50% loss of performance.[75] Manufacturers provide information and guides to help the clinical team determine when a powered tip should be discarded (see figure 5.7).

Figure 5.7 Checking ultrasonic tips



A B

A: Manufacturers' guides are provided within the packaging of each new tip and should be retained for regular instrument checks. B: Ultrasonic tips being checked for wear against the manufacturer-supplied guide.

- Keep hand instruments sharp and discard those which have reached the end of their useful life.
- Regularly inspect sonic and ultrasonic instruments for signs of wear or distortion.
- Follow the manufacturer's instructions for checking, maintenance and cleaning of sonic and ultrasonic instruments.

Anaesthesia

Some patients experience pain during and after subgingival PMPR which may be due to pulpal sensitivity or tissue trauma. The use of local anaesthesia can make patients more comfortable during treatment. In addition, local anaesthesia may allow the operator to more efficiently and effectively clean the root surface knowing that the patient is comfortable. Pain can also be reduced by using an atraumatic instrumentation technique.

There is some evidence to suggest that intra-pocket anaesthesia is not as effective as injection anaesthesia at controlling pain during instrumentation, although some patients may prefer to receive anaesthesia via the topical route.[76]

5.2.3 Antimicrobial medication

Local antimicrobials

KEY RECOMMENDATION

Local antimicrobials are not recommended for the routine care and management of patients with a diagnosis of periodontitis.
(Conditional recommendation; low certainty evidence)

Local antimicrobials,* including disinfectants such as chlorhexidine and locally-delivered antibiotics, have been proposed as both a stand-alone therapy for the treatment of patients with a diagnosis of periodontitis and as adjuncts to professional mechanical plaque removal. Numerous delivery systems and formulations are available.

A review of evidence suggests that locally delivered chlorhexidine as an adjunct to subgingival instrumentation can lead to short-term improvements in periodontal pocket depths compared to subgingival instrumentation alone.[77] However, the improvements were small, no significant differences in clinical attachment levels were observed and there was insufficient data on bleeding and pocket closure. The certainty of the evidence is considered low due to significant heterogeneity, risk of bias and lack of data on the long-term effects of the intervention.

A review of evidence suggests that local antibiotics as an adjunct to subgingival instrumentation can lead to short-term improvements in periodontal pocket depths and clinical attachment levels compared to subgingival instrumentation alone.[77] However, long-term benefits were not evident and the clinical relevance of the small improvements observed is unclear. The certainty of the evidence is considered low due to risk of bias and significant heterogeneity, most likely due to the variation in active ingredients, application protocols and study designs.

Based on these findings, the **BSP-S3** guideline recommends that specific locally administered sustained-release antibiotics and locally administered sustained release chlorhexidine as an adjunct to subgingival

*Note that these do not include active ingredients with antimicrobial activity that can be found in some toothpastes (e.g. stannous fluoride).

instrumentation in patients with periodontitis may be considered. These open/conditional recommendations reflect the uncertainty of the evidence.

However, due to the high risk of bias and heterogeneity observed in the majority of primary studies, the unclear clinical benefits of adjunctive local antimicrobial therapy and the unclear impact on antibiotic stewardship, the intervention is not recommended in this guidance for the routine care and management of patients with a diagnosis of periodontitis.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Systemic antibiotics

KEY RECOMMENDATIONS

Do not use adjunctive systemic antibiotic therapy for the routine care and management of patients with a diagnosis of periodontitis.

(Strong recommendation; high certainty evidence)

Consider referral to a specialist or advanced care practitioner for those patients who may benefit from adjunctive systemic antibiotic therapy, such as those whose level of disease suggests a high susceptibility (e.g. younger patients with Grade C periodontitis who show little or no improvement after non-surgical treatment).

(Conditional recommendation; low certainty evidence)

Systemic antibiotics, prescribed as an adjunct to non-surgical periodontal treatment, have been proposed to act by suppressing the bacterial species responsible for biofilm growth, leading to a less pathogenic oral environment. A review of evidence indicates that the adjunctive use of systemic antibiotics to treat periodontitis may result in clinically significant improvements to patient outcomes compared with those achieved by non-surgical periodontal treatment alone.[78] The certainty of the evidence is considered high due to low risk of bias, low heterogeneity and the high consistency of results from the included studies. However, it should be noted that almost all included studies were performed in a university setting and the observed improvements in outcomes with adjunctive systemic antibiotics may not be achievable in primary care.

There is high certainty evidence that systemic antibiotics can be beneficial in the treatment of periodontitis, However, the balance of risk and benefits on both an individual and collective basis is an important consideration in terms of antibiotic stewardship. There is widespread acceptance that inappropriate use of antibiotic therapy is linked to the increasing incidence of bacterial resistance. There are also numerous side effects associated with antibiotic therapy. Taking account of this, at both a patient and public health level, the **BSP-S3** guideline does not recommend the routine use of systemic antibiotics as an adjunct to subgingival instrumentation in patients with periodontitis. Similarly, this guidance includes a strong recommendation against the routine use of this intervention.

The **BSP-S3** guideline notes that the adjunctive use of specific systemic antibiotics may be considered for specific patient categories (e.g. periodontitis Grade C in younger adults where a high rate of progression is documented) but suggests that adoption of this management option should be determined by a specialist or by special interest periodontal practitioners.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

5.2.4 Host modulation therapy

KEY RECOMMENDATION

The use of host modulation therapy is not recommended for the routine care and management of patients with a diagnosis of periodontitis.

(Conditional recommendation; low certainty evidence)

Host modulation therapy uses local or systemic drugs as adjuncts to conventional periodontal treatment, with the aim of modifying the destructive aspects of the host inflammatory response to the microbial biofilm. One of the earliest and best known of these interventions utilises the anti-inflammatory properties of sub-antimicrobial dose doxycycline.

A review of evidence indicates that while host modulation therapy using sub-antimicrobial dose doxycycline may result in statistically significant improvements to patient outcomes compared to those achieved by PMPR alone, the clinical relevance of these improvements is less clear.[79] The evidence is considered to be low certainty due to concerns about the methodology of some of the included studies, such as risk of bias and indirectness. There is currently no evidence that the low antibiotic doses utilised by this treatment regime are associated with the development of antibiotic resistance.[80] However, host modulation therapy requires patients to take systemic medication over long periods of time (e.g. up to nine months) and this may impact on compliance. The cost effectiveness of the therapy is unclear and side effects related to liver enzymes have also been reported.

Given the unclear clinical benefits of the intervention and the potential risks associated with it, the **BSP-S3** guideline does not suggest the use of systemic sub-antimicrobial doxycycline as an adjunct to subgingival instrumentation.

The use of other of host modulating therapies (statins, bisphosphonates, probiotics, non-steroidal anti-inflammatory drugs, Omega-3 polyunsaturated fatty acids, metformin) was not specifically examined during the development of this guidance. However, the **BSP-S3** guideline does not recommend the use of these other host modulation therapies as an adjunct to subgingival instrumentation.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

5.2.5 Management of dentine sensitivity following PMPR

KEY RECOMMENDATION

For patients who experience post-PMPR dentine sensitivity, consider the use of a desensitising agent.

- At-home treatments (e.g. desensitising toothpaste) should be tried initially, with professionally-applied desensitising agents used for persistent sensitivity.

(Conditional recommendation; low certainty evidence)

Around 50% of patients may experience increased dentine sensitivity following professional mechanical plaque removal (PMPR), especially those with sensitive teeth prior to treatment.[81] There are a large number of over-the-counter products available to patients that claim to reduce dentine sensitivity, such as toothpastes containing arginine, stannous fluoride, calcium sodium phosphosilicate, strontium, potassium salts and hydroxyapatite, and there is some low to moderate quality evidence that these are effective in the treatment of general dentine sensitivity.[82-85] However, the applicability of this evidence to patients with increased dentine sensitivity following PMPR is unclear.

Additionally, there are various treatments that can be provided by the dental team, such as dentine bonding agents, fluoride varnish, glass ionomer cements and the use of lasers. Again, the efficacy of these agents in treating dentine sensitivity induced by PMPR is unclear, although there is some evidence of a benefit for patients with general dentine sensitivity.[83,84,86,87] The evidence is considered to be of low to moderate certainty due to the limited number of relevant studies, small study size, risk of bias and the variation in both the agents tested and study design.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

- Prior to carrying out periodontal therapy, explain to the patient that their teeth may become sensitive. They may also experience gingival recession following healing.
- Check that the patient uses a low-abrasive, fluoride-containing toothpaste and toothbrush and has an atraumatic brushing technique.
    - A pressure-controlled electric toothbrush may be useful if the patient's current brushing technique is too abrasive.
- During PMPR, use techniques that aim to avoid root surface damage and over-instrumentation.
- Where a patient complains of sensitivity, assess whether this is a post-PMPR effect or is related to another cause (e.g. caries, pulpitis, dental abscess, dental erosion, other post-treatment pain).
- Advise the patient that proprietary desensitising fluoride-containing toothpastes can be used to treat particular areas of sensitivity.
    - A small amount of toothpaste should be applied to the affected area with a finger after toothbrushing.
    - Alternatively, a desensitising mouthwash may be of benefit.
    - Emphasise to the patient the importance of having plaque-free dentine for the desensitising agent to be effective.
    - Patients may have to try different desensitising toothpaste or mouthwash formulations to find one that works for them.
- Advise the patient to reduce their intake of acidic food and drinks.
- Where a patient complains of acute sensitivity, consider other topical therapies in addition to desensitising toothpaste (e.g. apply fluoride varnish or a dentine bonding agent).

5.3 Assessing the response to periodontal treatment

An integral part of periodontal management is the ongoing reassessment and monitoring of the patient's status after active treatment and during maintenance. The collective observation and recording of symptom control, level of plaque biofilm control, level of marginal bleeding, residual periodontal probing depths and bleeding on probing will enable the clinician to plan what, if any, further treatment is required or if the goal of treatment has been reached and Step 4 of management, periodontal maintenance, is appropriate.

Patients are typically reviewed at 6-12 weeks post-treatment. However, timescales for reassessment will depend on initial presentation, the treatment carried out, the potential need for further treatment and the patient's risk for disease progression.

5.3.1 Reassessing symptom control

The goal of patient management will vary according to the patient's wishes and circumstances (see Section 4.1). However, the control of symptoms is likely to be important for all individuals.

Following successful competition of Step 1 of therapy, the patient can expect that gingival inflammation will reduce and the symptom of bleeding on brushing (i.e. marginal bleeding) will diminish along with pain (e.g. from exposed root surfaces, periodontal infections) and halitosis. However some symptoms (e.g. drifted teeth, poor aesthetics) may only be addressed once Steps 1-3 have been completed.

5.3.2 Reassessing clinical parameters

Monitoring plaque levels

Plaque biofilm control is essential to reduce gingival inflammation during treatment and to prevent relapse in the maintenance phase of management. Low levels of plaque are associated with periodontal stability. The level of self-care required to prevent and control inflammation will differ depending on the patient's risk profile. However, the goal should be for all patients to reach a level of self-care which promotes health and controls inflammation.

The **BSP-S3** guideline includes a guide outlining the changes in plaque scores which may indicate a favourable improvement in oral hygiene and a patient who is engaged during Step 1 of therapy. These are:

- plaque levels of ≤20%, *or*
- ≥50% reduction in plaque from baseline measurements, *or*
- targets for improvements in plaque levels can be agreed by the patient and clinician.

Consideration of these scores can be helpful during a holistic assessment of patient engagement.

Regular, objective recording and review of plaque biofilm levels will identify areas where ongoing support for home care by the patient is required and can also inform an overall assessment of the potential value of more advanced periodontal treatments.

Objective measuring can be performed using:

- Plaque charts which record the levels of plaque on all teeth (see Section 2.4.2 and Appendix 2);
- Plaque charts which record the levels of plaque at index teeth (e.g. Ramfjord teeth; see Section 2.3.2: Assessing plaque biofilm and bleeding and Appendix 2).

Monitoring gingival bleeding

Bleeding superficially from the gingival margin (marginal bleeding) rather than from the base of a periodontal pocket, is related in most cases to oral hygiene measures. Objectively measuring and recording this is useful for assessing the patient's response to home care oral hygiene measures.

The BSP-S3 guideline includes a guide outlining the changes in bleeding scores which may indicate a favourable improvement during Step 1 of therapy. These are:

- marginal bleeding levels of ≤30%, *or*
- ≥50% reduction in marginal bleeding from baseline measurements, *or*
- targets for improvements in marginal bleeding levels can be agreed by the patient and clinician.

Consideration of these scores can be helpful during holistic assessment of patient engagement.

Objective measuring can be performed using:

- Bleeding charts which record the presence or absence of marginal bleeding around all teeth (see Appendix 2);
- Bleeding indices which record the presence or absence of marginal bleeding at index teeth (e.g. Ramfjord teeth; see Section 2.3.2: Assessing plaque biofilm and bleeding and Appendix 2).

Monitoring periodontal probing pocket depth

Reduction in probing pocket depth following treatment is an indicator of disease resolution and maintenance of these reduced probing pocket depths during Step 4 of therapy is an indicator of disease stability.

The **BSP-S3** guideline suggests that a goal of treatment is shallow probing pocket depths of ≤4 mm with no bleeding at 4 mm sites. This corresponds to a diagnosis of periodontal stability or remission. It is recognised that this goal may not be attainable in some cases. A suitable compromise, for example for patients where persistent pocketing ≥5 mm is present but the oral conditions are not suitable for periodontal surgery or the patient does not wish further treatment, could be to move to Step 4 of treatment, with the agreement and consent of the patient.

- Ask about symptom control at each recall visit.
- Regularly monitor and review plaque biofilm and marginal bleeding levels to assess the patient's compliance with home-care regimes and to inform decisions about further treatment.
- Regularly measure and review probing pocket depths to monitor response to treatment and to identify any new or recurrent disease.

- For patients with a diagnosis of periodontal health or gingivitis, carry out BPE screening at each recall visit.
- For patients with a diagnosis of periodontitis, measure full probing pocket depths throughout the entire dentition at least annually and record measurements at any sites ≥4 mm, with or without bleeding. Consider reviewing and recording probing pocket depths at sites ≥4 mm more regularly to assess response to treatment and identify new or recurrent disease at an early stage.

5.3.3 Determining who will benefit from further treatment

It is important that at all stages where decisions about further active treatment or periodontal maintenance are made, there is a discussion with the patient about their particular situation. The implications of further active treatment, no treatment, or maintenance should be made clear, with the patient's wishes considered during any decisions.

An important component of assessment is to gauge which patients are likely to benefit from more advanced treatment, such as surgery or repeated subgingival PMPR. Treatment outcomes following periodontal therapy are related to several factors, including the level of plaque control which can be achieved by the patient and their ability or desire to attend for and engage with treatment.

The **BSP-S3** guideline groups these patient factors as 'engagement' and states that this is a key principle to consider in periodontal diagnosis, planning and treatment provision when determining who may benefit from further treatment. As part of assessing engagement, the guideline includes a guide outlining levels of plaque and marginal bleeding which may indicate that the patient is engaged, particularly where more advanced treatment is being considered. These are:

- plaque levels of ≤20% and marginal bleeding levels ≤30%, or
- ≥50% reduction in plaque and marginal bleeding from baseline measurements.

Alternatively, targets for improvements in plaque and marginal bleeding levels can be agreed by the patient and clinician.

While Step 1 of therapy should be provided in all circumstances, the **BSP-S3** guideline suggests that only those patients who are engaging will benefit from further treatment (Steps 2-4 of therapy). Resolution of periodontal inflammation is unlikely without adequate plaque control. Therefore, where oral hygiene does not initially improve sufficiently, focussing on improving the patient's plaque control (i.e. repeating Step 1), with the hope that this will in time allow further treatment to be successfully provided, may be appropriate. However, in some cases, it is acceptable to continue to Step 2 of treatment if subgingival PMPR is required to control inflammation. If this is the case, continued support for improved oral hygiene remains important.

Assessing engagement

The management of periodontal diseases relies on teamwork between the dental team and the patient. For this team to function well, both the patient and the dental team need to be engaged in the process of changing behaviour and modifying risk factors to promote health. The dental team are responsible for

diagnosing the problem and ensuring that the patient understands what is wrong, knows what is advised to control the problem and has the required skill and support. The patient needs to take responsibility for controlling modifiable risk factors by altering behaviours which put them at risk and attending for treatment as agreed.

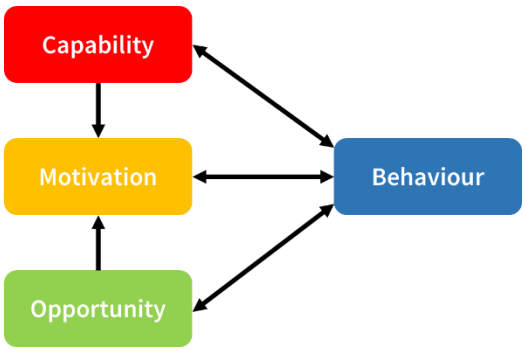
While good oral hygiene is key to resolving inflammation and maintaining treatment benefits, oral hygiene is a skill and not purely an indicator of psychological motivation and desire for treatment. The necessary skill of oral hygiene relies not only on the patient's motivation to improve but also on their capability and opportunity to conduct good oral hygiene behaviours. In addition, the role of the dental team must be considered, for example their ability to explain the diagnosis and its implications, and to ensure that the patient knows what their own role in the treatment process entails. Finally, the dental team should support the patient to control risk factors in a way that allows the patient to play an active part in their treatment.

In light of this, a broad and holistic view of patient engagement based on the principles of behaviour change may be appropriate. Principles of behaviour change management suggest that the complex process of long-term change of habits needed for patients with periodontal diseases requires more than a simple conversation with an individual. This is discussed further in the Public Health England publication *Achieving Behaviour Change. A guide for local government and partners* (2019).[88]

The COM-B model

A commonly used model to understand the factors influencing an individual's behaviour is the **COM-B** model.[89] This model proposes that for a behaviour to occur, an individual must have the **C**apability, **O**pportunity and **M**otivation to perform the **B**ehaviour. Not only do these factors influence behaviour, they also can influence each other, for example motivation may increase if capability is increased (see figure 5.8).

Figure 5.8 The COM-B model of behaviour



The **COM-B** model of behaviour encompasses the following components:

Capability: the physical or psychological capability to perform the behaviour. This can include the knowledge of how to perform the behaviour, the understanding that the behaviour is important, or the physical skills to perform the behaviour.

Opportunity: the physical or social opportunity to perform the behaviour. This can include considerations of the environment, availability of resources (including cost of treatment), social influences or cultural norms.

Motivation: the motivation to perform the behaviour. This can include desire, intention and personal beliefs that may influence the decision to perform the behaviour.

Table 5.1 presents some relevant questions to consider for each of the three components of the COM-B model. These questions can be used to reflect on the ability of the patient to perform a behaviour, such as oral hygiene, and the ability of the clinician to support the patient.

Table 5.1: Examples of questions related to influences on patient and clinician behaviour

Component	Patient behaviour	Clinician behaviour
Capability	• Is the patient physically capable of the behaviour? • Does the patient have the required skills to perform the behaviour?	• Do members of the dental team have the required skills to show the patient how to perform the behaviour? • Do members of the dental team know what is required to support the patient to perform the behaviour?
Opportunity	• Does the patient have the required time to perform the behaviour? • Does the patient have the required materials or resources to perform the behaviour?	• Do members of the dental team have the required time to show/explain to the patient how to perform the behaviour? • Do other dental team members within the practice support their patients to perform the behaviour?
Motivation	• Is the behaviour an established part of the patient's daily routine? • Is it important to the patient to perform the behaviour?	• Is it important to the dental team to show the patient how to perform the behaviour? • Is showing the patient how to perform the behaviour something the dental team would normally do?

To promote patient engagement in treatment, clinicians can use one or multiple aspects of the **COM-B** model to help support patients to change their behaviour, when the patient is ready to change. In addition, clinicians can use the **COM-B** model to consider their own behaviour in relation to supporting the patient to adopt and maintain a new behaviour.

This holistic approach to assessing patient engagement, considering the capability, opportunity and motivation of both patient and clinician, may help to identify engaging patients who are not currently able to achieve the levels of plaque and bleeding specified by the **BSP-S3** guideline, but who, with further support, may be able to achieve this in time.

Further information regarding the principles of behaviour change can be found in the *Delivering Better Oral Health* toolkit.[7]

Note that even in the absence of adequate plaque control to proceed to Steps 2 or 3 of treatment, periodontal charting, and recording of that charting, should be carried out in accordance with guidance where BPE scores of 3 or 4 are measured or where a diagnosis of periodontitis has been made (see Section 2).

6 Management of plaque-induced periodontal diseases

6.1 Managing patients with a diagnosis of periodontal health

Periodontal health is defined in the 2018 *Classification of Periodontal Diseases* as <10% of sites with bleeding on probing and all sites with probing pocket depths of ≤3 mm and no clinical attachment loss due to periodontitis.[8]

KEY RECOMMENDATION

For patients with a diagnosis of periodontal health, prioritise personalised oral hygiene instruction over professional mechanical plaque removal (PMPR) to encourage effective oral self-care.

(Strong recommendation; high certainty evidence)

In patients with a diagnosis of periodontal health, the priority is to support the patient to maintain their healthy status.

The *Delivering Better Oral Health* toolkit (**DBOH**)[7] notes the importance of daily, effective plaque removal and the 11th European Workshop in Periodontology consensus report *Principles in prevention of periodontal diseases*[90] recommends repeated and individually tailored oral hygiene instruction (OHI), with the addition of professional mechanical plaque removal (PMPR) both supragingivally and submarginally, where required, to allow good self-performed oral hygiene.

A systematic review assessed studies investigating the provision of periodontal "standard care" (i.e. 6-monthly review appointments, where the focus was on calculus removal) conducted in general dental practice in regularly attending adults without severe periodontitis compared to less frequent care.[57,58] The review found that providing calculus removal on a less frequent basis was as effective as "standard care" when assessing plaque biofilm (low certainty evidence due to risk of bias and indirectness) and gingival bleeding (high certainty evidence) levels over two to three years follow-up.

Periodontal health is dependent on the patient controlling, and eliminating where possible, risk factors for disease and consistently performing adequate home care. Support from the dental team, such as providing information about risk factors, support for skills development in oral hygiene and removal of plaque retentive factors will help the patient achieve this. For some patients, calculus removal will be required as part of the process of supporting periodontal health to enable adequate home care.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

For patients with a diagnosis of periodontal health:

- Explain that healthy periodontal tissues are important to retain teeth, that disease may develop in the presence of risk factors and that the dental team will regularly check the status of the patient's periodontal health.
- Provide personalised oral hygiene advice and instruction, where required, to assist and encourage the patient to improve their oral hygiene skills as well as their knowledge base on the value of good self-care routines (see Section 5.1.3).
- Where applicable, give information regarding personal risk factors and modifying them, for example, smoking cessation advice and diabetes control (see Section 5.1.1).
- Assess whether professional mechanical plaque removal (PMPR) is required, for example at sites where calculus or other plaque retentive factors are present, and provide as necessary.
- Continue to check the patient's risk profile (see Section 2.5) and their periodontal health status regularly.

6.2 Managing patients with a diagnosis of gingivitis

Gingivitis is defined in the 2018 *Classification of Periodontal Diseases* as ≥10% of sites with bleeding on probing and all sites with probing pocket depths of ≤3 mm and no clinical attachment loss due to periodontitis (see figure 6.1). There should be no evidence of bone loss.[8]

KEY RECOMMENDATION

For patients with a diagnosis of gingivitis, provide personalised oral hygiene instruction. In addition, assess levels of plaque and calculus and deliver professional mechanical plaque removal (PMPR) at required sites, especially where inflammation is present, to enable and encourage oral hygiene self-care.

(Strong recommendation; high certainty evidence)

In patients with a diagnosis of gingivitis, the priority is to support the patient to resolve the inflammation and avoid progression to more serious disease.

The 2015 European Workshop *Principles in Prevention of Periodontal Diseases*,[90] recommends repeated and individually tailored OHI to treat gingival conditions, with the addition of professional mechanical plaque removal (PMPR) both supra- and subgingivally, where required, to allow good self-performed oral hygiene. **DBOH** states that *'daily, effective plaque removal is critical to periodontal health'*, with professional interventions such as 'routine scale and polish' considered less important.[7]

A systematic review assessed studies investigating the provision of periodontal "standard care" (i.e. 6-monthly review appointments, where the focus was on calculus removal) conducted in general dental practice in regularly attending adults without severe periodontitis compared to less frequent care. The review found that providing calculus removal on a less frequent basis was as effective as "standard care"

when assessing plaque biofilm (low certainty evidence due to risk of bias and indirectness) and gingival bleeding (high certainty evidence) levels over two to three years follow-up.[57]

Resolving inflammation and avoiding progression to more serious disease is dependent on the patient controlling, and eliminating where possible, risk factors for disease and improving and consistently performing adequate home care. In combination with this, patients are supported by the dental team who can provide information about risk factors, support for skills development in oral hygiene and removal of plaque retentive factors. Calculus removal is likely to be required to enable adequate home care.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Figure 6.1 Gingivitis

A **B**

Image A shows gingivitis due to inadequate plaque removal. Following treatment, the inflammation almost completely resolved although slight residual inflammation was observed around the veneers 11/21 which had a poor marginal fit (image B).

For patients with a diagnosis of gingivitis:

- Explain to the patient that gingivitis is a risk factor for periodontitis, which can lead to tooth loss.
- Provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills, with the aim of reducing and controlling their inflammation as well as improving their understanding of the value of good self-care routines (see Section 5.1.3).
- Where applicable, give information regarding personal risk factors and modifying them, for example, advice on smoking cessation and diabetes control (see Section 5.1.1).
- Perform professional mechanical plaque removal (PMPR) at sites where inflammation is present.
    - Remove both supra- and subgingival plaque and calculus using an appropriate method.
- Ensure that local plaque retentive factors are corrected - for example, remove overhanging restorations or alter denture design.
- Re-assess at future visits to determine whether the gingivitis has resolved.

6.3 Managing patients with a diagnosis of periodontitis

Periodontitis is defined in the 2018 *Classification of Periodontal Diseases* as interdental clinical attachment loss detected at ≥2 nonadjacent teeth and patients with periodontitis will typically present with pockets ≥4 mm and/or obvious evidence of interdental recession.[8] Bone loss will be visible on radiographs.

KEY RECOMMENDATION

For patients with a diagnosis of periodontitis, carry out subgingival professional mechanical plaque removal (PMPR) in order to reduce probing pocket depth, gingival inflammation, bleeding on probing (from the base of the pocket) and the number of diseased sites.

(Strong recommendation; high certainty evidence)

The BSP implementation of European S3 - level evidence-based treatment guidelines for stage I-III periodontitis in UK clinical practice (**BSP-S3**)[6] guideline advocates a stepwise approach to periodontal therapy. It recommends supragingival professional mechanical plaque removal (PMPR) and control of retentive factors, as part of the first step of therapy for patients with a diagnosis of periodontitis. Interventions to address inadequate oral hygiene and other modifiable risk factors, such as smoking and diabetes, are also recommended.

The second step of therapy aims to address subgingival plaque biofilm, endotoxin and calculus. A recent review of the evidence confirmed the efficacy of subgingival instrumentation (subgingival PMPR) in the non-surgical treatment of periodontitis.[42] The evidence is considered to be high certainty due to consistency of the findings across a substantial number of prospective studies. Accordingly, the **BSP-S3** guideline recommends that subgingival periodontal instrumentation (subgingival PMPR) be employed to treat periodontitis to reduce gingival inflammation, the number of diseased sites and probing pocket depths.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Step 1 of therapy

- Explain to the patient the causes of periodontitis and the potential benefits of successful treatment: stabilisation of disease, increased oral comfort and reduced risk of tooth loss.
- Explain to the patient their role in improving their periodontal health, emphasising that:
  - periodontitis is a multifactorial condition and successful control is dependent on both self-care regimes and in-surgery interventions;
  - management of the disease is a partnership between patient and clinician and requires a life-long commitment.
- Provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Where applicable, give smoking cessation advice and support (see Section 5.1.1: Smoking cessation).
- Give advice and support on the control of other modifiable systemic risk factors, for example control of diabetes (see Section 5.1.1: Control of diabetes).
- Remove supragingival plaque and calculus using an appropriate method.
- Ensure that local plaque retentive factors are corrected – for example, remove overhanging restorations or alter denture design.
- Assess the response to Step 1 of therapy, including the levels of engagement, oral hygiene and risk factor control, and consider whether it is appropriate to provide Step 2 of therapy.

Step 2 of therapy

- Continue to encourage and support effective self-performed oral hygiene during this step of therapy (see Section 5.1.3).
- Where applicable, reinforce the importance of modifying personal risk factors such as smoking and diabetes (see Section 5.1.1).
- Assess the level of deposits, extent of disease along with patient preference and operator preference and skill to determine the number and length of appointments required for thorough subgingival PMPR.
- Carry out subgingival PMPR at sites of ≥4 mm probing depth where subgingival deposits are present or which bleed on probing. Local anaesthesia may be required for this.
  - Site specific instruments may be required to adequately instrument difficult to reach sites (e.g. furcations).

- Advise the patient that they may experience some discomfort and sensitivity immediately following treatment.
- Advise the patient that as periodontal pocketing and gingival swelling reduce when the disease stabilises, they may notice a degree of interdental (black triangles) or smooth surface recession.

- Assess the response to Step 2 of therapy to decide whether further periodontal treatment is indicated.

- Where residual disease is present after Steps 1 and 2 of therapy, discuss with the patient options for further treatment.
  - Step 3 of therapy could involve further non-surgical or surgical treatment or onward referral for specialist care.

- Once the active phase of treatment is complete, arrange and encourage regular maintenance care (Step 4 of therapy) to prevent and detect any areas of recurrent disease and to maintain stability.

6.3.1 Teeth with furcation involvement

KEY RECOMMENDATIONS

For teeth with Grade I furcation involvement, provide non-surgical treatment with the aim of achieving medium/long term retention of the tooth.
(Strong recommendation; moderate certainty evidence)

For teeth with Grade II or III furcation involvement, especially those that are holistically assessed as being of ongoing value to the patient and their dentition, provide non-surgical treatment with the aim of achieving medium/long term retention of the tooth.

- Referral and/or surgical management might be appropriate for some patients.
- Furcation involvement alone is not an indication for extraction.

(Conditional recommendation; low certainty evidence)

While teeth with furcation involvement are likely to require more complex management, evidence suggests that many will respond to periodontal treatment. The response to treatment varies based on the degree of furcation involvement, with more advanced lesions more likely to lead to tooth loss.

There is consensus in the literature that teeth with class I furcation involvement can be treated successfully with non-surgical periodontal therapy and evidence suggests that the rate of tooth loss for these teeth is similar to that of molar teeth without furcation involvement.[91] When comparing the outcomes of teeth with class II or III furcation involvement treated surgically and those treated non-surgically, there is very little difference in survival rates.[92] A tooth survival rate of 70% has been observed in the presence of degree III furcations over a follow-up period of 5-15 years in specialist/secondary

care.[93] The certainty of the evidence is considered low due to the retrospective nature of the included studies.

The **BSP-S3** guideline recommends that molars with residual pockets and associated class II and III furcation involvement receive periodontal therapy. The guideline includes a specific statement that furcation involvement is not an indication for extraction.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

- Manage teeth with Grade I furcation involvement non-surgically and provide advice regarding home care and maintenance.
- For teeth with Grade II or III furcation involvement, provide non-surgical treatment and advice regarding home care and maintenance. If the tooth is holistically assessed as being of ongoing strategic value to the patient and their dentition, consider referral for specialist advice and potential surgical treatment.

6.4 Management of other periodontal conditions

Non-plaque biofilm-induced periodontal diseases are a group of conditions characterised by atypically presenting gingival, and sometimes oral mucosal, lesions. They may be manifestations of systemic conditions, a medical disorder or may represent pathologic changes in the gingival tissues. Their atypical appearance will often extend beyond the mucogingival margin and will not respond to oral hygiene measures. Although these lesions are not directly caused by plaque, their clinical course may be impacted by plaque accumulation and subsequent gingival inflammation.

As many of these conditions are rare, their appearance may not be recognised or may cause concern to the primary care team. In those cases, early referral to a specialist in periodontology, oral medicine or oral surgery should be considered to confirm a diagnosis and exclude underlying disease which requires separate management.

A brief summary of non–plaque-induced gingival diseases and conditions is presented below, and specific examples are discussed in more detail later in this guidance (i.e. necrotising periodontal disease, drug-induced gingival enlargement, puberty gingivitis, leukaemia).

- Genetic/developmental disorders (e.g. hereditary gingival fibromatosis);
- Specific infections (bacterial origin [e.g. necrotising periodontal diseases], viral origin [e.g. Coxsackie virus, Herpes simplex virus], fungal origin [e.g. candidosis]);
- Inflammatory and immune conditions and lesions (hypersensitivity reactions, autoimmune diseases of skin and mucous membranes [e.g. lichen planus], granulomatous inflammatory conditions [e.g. orofacial granulomatosis]);
- Reactive processes (epulides [e.g. fibrous epulis]);
- Neoplasms (premalignant leukoplakia/erythroplakia, malignant squamous cell carcinoma, leukaemia, lymphoma);
- Endocrine, nutritional, and metabolic diseases (e.g. vitamin C deficiency);

- Traumatic lesions (physical/mechanical insults [e.g. toothbrushing trauma; lip or tongue piercing], chemical injury [e.g. etching], thermal injury [e.g. burns of mucosa]);
- Gingival pigmentation (e.g. amalgam tattoo).

More information on these conditions is available in an article from the *Proceedings of the World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions*.[94]

6.4.1 Gingival recession

Gingival recession is common and may be due to underlying periodontitis, tooth prominence, thin attached gingival tissue or trauma (e.g. from toothbrushing or piercings; see figure 6.2). It may also arise as a consequence of orthodontic treatment, particularly during arch expansion. For many patients, gingival recession causes no symptoms, but some may report dentine sensitivity or aesthetic issues. Management includes eliminating, where possible, the cause of the recession and managing any associated sensitivity. In most cases, more active management of recession defects is not required. Surgery to manage these defects is complex and beyond the scope of this guidance, but can be considered if there are specific concerns.

Figure 6.2 Gingival recession

Generalised mid-buccal recession associated with toothbrushing trauma. Note also gingivitis is present in the upper and lower anterior regions where oral hygiene is inadequate.

If gingival recession is present:

- Carry out a periodontal examination to establish a periodontal diagnosis and to identify inflammatory disease or other contributing factors for recession.
- Eliminate the cause of the recession, where possible.
  - If the recession is due to overzealous toothbrushing, help the patient develop an atraumatic technique.
  - If recession develops during orthodontic treatment, stop treatment and seek advice regarding ongoing care.
  - Advise the removal of piercings which are causing recession or may lead to this in future.

- Manage any recession-associated sensitivity (see Section 5.2.5).
  - In most cases, dentine sensitivity can be effectively managed by amending toothbrushing habits and the use of topical toothpastes.
  - If these fail to resolve the sensitivity, consider application of in-surgery agents to occlude exposed dentinal tubules.
- Monitor the recession to check for stability in the longer term.
  - Dental charts that record recession from the CEJ, digital scans or photographs which show the affected area or conventional study casts can be used as monitoring tools.

6.4.2 Drug-influenced gingival enlargement

Patients taking certain drugs for existing conditions such as calcium channel blockers for hypertension, phenytoin for epilepsy and ciclosporin, an anti-rejection drug which can also be prescribed for some autoimmune disorders, may be at risk of drug-influenced gingival enlargement (see figure 6.3). In cases where gingival overgrowth is limited, the condition may respond to non-surgical treatment. In addition to periodontal management, drug substitution should be considered and can be discussed with the patient's general medical practitioner. Periodontal surgery may be required to reduce and recontour the tissue at sites of gingival enlargement. However, the condition may recur in susceptible individuals and the surgery may need to be repeated.

Figure 6.3 Examples of drug-influenced gingival enlargement

6.4.3 Puberty-associated gingivitis

Gingivitis is commonly observed in pre-teens and young teenagers where the increased inflammatory response to plaque is thought to be aggravated by the hormonal changes associated with puberty. The presentation may vary between individuals and in some cases marked gingival enlargement can occur.

6.4.4 Leukaemia

Gingival enlargement, inflammation and bleeding can be a sign of an underlying medical condition that requires investigation, such as undiagnosed leukaemia, in both children and adults (see figure 6.4).

Figure 6.4 Gingival enlargement and gingivitis in leukaemia

A B

Image A shows gingival enlargement as a result of acute myeloid leukaemia. Image B shows marginal gingivitis, due to neutropenia, in a leukaemia patient awaiting bone marrow transplant. The patient had scrupulous oral hygiene.

For patients with gingivitis or gingival enlargement associated with medication or puberty:

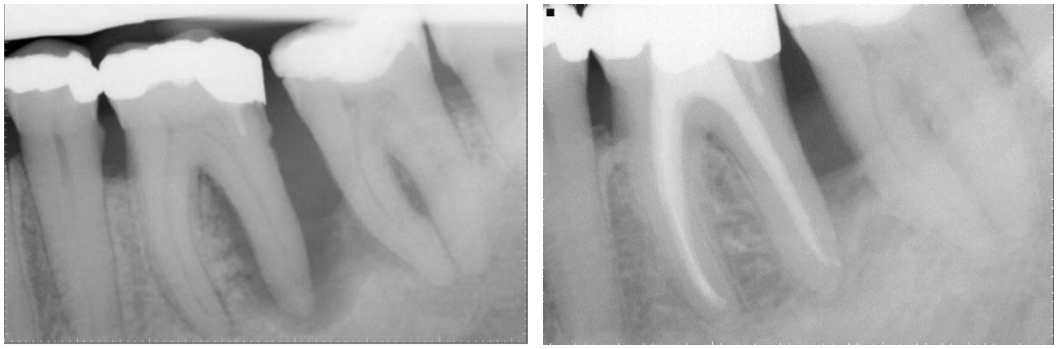
- Ensure you have an up-to-date medical history for all patients.
- Where there is gingivitis or gingival enlargement, provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Where applicable, give information regarding other personal risk factors and modifying them, for example, advice on smoking cessation and diabetes control (see Section 5.1.1).
- Remove factors that impede effective plaque control, such as calculus, using an appropriate method.
- Ensure that other local plaque retentive factors are corrected - for example, remove overhanging restorations or alter denture design. Ensure patients are able to clean effectively around fixed orthodontic appliances.
- Where drug-influenced gingival enlargement hinders adequate plaque removal, becomes an aesthetic issue or interferes with the normal function of the oral cavity, consult the patient's physician regarding possible drug substitution and/or consider referring for specialist periodontal care.
- Where puberty-related gingival enlargement hinders adequate oral hygiene or interferes with the normal function of the oral cavity, consider referring to a consultant in paediatric dentistry, consultant in restorative dentistry or specialist periodontist.

- Re-assess at a future visit to determine whether gingivitis or gingival enlargement has resolved.
- In cases of unexplained gingivitis or gingival enlargement which does not respond to treatment as expected, or the extent of the condition is inconsistent with the level of oral hygiene observed, consider urgent referral to an oral medicine specialist or specialist periodontist.

6.4.5 Combined endodontic-periodontal lesions

Combined endodontic-periodontal lesions occur where a patient not only has clinical attachment loss but also a tooth with a necrotic, or partially necrotic, pulp (see Section 3.2.4). Pulpal damage may occur as a result of exposure of accessory canals in patient with a diagnosis of periodontitis, or the lesion may be associated with damage to the root or root surface itself, independent of periodontal disease. These lesions can be difficult to diagnose, therefore a clinical examination and the use of special tests (radiographs and vitality tests) are required to assess both the periodontal (swelling, bleeding or suppuration, increased probing pocket depth) and endodontic (presence of root damage or perforation, pulpal status, presence of fistula, tenderness to percussion) signs (see figure 6.5).

Figure 6.5 Radiographs showing endodontic-periodontal lesion before and after treatment



A **B**

A: Periapical radiograph before treatment showing bone loss extending to the apex and into furcation around tooth 36. This was managed by a combination of endodontic and non-surgical periodontal treatment. B: Image after treatment shows good quality root filling and bone infill around the distal root of 36.

Management will involve both endodontic and periodontal treatment, although the endodontic source of infection should be eliminated with root canal treatment in the first instance. Where damage to the root itself is present, the tooth may not be saveable.

- Consider the overall prognosis of the tooth (see Section 4.2) and assess whether tooth retention is possible or desirable.
- If the tooth is to be retained, carry out endodontic treatment of the affected tooth.
- Following endodontic treatment manage the periodontal tissues as indicated non surgically or surgically.
- Do not prescribe antibiotics unless there are signs of spreading infection or systemic involvement.

6.4.6 Acute conditions

Acute conditions should be managed using local measures in the first instance. Do not prescribe antibiotics unless there is evidence of spreading infection (cellulitis, lymph node involvement) or systemic involvement (fever, malaise). Where antibiotic therapy is indicated, refer to the SDCEP *Drug Prescribing for Dentistry* guidance[95] for further details of drug regimens.

Periodontal abscess

Periodontal abscesses most frequently occur in pre-existing periodontal pockets and are characterised by localized accumulation of pus within the gingival wall of the periodontal pocket/sulcus (see Section 3.2.4). They cause rapid tissue destruction, which may compromise tooth prognosis, and are associated with risk for systemic dissemination (see figure 6.6).[41]

Figure 6.6 Periodontal abscess

Periodontal abscess at 36, 37 in a patient with periodontitis.

- Establish that the lesion is periodontal in nature rather than a combined endodontic-periodontal lesion or one of pulpal origin.
  - Periodontal abscesses can occur in patients without a diagnosis of periodontitis, for example following impaction of food or other foreign bodies.
  - Note that recurrent periodontal abscesses may indicate undiagnosed diabetes (see Section 5.1.1: Control of diabetes).

- Carry out careful subgingival PMPR short of the base of the periodontal pocket to avoid iatrogenic damage; local anaesthesia may be required.
- If pus is present in a periodontal abscess, drain by incision or through the periodontal pocket.
- Recommend optimal analgesia.
- Do not prescribe antibiotics unless there are signs of spreading infection or systemic involvement.
- Following acute management, arrange early review (e.g. within ten days) and carry out definitive periodontal instrumentation. Arrange an appropriate recall interval.

Necrotising gingivitis and periodontitis

Necrotising gingivitis is characterised by marginal gingival ulceration with blunting/loss of the interdental papillae and a grey sloughing on the surface of the ulcers (see figure 3.6).[41] It may be accompanied by a characteristic halitosis and is often painful. It is associated with anaerobic fuso-spirochaetal bacteria and is more common in patients who smoke, the immunosuppressed and those with inadequate oral hygiene (see Section 3.2.4). Necrotising periodontitis is diagnosed in the presence of connective tissue attachment loss and bone destruction.

As an adjunct to local measures, metronidazole is the drug of first choice where there is systemic involvement or persistent swelling despite local measures.

- Establish if there are any underlying contributing risk factors, such as systemic disease or smoking, which could be controlled by the patient (see Section 2.2.1).
- Provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Remove supra- and subgingival plaque and calculus deposits using an appropriate method; local anaesthesia may be required.
    - Due to the pain associated with the condition, the patient may only be able to tolerate limited supra- and subgingival PMPR in the acute phase.
- Recommend the use of either 6% hydrogen peroxide or 0.2% chlorhexidine mouthwash until the acute symptoms subside.
- If there is evidence of spreading infection or systemic involvement, or if local measures are incomplete at initial presentation:
    - consider prescribing metronidazole;
    - give the patient advice about general analgesia, hydration and rest.

- Following acute management, arrange early review (e.g. in 3-5 days) and carry out further supra- and subgingival PMPR as required and arrange an appropriate recall interval.
- If no resolution of signs and symptoms occurs, review the patient's general health and consider referral to a specialist in primary or secondary care.

6.5 Systemic conditions linked to periodontal disease

6.5.1 Systemic disease

KEY RECOMMENDATION

For patients with diabetes and periodontitis, provide periodontal treatment, including oral hygiene instruction and supra- and subgingival professional mechanical plaque removal (PMPR), with the aim of reducing oral inflammation and improving diabetes control.

(Strong recommendation; moderate certainty evidence)

For patients with periodontitis and with systemic conditions that may be related to periodontitis, provide periodontal treatment, including oral hygiene instruction and supra- and subgingival professional mechanical plaque removal (PMPR), with the aim of reducing oral inflammation.

(Conditional recommendation; low certainty evidence)

Periodontitis is an inflammatory disease of the soft tissues and bone supporting the teeth in susceptible individuals that is associated with dental plaque biofilm. This has been linked with an increase in systemic inflammation, which may impact on other body tissues and increase risks associated with other inflammation-mediated conditions (e.g. diabetes or cardiovascular disease).

Patients with diabetes have an increased risk of developing periodontal diseases. Sub-optimally controlled diabetes enhances the signs and symptoms of gingivitis and periodontitis and has an adverse effect on wound healing, making treatment of these patients more difficult. There is moderate certainty evidence that non-surgical periodontal treatment improves glycaemic control in patients with a diagnosis of periodontitis who also have diabetes.[21] The improvements observed are clinically significant and sustained over at least a 12-month period. The certainty of the evidence is considered moderate due to risk of bias, largely due to lack of blinding in the primary studies. The NICE guidelines on management of diabetes recommend that adults with diabetes have regular oral health reviews and that those who have been diagnosed with periodontitis are offered dental appointments to manage and treat their periodontal disease.[22,23]

There is a body of evidence indicating an association between periodontitis and cardiovascular disease. This may be due to shared risk factors and/or the impact of chronic inflammatory diseases (such as periodontitis) on the cardiovascular system. However, there is currently no reliable evidence that treatment of periodontal disease can improve cardiovascular outcomes. Two Cochrane reviews did not

find any conclusive evidence regarding the effect of periodontal treatment on cardiovascular disease or hypertension.[96,97]

Associations between periodontitis and other chronic conditions, such as rheumatoid arthritis, chronic kidney disease and psoriasis, have been proposed but there is insufficient evidence to determine if periodontal treatment influences the activity of these diseases.[98-100] In addition, Alzheimer's disease has been linked with periodontitis but further research is required to determine the significance of this and to determine if periodontal treatment has an impact on clinical outcomes.[101,102]

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

- Explain to all patients who have diabetes that sub-optimally controlled diabetes increases the risk of developing periodontitis or worsening existing periodontitis. Give personalised advice on oral hygiene (see Section 5.1.3) and carry out periodontal treatment where required.
- For patients who have both a diagnosis of periodontitis and diabetes, explain that treatment of their periodontal disease is likely to improve control of their diabetes. Consider communicating with their general medical practitioner or diabetic care team if necessary (see Section 5.1.1: Control of diabetes).
- For patients who have both a diagnosis of periodontitis and diabetes, carry out non-surgical periodontal treatment, including subgingival PMPR where required.
- For patients with other health conditions that may be linked to periodontitis (e.g. cardio-vascular disease, rheumatoid arthritis), emphasise the importance of good oral health and control of oral inflammation to general health. Carry out periodontal treatment where required.
    - For patients with unstable cardiovascular disease, consider the health status of the patient and the potential risks of a full mouth delivery approach before periodontal instrumentation is carried out.

6.5.2 Pregnancy

Pregnancy-associated gingivitis

The changes in hormone levels and to the immune response associated with pregnancy have been implicated in the development or worsening of gingivitis. In most patients this can be managed with adequate oral hygiene, but more severe cases of gingival enlargement may require further professional care. Most cases will resolve after delivery of the baby, although breastfeeding can extend the duration of the condition. Note that long periods in the prone position are not advised during pregnancy. Therefore, long periods lying flat in a dental chair should be avoided in the third trimester, where possible.

- Provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Remove supragingival plaque, calculus and subgingival deposits using an appropriate method. Highlight to the patient areas where supragingival deposits are detected.
  - Patients with pregnancy gingivitis may require additional care and more frequent recall visits during pregnancy.
- Strongly encourage and support smoking cessation if the patient smokes (see Section 5.1.1: Smoking cessation).
- Ensure that local plaque retentive factors are corrected - for example, remove overhanging restorations or alter denture design.
- Explain to the patient that the condition is likely to resolve once the baby is born or following the cessation of breastfeeding, assuming the patient's oral hygiene is adequate.
- Re-assess at a future visit to determine whether the gingivitis has resolved.
- Where large gingival overgrowths do not respond to non-surgical treatment, either excise the overgrowth or refer the patient to secondary care.

Periodontitis in pregnancy

Periodontal treatment during pregnancy is considered safe and should be provided when required.[103]

While periodontitis has been linked with adverse pregnancy outcomes, such as pre-term birth and low birth weight, the exact nature of the relationship remains unclear. Studies to determine if periodontal treatment leads to improved pregnancy outcomes have been performed but several systematic reviews have found a lack of evidence that treatment to control periodontal disease is of benefit.[104,105] The recent European Federation of Periodontology (EFP) *Treatment of stage IV periodontitis: The EFP S3 level clinical practice guideline*[9] states that it is unclear whether treatment of periodontitis during pregnancy reduces pre-term births (<37 weeks) or reduces other adverse pregnancy outcomes. Overall, there is insufficient evidence to determine if treatment of periodontitis in patients who are pregnant improves pregnancy outcomes.

Note that long periods in the prone position are not advised during pregnancy. Therefore, long periods lying flat in a dental chair should be avoided in the third trimester, where possible.

- For patients with a diagnosis of periodontitis who are planning to become pregnant, discuss with them the association between pregnancy and periodontitis.
  - Encourage these patients to have periodontal treatment and to aim for periodontal stability before becoming pregnant.
  - Strongly encourage and support smoking cessation if the patient smokes (see Section 5.1.1: Smoking cessation).
- Provide support before and during pregnancy to help the patient maintain good oral hygiene and to control oral inflammation (see Section 5.1.3).
- Provide non-surgical periodontal care where required, ideally during the second trimester.
  - Periodontal treatment is considered safe in pregnancy and should be provided when required.
  - Reassure the patient that periodontal treatment is safe for both mother and baby during pregnancy.
- Once the baby is born, continue to provide periodontal care, where required.

7 Long-term periodontal care

Long-term periodontal care is relevant to all patients. It combines aspects of both prevention and treatment, and involves ongoing monitoring of risk factors for disease, disease status and PMPR, where needed, on a risk-assessed basis. It aims to:

- prevent the development of primary disease in those with a diagnosis of periodontal health;
- prevent disease recurring in patients with a diagnosis of gingivitis or periodontitis;
- recognise new or recurrent disease at an early stage;
- support patients with a diagnosis of periodontitis sustain improvements gained during active treatment.

The recall interval and level of care provided in the long-term is based on the individual patient's risk profile and periodontal status. Therefore, long-term care will vary based on the patient's diagnosis (health, gingivitis or periodontitis) and the presence or absence of risk factors which may promote or worsen active disease. If, during long-term care, initial disease or recurrence is detected, appropriate (re)treatment should be considered and provided in agreement with the patient.

Periodontal assessment is part of the holistic process of oral health assessment and recall intervals will also depend on an assessment of the patient's risk of developing other oral diseases such as caries and oral cancer (see Appendix 3).

Sufficient time is required at each recall appointment to carry out examination and any required care effectively. Patients who have previously received active treatment for periodontitis will likely require longer appointments than those receiving care focussing on primary prevention of disease.

7.1 Patients with a diagnosis of periodontal health

Long-term care for patients with a diagnosis of periodontal health aims to prevent the development of primary disease. It includes aspects of both prevention and treatment, with emphasis on regular re-enforcement of effective oral hygiene and management of modifiable risk factors (e.g. smoking status, diabetes control).

Care is likely to be delivered less frequently and less intensively for these patients than that provided to patients with a diagnosis of periodontitis. The presence or absence of specific factors related to an increased risk of disease onset (e.g. inadequate oral hygiene, smoking, diabetes, a family history of early tooth loss) will determine the interval for this risk-based recall.

In patients who have no history of periodontitis and who do not currently have gingivitis, each recall appointment should comprise assessment and, if appropriate, treatment as follows.

- Update the patient's medical and social history and assess the patient's control of modifiable risk factors (e.g. plaque control, smoking status, HbA1c levels).
- Carry out an oral examination, including periodontal screening (including BPE) and assessment of plaque and bleeding levels.

- Provide personalised oral hygiene advice and instruction, where required, to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Where applicable, give advice on control of modifiable risk factors (see Section 5.1.1).
- Assess whether professional mechanical plaque removal (PMPR) is required, for example at sites where calculus or other plaque retentive factors are present, and provide as necessary.
- Correct local plaque retentive factors - for example, remove overhanging restorations or alter denture design.
- Assess and assign an individual periodontal risk level (see Section 2.5 and Appendix 3) based on the patient's medical history, known risk factors, current oral health status and levels of plaque control. Explain to the patient what this means for them and use the risk level to inform the future recall interval.

7.2 Patients with a diagnosis of gingivitis

Long-term care for patients with a diagnosis of gingivitis aims to maintain the gingival tissues in a state of health after initial treatment to reduce inflammation has been delivered. It includes aspects of both prevention and treatment, with emphasis on regular re-enforcement of effective oral hygiene, management of modifiable risk factors (e.g. smoking status, diabetes control) and PMPR, where required.

Patients with a diagnosis of gingivitis are at increased risk of developing periodontitis (see Section 2.2). Specific risk factors that suggest an increased risk of disease onset (e.g. age, inadequate oral hygiene, smoking, diabetes or a family history of early tooth loss) will shorten the risk-based recall interval compared to those with a diagnosis of periodontal health.

In patients who have a diagnosis of gingivitis but no history of periodontitis (i.e. no bone loss), each recall appointment should comprise assessment and, if appropriate, treatment as follows.

- Update the patient's medical and social history and assess the patient's control of modifiable risk factors (e.g. plaque control, smoking status, HbA1c levels).
- Carry out an oral examination, including periodontal screening (including BPE) and assessment of plaque and bleeding levels.
- Provide personalised oral hygiene advice and instruction, where required, to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Where applicable, give advice on control of modifiable risk factors (see Section 5.1.1).
- Assess whether professional mechanical plaque removal (PMPR) is required, for example at sites where inflammation is present.

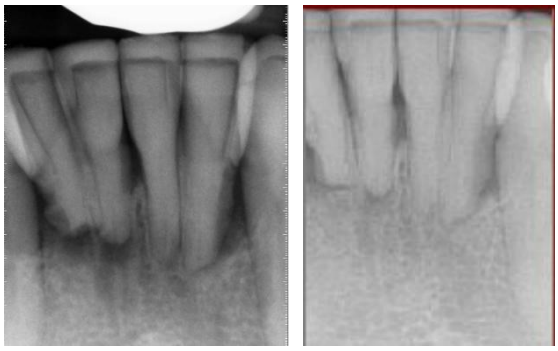
- If PMPR is necessary, remove both supra- and subgingival plaque and calculus using an appropriate method.
- Correct local plaque retentive factors - for example, remove overhanging restorations or alter denture design.
- Assess and assign an individual periodontal risk level (see Section 2.5 and Appendix 3) based on the patient's medical history, known risk factors, current oral health status and levels of plaque control. Explain to the patient what this means for them and use the risk level to inform the future recall period.

7.3 Patients with a diagnosis of periodontitis

In patients with a diagnosis of periodontitis who have completed a course of active therapy, long-term care (also known as the Fourth step of therapy and Maintenance) involves supportive periodontal care provided in the dental clinic, along with the patient's ongoing homecare regime and control of risk factors. It aims to maintain periodontal stability, prevent disease recurrence and, if disease does recur, recognise it early and intervene to limit tissue damage (see figure 7.1). It combines aspects of monitoring, prevention and treatment and is an active process of re-assessment and re-treatment, where required.

Before entering a maintenance programme, it is important that patients with periodontitis understand the nature and purpose of maintenance and are aware of the signs and symptoms of gingivitis or periodontitis which might indicate the need for further active treatment.

Figure 7. 1 Radiographs showing impact of long-term care



A B

Images taken A: at baseline and B: at 5 years for a patient with Stage IV periodontitis and an extensively restored dentition on a programme of regular maintenance. While the periodontal disease was not completely stable at 5 years, bone infill had occurred around the lower anterior teeth, and inflammation was controlled.

Sufficient time is required at each recall appointment to carry out examination and supportive care effectively, and patients who have previously received active treatment for periodontitis will likely require longer and more frequent appointments than those receiving care focussing on primary prevention of disease.

7.3.1 Supportive periodontal care for patients with a diagnosis of periodontitis (Step 4 of therapy)

KEY RECOMMENDATION

For patients with a diagnosis of periodontitis who have completed active periodontal therapy, provide regular* supportive periodontal care to maintain stability of the patient's disease status.

(Strong recommendation; low to moderate certainty evidence)

*Suitable recall intervals range from 3 to a maximum of 12 months, with the frequency determined by the patient's clinical history, an assessment of their risk and the needs and wishes of the patient.

There is a substantial body of low to moderate certainty evidence from long term observational studies of the benefits of supportive periodontal care (SPC) in patients who have had periodontal treatment. This suggests that tooth loss and disease progression is lower in patients who comply effectively with SPC and that most of these patients are less likely to experience tooth loss in the moderate to long-term.[106] There is moderate certainty evidence that tooth loss in those who attend either regularly or irregularly is around 10% during SPC of at least 5 years duration.[106] Although the evidence regarding the effectiveness of supportive periodontal care is largely drawn from observational studies, there is consistency in the findings across a significant number of studies. In addition, provision of supportive care has been standard practice for many years. Consequently, this guidance includes a strong recommendation in favour of SPC, based on low to moderate certainty evidence, because of the increased risk of tooth loss if SPC is not provided.

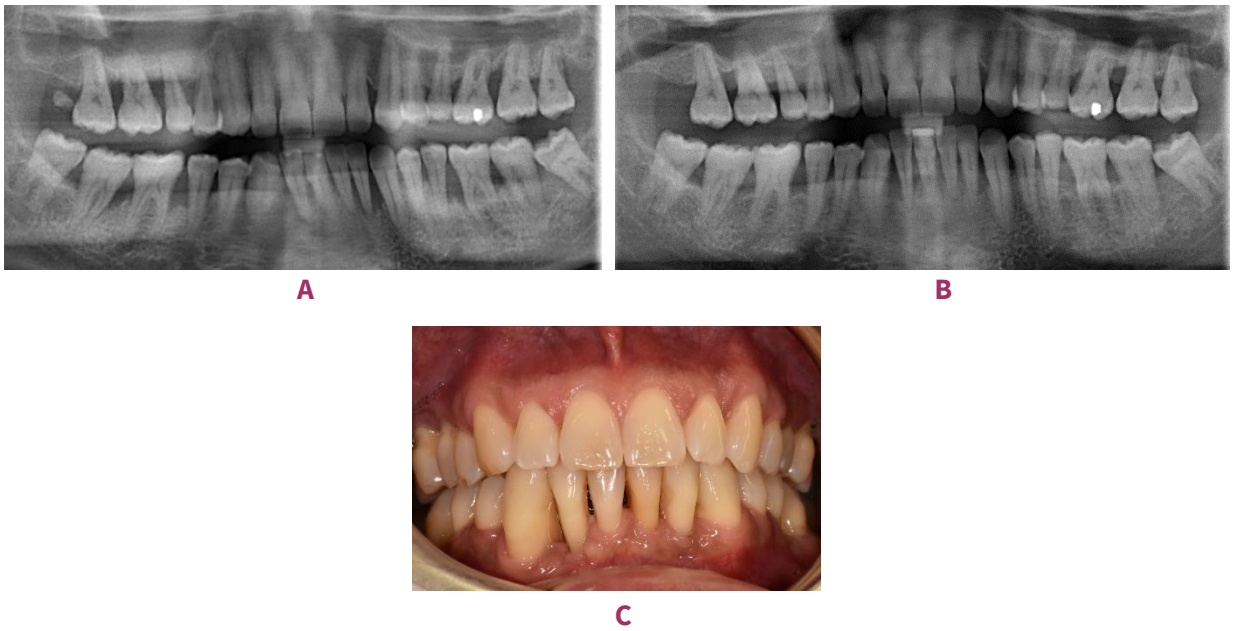
Low certainty evidence suggests that, for patients who are moving from active therapy to maintenance, regular recall appointments (e.g. three monthly) at the beginning of periodontal maintenance are beneficial, with the ongoing recall interval tailored to the patient's clinical and behavioural circumstances.[31,107-109]

Accordingly, recall intervals based on an assessment of the patient's risk for disease progression are recommended by both the *BSP implementation of European S3 - level evidence-based treatment guidelines for stage I-III periodontitis in UK clinical practice* (**BSP-S3**) guideline[6] and the *Treatment of stage IV periodontitis: The EFP S3 level clinical practice guideline* (**EFP-S3**).[9]

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

The status of a previously stable patient during periodontal maintenance can change and deteriorate due to changes in general health (e.g. development of diabetes) or changes in other risk factors (e.g. stress level or smoking status). Therefore, at each recall visit a fresh assessment of the patient's periodontal status and risk level, taking these factors into account, should be used to determine the next recall interval (see figure 7.2).

Figure 7.2 Supportive periodontal care



A B C

Image A shows a baseline radiograph for a 40-year old patient with Stage IV periodontitis. Image B shows a radiograph following 5 years of non-surgical treatment and supportive therapy. Note the bone healing, particularly in the lower right quadrant. Image C shows a clinical view of this patient at 5 years. Despite the extensive recession in the lower anterior region, there is no gingival inflammation and the level of oral hygiene is excellent. This patient had been a smoker at initial presentation and managed to successfully quit.

7.3.2 Components of supportive periodontal care for patients with a diagnosis of periodontitis

KEY RECOMMENDATION

For patients with a diagnosis of periodontitis who have completed active periodontal therapy, provide a comprehensive regime of supportive periodontal care that comprises updating patient histories, assessment of risk factor control, oral tissues and care needs, and treatment, where necessary.

(Strong recommendation; low certainty evidence)

Low certainty evidence, based on observational studies, suggests that a regime of supportive periodontal care that includes regular professional mechanical plaque removal (PMPR) is effective in maintaining periodontal stability.[108] Accordingly, the **BSP-S3** guideline suggests performing PMPR as part of a maintenance programme, to limit the rate of tooth loss and provide periodontal stability/improvement. The **BSP-S3** and **EFP-S3** guidelines, along with the *Delivering Better Oral Health* (**DBOH**) toolkit,[7] also give advice on the typical components of a programme of supportive periodontal care.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

In patients who have previously received treatment for periodontitis, a comprehensive supportive periodontal care appointment should include assessment and treatment as follows:

- For patients who are moving from active treatment to maintenance, schedule regular supportive care appointments, for example at three month intervals, to gauge the ongoing control of the patient's disease status.
- Update the patient's medical and social history and assess the patient's control of modifiable risk factors (e.g. plaque control, smoking status, HbA1c levels).
- Carry out an oral examination that includes assessment of plaque biofilm and calculus deposits and periodontal heath status (i.e. level of inflammation, probing depths and bleeding on probing).
- Ensure that a full mouth periodontal assessment is performed at least annually (see Section 2.4.1).
- Review personal oral hygiene and, where necessary, provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Where applicable, give advice on control of modifiable risk factors (see Section 5.1.1).
- Discuss the findings of the clinical examination with the patient and agree on next steps related to the clinical status at the time of examination.
    - This may include timing for the next supportive care visit, re-treatment of sites that have deteriorated or referral for specialist care.
- Carry out supra- and subgingival PMPR, where required, using an appropriate method.
    - For example, remove supra- and subgingival plaque biofilm and calculus at sites ≥4 mm with subgingival deposits or sites that bleed on probing.
- Correct local plaque retentive factors - for example, remove overhanging restorations or alter denture design.
- Assess the patient's risk for disease progression (see Section 2.5 and Appendix 3), based on their medical history, known risk factors, periodontal status (e.g. degree of residual periodontal pocketing, levels of inflammation, levels of previous disease) along with levels of plaque control, and use this to inform future recall intervals for supportive periodontal care.

7.3.3 Management of disease recurrence in patients with a diagnosis of periodontitis

The main components of supportive periodontal care are continual reassessment of risk factor management and assessment of the patient's periodontal status at each visit. This aims to facilitate early recognition of any problems which may arise and appropriate management. Clinical signs and symptoms related to potential disease recurrence should be monitored and recorded at each recall visit.

For some patients in periodontal maintenance, disease can recur at sites which were previously not active, or disease can develop at new sites. It is important to recognise new or recurrent disease and determine why this has occurred to inform the management of site(s) where disease is present.

New or recurrent disease may be identified during periodontal maintenance by changes in clinical signs (e.g. increased probing pocket depths or bleeding on probing), routine radiographs (i.e. bone levels on bitewings taken for caries prevention) or patient-reported symptoms (e.g. bleeding gums on brushing or interdental cleaning, drifting teeth, pain/swelling, a bad taste, recession or an increase in tooth mobility). If a change in periodontal status is recognised, the reasons for this should be determined to inform management of the problem.

Many factors can contribute to periodontal deterioration during maintenance; these can be patient-related or related to the clinical care they have received.

Examples of patient-related factors include:

- changes in risk profile, which can be local (e.g. teeth have been removed or interdental spaces have developed) or systemic (e.g. a diagnosis of diabetes);
- change in habits (e.g. smoking, level of home care);
- change in cognitive level or skill;
- change in attendance pattern (e.g. longer than advised interval between recalls or non-attendance for recall).

Examples of clinical factors include:

- disease which was not previously recognised;
- disease which was inadequately or sub-optimally treated before patient entered maintenance;
- oral hygiene instruction from the clinical team which has been misunderstood or not delivered in a way the patient can understand;
- a completely different pathology which may be contributing to breakdown at an existing site (e.g. a root fracture, endo-perio lesion).

Once the reasons for periodontal deterioration are understood, active treatment which is tailored to address the causes can be provided. This may focus on:

- risk factor control (see Sections 5.1.1 and 5.1.2);
- improving oral hygiene (see Section 5.1.3);
- delivering more effective PMPR (see Section 5.2); this may involve detection of residual calculus on root surfaces, use of suitable, high-quality instruments, sufficient time to deliver care and developing PMPR skills.

Note that there is a lack of evidence to support the use of local antiseptics, local antimicrobials and systemic antibiotics in the routine management of periodontal relapse and these interventions are not recommended (see Section 5.2.3).

If attempts to resolve the disease recurrence are unsuccessful, various management options can be considered. For example:

- If the patient is not engaged, discuss this with the patient, outline the possible consequences and continue to provide maintenance care at a more frequent recall interval;
- If the patient is engaged, consider providing additional round(s) of treatment;
- If the patient is engaged but the periodontal situation cannot be sufficiently controlled in primary care, consider referral.

In situations where referral is not possible, or is not desired by the patient, the situation should be recorded in the clinical record and the options for treatment available within primary care should be discussed with the patient. It is important that the patient is aware that this course of action may not be ideal, but it may to some extent control periodontal breakdown.

In some situations, reoccurrence of disease during maintenance care is an indicator that a tooth/teeth may not be retainable in the long term (see Section 4.2). If this is the case, the clinician and patient should discuss and agree the ongoing treatment plan, which might involve seeking a second opinion from a colleague. Note that many teeth of initially poor prognosis can be retained for long periods of time with the appropriate treatment (see Section 4.2).

For patients who relapse or develop new disease during periodontal maintenance:

- Determine the cause of the periodontal deterioration, for example:
  - Change in risk factors (e.g. the patient has started smoking or has developed diabetes);
  - Continued presence of calculus or plaque biofilm on root surfaces;
  - Changes leading to inadequate oral hygiene (e.g. changes in manual skills or frequency of home care);
  - Changes in attendance (e.g. longer intervals between recall visits for maintenance or failure to attend for maintenance care).
- Address the cause of the periodontal deterioration by providing relevant treatment/care related to that cause (see Section 5).
  - Adjustments to the way oral hygiene instruction/coaching, sub-gingival PMPR or other relevant interventions are delivered may be required to achieve optimal outcomes.
- Arrange review based on the severity of disease or the risk of further periodontal deterioration.
- If no improvement is observed at review, consider whether additional treatment is likely to be beneficial or whether referral to secondary care should be considered.
  - If referral is not an option, provide ongoing support to the patient, which may include continued discussion regarding risk factor control, advice and coaching regarding home

care, repeated PMPR or the shortening of recall visits to allow for more regular or frequent professional interventions.

- If a tooth or teeth do not appear retainable in the long term, discuss with the patient the available options and agree a treatment plan.
  - Consider seeking a second opinion from a colleague.

7.3.4 Management of patients who need additional support

Patients who may need additional support include those with additional care needs (i.e. adults aged 16-64 who require support with daily oral care as a result of a physical, cognitive, medical or mental health condition) and frail and/or dependent older people.

Patients with additional care needs can face many barriers to good oral health. They may be more susceptible to disease development or face challenges with access to treatment, the provision of treatment and long term maintenance. Management can also be challenging as a result of specific medical or behavioural issues, which may affect their ability to cope with dental treatment or which make dental treatment more difficult. In addition, these patients may depend on support from carers to maintain their oral health.

The main issues related to periodontal care in patients with additional care needs are maintenance of oral hygiene and access to PMPR. *Open Wide* is NHS Scotland's oral health improvement programme for adults with additional care needs and provides further information to support oral hygiene for these individuals.

Ongoing and long-term maintenance care inevitably involves caring for patients as they age. Patients can develop new co-morbidities and may also lose some of the manual and cognitive skills needed to maintain their dentition. A healthy, comfortable, and aesthetic mouth and dentition is needed to support adequate nutrition, general health and well-being in older patients. The Public Health Scotland publication *Caring for Smiles* provides greater detail on how to support the oral hygiene of dependent older people.

The main issues related to periodontal care in older patients are maintenance of oral hygiene, access to PMPR and the management of tooth loss. The wider management of tooth loss is beyond the scope of this guidance. However dentures, bridges and implants can be successfully provided for older adults and improve not only their oral function but also their nutritional levels and sense of well-being.

Oral hygiene

Oral hygiene measures may deteriorate in older age because of loss of manual skill, a change in levels of cognition or dependence on a carer for oral care. Patients with additional care needs can also find it difficult to perform effective oral hygiene and may rely on others for help with self-care. Measures which address these factors include:

- adaptation of existing oral hygiene aids (e.g. alterations to handles of toothbrushes to make them easier to hold);

- using different tools to clean teeth (e.g. electric toothbrushes rather than manual);
- supporting carers to learn the skills necessary to clean someone else's teeth and mouth.

In addition, the use of high fluoride toothpaste can be considered to help prevent the development of caries. Toothpastes which are free of foaming agents and flavours may be useful for those with sensitive oral mucosa or who dislike strong flavours and those with swallowing difficulties or who are at risk of aspiration.

Detailed advice regarding care of older people, particularly those living in care homes, is available at *Caring for Smiles*.

Advice regarding care of adults with additional care needs is available at *Open Wide*.

PMPR

For patients where oral hygiene is difficult, significant calculus deposits may build up and will need to be removed. PMPR can be challenging to deliver in some cases due to difficulties in accessing the dental surgery, patients being unable to sit or lie back in a dental chair for treatment, limited mouth opening or limited ability to cope with treatment. While recognising these limitations, it is important to attempt to provide treatment where possible that aims to remove calculus and plaque biofilm to support dental health.

Adaptations which may be helpful include providing domiciliary care, treating patients sitting up in the dental chair, using hand instruments rather than powered scalers and allowing time for the patient to rest intermittently during care. In some situations, it may be necessary to consider referral to assess whether sedation or general anaesthetic is indicated to allow delivery of more complex care or where the patient is not able to cooperate.

For patients who need additional support:

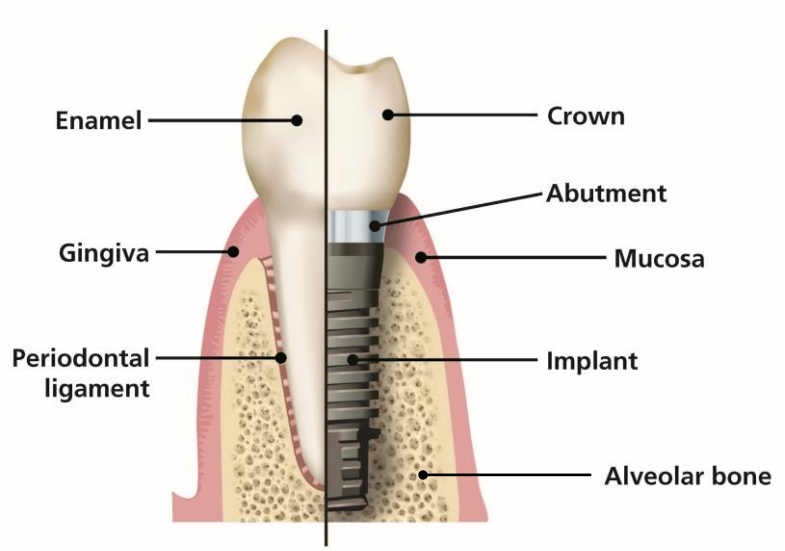
- Provide long term maintenance care that focuses on maintaining a healthy, intact periodontium to support oral comfort, function, health and aesthetics.
  - Note that adaptations may be required to oral hygiene practices to enable the patient or carer to maintain oral hygiene at as high a standard as is possible (e.g. alterations to brush handles, powered toothbrushes).
- If the patient's oral care is provided by a carer, encourage and support them to learn the skills required to clean the patient's teeth (see *Caring for Smiles* and *Open Wide*).
- Carry out supra- and subgingival PMPR, where required and possible, using an appropriate method.
  - Note that adaptations in delivery may be required (e.g. using hand instruments rather than powered scalers; providing treatment while the patient is sitting up).

8 Management of patients with dental implants

There are several treatment options when patients lose teeth; these include dental implants and the more conventional options of fixed bridgework, dentures or leaving the space unrestored.

Dental implants are surgical, titanium, screw-like devices placed directly into bone either immediately after a tooth is extracted or after bone has healed. After placement, bone grows directly onto the titanium surface and leads to osseointegration of the implant. In most cases, once this process is complete the implant is loaded, by attaching a restoration to it, and the implant/restoration combination will function much like a natural tooth. In some selected cases, implants are loaded immediately after placement. The principal difference between a tooth and an implant is that between tooth and bone there is a periodontal ligament whereas there is a direct connection between an implant and bone (as shown in figure 8.1).

Figure 8.1 Anatomical differences between tooth and implant.



Like teeth, implants are susceptible to the effects of bacterial plaque and calculus formation, leading to an inflammatory response in the peri-implant tissues, either superficially in the mucosa or more deeply in the bone. Peri-implant tissues can also become inflamed in response to the presence of a foreign body, such as excess residual cement which may be present if an implant restoration is cemented rather than screwed in place.

Peri-implant disease is known to be multi-factorial and both biological and non-biological factors increase the risk of the disease and implant loss. The reported prevalence of peri-implant disease is variable, mainly due to the variation in definitions of the disease used in different studies but is estimated to affect approximately 20% of patients and 11.5% of implants overall.[110]

8.1 Risk factors for peri-implant disease in patients with periodontitis

KEY RECOMMENDATION

For patients with a diagnosis of periodontitis who are considering dental implants, ensure they are aware that they are at increased risk of peri-implant disease.
(Strong recommendation; low certainty evidence)

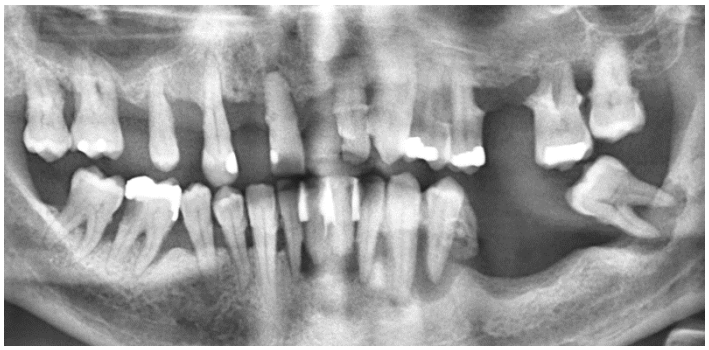
Low certainty evidence, based on observational studies, suggests that patients with a history of periodontitis have a higher risk of developing peri-implant disease.[111-114] Accordingly, the *EFP Treatment of stage IV periodontitis* guideline[9] includes a strong recommendation that when dental implants are considered in the rehabilitation of patients with stage IV periodontitis, information on the increased risk for peri-implantitis and implant loss should be provided.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Patients who have active periodontal disease or a history of periodontitis present specific challenges when implants are being considered, when they are placed and after they are restored. The risk of development of peri-implant diseases, along with the prognosis of any remaining teeth and the dentition overall, should be considered for each individual patient during the planning phase (see figure 8.2 and Section 4.2). In addition to periodontitis, patient-related risk factors[112,114-116] to be considered during treatment planning include:

- smoking;
- diabetes;
- the likelihood of further tooth loss;
- lack of adherence to maintenance care;
- inadequate oral hygiene.

Figure 8.2 Peri-implant disease risk

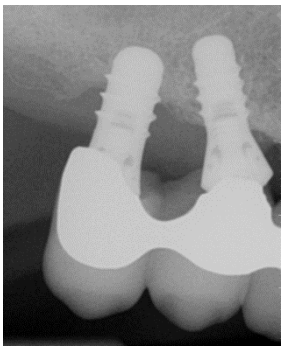


Irregularly attending patient who requested dental implants. The patient had generalised Stage IV periodontitis, caries in tooth 46 and gross calculus on all teeth and was high risk for peri-implant disease and implant failure.

Factors related to the implant/prosthesis design and placement can also influence the risk of peri-implant disease (see figure 8.3). However, aspects of surgical and prosthodontic planning, implant

design, surgical implant placement and restoration are beyond the scope of this guidance and are not discussed in detail.*

Figure 8.3 Peri-implantitis in presence of poorly fitting restoration



Peri-implant bone loss around implants with poorly fitted and poorly seated crowns.

When considering dental implants, the patient should be made aware of any risk factors which may increase the risk of peri-implant disease and, where possible, these should be mitigated before implant treatment commences.

For patients with a diagnosis of periodontitis who are considering dental implants:

- Inform patients of their increased risk of peri-implant disease and how this can be mitigated.
- Advise patients of the need for increased maintenance care and vigilance post implant-placement.
- Control risk factors and active disease, including periodontitis, before implant placement, where possible.
- If responsible for designing the restoration, ensure the superstructure design allows for ease of access for oral hygiene, and also inspection of peri implant tissues to allow detection of inflammation at an early stage.

See Sections 2 and 3 for further information on assessment and risk factors related to periodontal disease.

*These include iatrogenic factors such as incorrect surgical technique, incorrect positioning of the implant and foreign body reaction. In addition, aspects of the restoration which make oral hygiene and maintenance around the implants more difficult will contribute to an increased risk of peri-implant inflammation.

8.2 Managing increased risks of peri-implant disease in patients with periodontitis

KEY RECOMMENDATION

Prior to placing implants in patients with a diagnosis of periodontitis, stabilise any periodontal disease around teeth which are to be retained, address modifiable risk factors (e.g. inadequate oral hygiene, smoking, systemic disease) and explain the need for ongoing periodontal and implant maintenance care after placement to reduce the risk of peri-implant disease.

(Strong recommendation; low certainty evidence)

There is a lack of direct evidence related to interventions to address factors related to a higher risk of developing peri-implant disease prior to implant placement. However, indirect evidence relating to post-placement maintenance care suggests that addressing risk factors is beneficial, both in terms of preventing peri-implant disease and promoting implant survival.[117-119] In addition, principles of treatment planning dictate that advanced treatments should not be provided until any current disease is under control. The evidence is considered low certainty due to risk of bias, indirectness and the observational nature of some studies. However, this guidance includes a strong recommendation in favour of the intervention because of the potential increased risk of peri-implant disease and implant loss if any current disease or risk factors are not addressed prior to implant placement.

For all patients considering dental implant therapy, a periodontal examination is essential during the treatment planning phase to determine the periodontal status of the patient (see Section 2). This will allow any existing periodontal disease to be identified and treated prior to implant placement. It will also ensure that patients can be informed of their increased risk of peri-implant disease and the need for additional ongoing maintenance care post-placement. The EFP *Prevention and treatment of peri-implant diseases* guideline[10] recommends thorough assessment of the patient's risk profile to identify and manage modifiable risk factors prior to implant placement. This is described as primordial prevention. It also recommends treatment of any existing gingivitis and/or periodontitis to a stable endpoint prior to implant placement and adherence to a supportive care programme afterwards.

Guidance from the Royal College of Surgeons of England[120] states that patients with a history of periodontitis should have the disease treated and stabilised for at least six months prior to the start of the implant treatment. The *EFP Treatment of stage IV periodontitis* guideline[9] does not specify a time limit between stabilisation of disease and proceeding to rehabilitation.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

Treatment and control of periodontal disease prior to implant planning, placement and restoration:

- reduces the risk of peri-implant disease in those at higher risk;
- helps the clinician to more predictably assess patient response and likely prognosis of remaining teeth;
- gives the patient time to acquire skills in oral hygiene;
- supports the clinician in providing a restoration with a good long-term prognosis.

For those patients who have had extensive disease, planning should incorporate a view on prognosis (see Section 4.2) and retention or extraction of other teeth in the mouth and consideration of any special challenges due to bone loss at potential implant sites which may complicate surgery. In some cases, referral to a practitioner or team with enhanced or specialist skills may be appropriate.

In patients with a diagnosis of periodontitis who are considering dental implant(s):

- Discuss the risk of peri-implant disease with the patient and explain that they are at higher risk of complications due to their history of periodontal disease.
- Explain to the patient that after the implant(s) is placed, there will be an ongoing, lifelong need for both periodontal and implant maintenance care to reduce the risk of peri-implant disease.
- Provide non-surgical (and if necessary surgical) treatment to control any active periodontal disease around teeth which are to be retained.
    - Address modifiable risk factors, such as inadequate oral hygiene, smoking, and systemic disease (e.g. diabetes), before implant placement, where possible.
- If the patient is referred externally for placement of the implant(s) (and restoration, if applicable), ensure that there is communication with the external team regarding the patient's periodontal condition and the status of modifiable risk factors.
- Prior to implant placement, ensure plans for ongoing maintenance care after placement are in place to prevent, and if necessary monitor, peri-implant inflammation.

8.3 General care of dental implants

Bone remodelling around the head of the implant occurs following placement and restoration. After the adaptive phase, bone levels in stable patients enter a steady state where crestal bone loss of no more than 0.2 mm annually should be expected.[121] If osseointegration is successful, implant loss is rare and, with effective personal and professional maintenance, most patients can hope to retain their implants for many years.

As with teeth in the natural dentition and control of periodontal diseases, effective self-performed oral hygiene and regular monitoring of the peri-implant tissues are key to the prevention of peri-implant disease. The complexity of the restoration and the presence of risk factors will influence the level of maintenance required.

Regular review and maintenance of implants enables the clinician to:

- prevent inflammation developing around an implant;
- identify any problems at an early stage, when treatment is more straightforward;
- provide support for the restorative aspects of the prosthesis;
- enhance the overall longevity of the implant and prosthesis.

KEY RECOMMENDATION

For patients with dental implants, provide implant-specific maintenance care to reduce the risk of peri-implant disease.

(Strong recommendation; low certainty evidence)

Current evidence suggests that provision of implant-specific maintenance care results in increased implant survival rates and is more effective at preventing peri-implant disease (primary prevention) compared to no maintenance care.[117,118] The certainty of the evidence is considered to be low due to the observational nature of most of the included studies. However, this guidance includes a strong recommendation in favour of the intervention because of the increased risk of peri-implant disease and implant loss if implant-specific maintenance care is not provided. In addition, regular monitoring of a patient's oral health status, with treatment provided where required, is standard practice.

The *Delivering Better Oral Health* (**DBOH**) toolkit[7] states that implants should be monitored regularly, with soft tissue health checked both visually and by probing. It suggests monitoring of plaque, inflammation, probing depths (compared to baseline measurements), checking for bleeding and the presence of pus, and removal of supra- and submucosal plaque and calculus from the implant surfaces and restoration. **DBOH** also suggests the recall interval for maintenance care should be based on the peri-implant and periodontal status of the patient. The EFP *Prevention and treatment of peri-implant diseases* guideline[10] recommends that patients should be informed of the importance of effective home care and adhering to supportive peri-implant care to reduce the risk of peri-implant diseases. It also recommends that the dental team provides regular supportive peri-implant care. Glycaemic control, smoking cessation and oral hygiene interventions are also recommended, where appropriate.

As part of the ongoing care of implants, radiographs are used to monitor bone stability over time. A periapical radiograph aligned using the long cone paralleling technique should be taken at the time of superstructure connection. A further periapical radiograph, aligned using the long cone paralleling technique, should be taken at one year following this as a baseline for monitoring future changes in the bone level. Routine radiographic monitoring is not required unless there are clinical signs of infection and inflammation.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

8.3.1 Examining the peri-implant tissues

Oral hygiene

Inadequate oral hygiene around an implant and its restoration can contribute to inflammation and peri-implant problems.[115] Some fixed restorations are extremely challenging to assess and to clean for both clinician and patient. Reduced manual dexterity in older patients may also contribute to increased plaque retention around a restoration. In these cases, personalised oral hygiene instruction will be required and increased frequency of maintenance support to counter the increased risk should be considered.

Probing

The tissues surrounding implants are not connected to the implant surface in the same way as those surrounding teeth and are less resistant to probing (see figure 8.1). In addition, the depth of the crevice around implants is variable and dependent on the depth of placement of an implant and the thickness of the overlying tissues. Therefore, the probing depth around healthy implants can be variable.

The EFP *Prevention and treatment of peri-implant diseases* guideline[10] recommends assessment of peri-implant health at each clinical examination, including assessment of probing depths and bleeding on probing (see figure 8.4).

Figure 8.4 Probing around implants

Clinical image showing healthy peri-implant tissue around the implant at 11 and bleeding on probing around the implant at 21.

When examining the peri-implant tissues, gentle probing pressure is advised and probing depth, if recorded, should be measured from a fixed landmark. A marked increase in probing depth from baseline fixed points, together with suppuration and bleeding, suggests the presence of peri-implant inflammation and infection. In the absence of progressive bone loss, these signs indicate peri-implant mucositis. If progressive bone loss is present, then a diagnosis of peri-implantitis can be made.

Although plastic probes are available (see figure 8.5), there is no evidence that the use of metal probes is detrimental to the tissues around the superstructure or implant.

It is not appropriate to apply the Basic Periodontal Examination (BPE) for the assessment of implants.

Figure 8.5 Implant probe

Plastic graduated probe suitable for probing around dental implants.

Calculus

Supramucosal calculus is more common around implants than submucosal calculus and this is generally easier to remove than the calculus attached to teeth. However, if the implant threads are exposed, plaque biofilm and calculus removal from them can be difficult. Soft supramucosal deposits can be removed using a rubber cup and an implant-specific prophylactic paste or an air polisher and glycine powder. Calculus should be removed using standard techniques while making every effort to minimise damage to the restoration and implant surface.

Although non-metal curettes and tips for sonic and/or ultrasonic instruments are available, the use of metallic instruments or tips is not contra-indicated and their use is not detrimental to the tissues around the superstructures or implants when used correctly.

Radiographs

The clinical team placing the implant should provide a radiograph which shows bone levels around the implant at the time the superstructure is connected. The clinical team responsible for maintenance should take a new periapical radiograph, using the long cone paralleling technique, showing the bone crest around the implant one year later. This radiograph obtained at one year, when compared to the radiograph at superstructure connection, will show the degree of adaptive remodelling. A stable landmark, such as the implant shoulder or implant threads, on the one year radiograph becomes the baseline from which bone loss around the implant can be monitored in the long term.

If a patient presents to a new clinical team with no radiographic record, the clinical team should initially try to obtain baseline radiographs, with the patient's consent. If this is not possible, then radiographic assessment of the implant(s) should be performed.

8.3.2 Examining a patient for the first time after implant placement and restoration

In many cases, patients are referred externally for implant placement and restoration and will return to primary care post-treatment. Details of the implant and its restoration, and post-placement radiographs should be supplied by the clinical team who carried out the treatment. The primary care team will often be responsible for implant monitoring and maintenance. When the patient is seen in primary care for the first time after implant placement and restoration, it is important that the peri-implant tissues are examined and the findings recorded to establish baseline conditions. This will allow monitoring and maintenance of the implant and its restoration in the long term.

The EFP *Prevention and treatment of peri-implant diseases* guideline[10] recommends baseline probing within 3 months of prosthesis delivery and advises that a baseline intra-oral radiograph be obtained at the completion of physiological remodelling to document marginal bone levels.

When a patient is seen for the first time after implant placement and restoration:

- Assess the cleansability of the superstructure and consider replacement or modification of the restoration if it is not readily accessible for personal and professional plaque removal.
- Visually assess the soft tissue health and the presence or absence of inflammation around the implant.

- Probe around the implant, and restoration if it is fixed, to determine:
  - the presence of bleeding on probing and/or suppuration;
  - the presence of excess residual cement;
  - the presence of submucosal plaque and calculus deposits.

  Note that topical or local anaesthetic can be used if probing around an implant is painful.
- Measure and record peri-implant probing depths, at four to six sites around the implant where possible, using fixed landmarks.

  N.B. The BPE is not appropriate for the assessment of dental implants.
- Review personal oral hygiene and, where necessary, provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Encourage the use of oral hygiene aids such as implant floss and interdental brushes. Where applicable, give smoking cessation advice (see Section 5.1.1: Smoking cessation).
- Ensure that a baseline periapical radiograph of the implant, aligned using the long cone paralleling technique, is obtained (e.g. at one year after superstructure connection).
  - Position the x-ray head perpendicular to the long axis of the implant; this may be at a different angle to adjacent teeth.
  - Identify a stable landmark, for example, the implant shoulder or implant threads, to enable comparison of bone levels over time.
- Assess the patient's risk for disease progression (see Appendix 3), based on their medical history, known risk factors, periodontal status along with levels of plaque control, and use this to inform future recall intervals.

8.3.3 Recall and ongoing maintenance care

If the primary care team is responsible for ongoing maintenance care of the implant and its restoration, a suitable recall interval should be established. This should be based on their initial findings (see Section 8.3.2), any specific directions from the clinical team who placed the implant, and should take into account the needs and wishes of the patient.

Recall appointments should be scheduled at least annually for all patients with implants. However, those with specific risk factors, such as smoking, sub-optimally controlled diabetes, those with complex restorations which are hard to clean or those with additional needs may require to be seen more often. Patients with a history of periodontitis may be more susceptible to peri-implant disease and the recall interval for maintenance care should be scheduled to reflect this.

Implant-specific monitoring and maintenance should be carried out at each recall visit as detailed below:

- Assess the level of oral hygiene around an implant supported restoration.
  - Visually assess the soft tissue health and the presence or absence of inflammation around the implant.
- Probe around the implant, and restoration if it is fixed, to determine:
  - the presence of bleeding on probing and/or suppuration;
  - the presence of excess residual cement;
  - the presence of submucosal plaque and calculus deposits.

  Note that topical or local anaesthetic can be used if probing around an implant is painful.
- Measure and record peri-implant probing depths, at four to six sites around the implant where possible, using fixed landmarks, and compare to baseline measurements.

  N.B. The BPE is not appropriate for the assessment of dental implants.
- Review personal oral hygiene and, where necessary, provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Encourage the use of implant-specific oral hygiene aids such as implant floss and interdental brushes.
- Where applicable, give smoking cessation advice (see Section 5.1.1: Smoking cessation).
- Remove supramucosal and submucosal plaque and calculus deposits, where present, using an appropriate method. Remove submucosal excess residual cement, when possible, if this is detected. Use this opportunity to highlight to the patient areas where supramucosal deposits are detected.
  - Supra- and submucosal deposits can be removed using conventional instruments. Additional training may be required.
- When clinically indicated (e.g. where there is evidence of inflammation around the implant), perform radiographic examination of the implant to assess bone levels, using periapical radiographs taken using the long cone paralleling technique.
  - Routine radiographic assessment of implants is not recommended.
- Assess the patient's risk for disease progression (see Appendix 3), based on their medical history, known risk factors, periodontal status (e.g. degree of residual periodontal pocketing, levels of inflammation, levels of previous disease) along with levels of plaque control, and use this to inform future recall intervals for maintenance care.

8.4 Implant-specific oral hygiene methods

It is important that the patient is aware that effective oral hygiene is critical in ensuring tissue health and the longevity of an implant.

The clinical team should determine what interdental aid is most suitable for use around any particular implant. This will be dependent on soft tissue contour around the restoration and access to the peri-implant margins. The patient should be encouraged to use an effective but atraumatic technique to avoid soft tissue injury. For example, stress that patients should use a gentle flossing technique and that the floss should not be forced below the peri-implant mucosal margin.

If used, interdental brushes should fit snugly into the interdental space without the wire rubbing against the superstructure or adjacent tooth (note that plastic coated interdental brushes are available). Rechargeable powered toothbrushes may be useful for any patient who cannot clean effectively with a manual brush.

Patients with a single implant crown can be encouraged to treat the implant as they would their natural dentition and to clean it with a toothbrush, interdental brushes, dental floss and implant floss.

Patients with an implant-supported bridge or denture will require personalised training in oral hygiene techniques, such as the use of interdental brushes, single tufted brushes, dental floss and implant floss, in addition to toothbrushing at the cervical/mucosal edge of the restoration, to clean these prostheses (see figure 8.6).

Figure 8.6 Implant-specific oral hygiene methods

A **B**

Image A shows cross-over flossing of an implant supported denture. Image B shows the use of an interdental brush to clean an implant-supported denture.

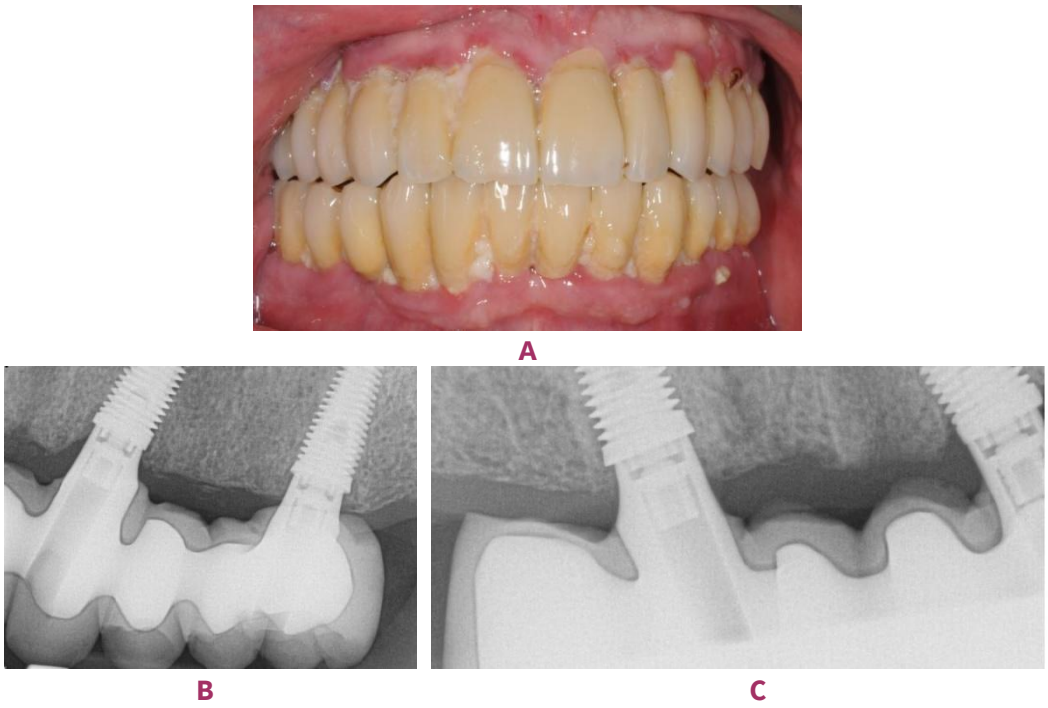
Note that there is very limited evidence[122] that rough, exposed dental implant threads can cause dental floss or implant floss to shed. Remnants of these may act as a foreign body and have been implicated in an increased risk of peri-implant disease. Therefore, patients with exposed dental implant threads should be advised to use interdental brushes to clean around the affected implant.

8.5 Treatment of peri-implant mucositis

Peri-implant mucositis is mucosal inflammation in the absence of marginal peri-implant bone loss beyond crestal bone level changes resulting from initial bone remodelling.[10,123] Clinical signs include redness, swelling, bleeding on gentle probing at more than one site around the implant, and suppuration (see figure 8.7).

The goals of treatment are to achieve bleeding on probing at ≤1 site (bleeding should not be profuse) and absence of suppuration around the affected implant at 2-3 months after treatment.[10]

Figure 8.7 Peri-implant mucositis



A

B C

A: Patient with full upper and lower arch restorations and peri-implant mucositis. Radiographs B and C show no bone loss around the implants.

KEY RECOMMENDATIONS

For patients with peri-implant mucositis, the routine use of adjunctive or alternative measures to professional mechanical plaque removal is not recommended.
(Conditional recommendation; low certainty evidence)

The routine use of local or systemic antibiotics for the treatment of peri-implant mucositis in primary care is not recommended.
(Conditional recommendation; low certainty evidence)

A recent consensus statement from the World Dental Federation noted that conventional non-surgical professional mechanical plaque removal (PMPR), in conjunction with oral hygiene reinforcement, is the standard treatment for peri-implant mucositis.[124] Evidence suggests that specific alternative or adjunctive therapies, such as antiseptics, antibiotics or treatment using lasers, do not significantly

improve clinical outcomes when compared with PMPR alone.[125-128] The certainty of the evidence is considered to be low due to risk of bias and inconsistency.

In addition, the EFP *Prevention and treatment of peri-implant diseases* guideline[10] recommends PMPR in combination with oral hygiene re-enforcement for the management of peri-implant mucositis. PMPR can be performed with ultrasonic or air polishing devices or with hand instruments. Short term use of patient-administered oral antiseptic rinses can be considered. The guideline does not recommend combining modes of PMPR or using lasers in combination with conventional PMPR. It also does not recommend the use of systemic or locally administered antibiotics as adjuncts to PMPR. It suggests not to use professionally administered local agents (e.g. antiseptics) or photodynamic therapy as adjuncts to PMPR.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

If soft tissue inflammation is present:

- Exclude the presence of peri-implantitis by carrying out a radiographic examination of the implant to assess peri-implant bone levels compared with the baseline radiograph.
  - Periapical radiographs, taken using the long cone paralleling technique, are appropriate for assessing peri-implant bone levels.
  - If bone loss is observed, refer to Section 8.6 (Treatment of peri-implantitis).
- Check the restoration contour to ensure that patient performed oral hygiene is possible.
  - If the restoration does not allow access for home care, consider whether it is possible to recontour or replace the restoration to allow adequate oral hygiene.
- Check for the presence of retained cement around the restoration.
- Inform the patient of their diagnosis and any associated factors that increase their risk of disease.
- Provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
- Encourage the use of implant-specific oral hygiene aids such as implant floss and interdental brushes.
- Where applicable, give smoking cessation advice and support (see Section 5.1.1: Smoking cessation).
- Carry out professional mechanical plaque removal of the restoration and implant surface.
  - Remove supramucosal and submucosal plaque and calculus and any retained cement using an appropriate method. Local anaesthesia may be required.
- Arrange a review appointment after 1-2 months to assess the outcome of treatment.

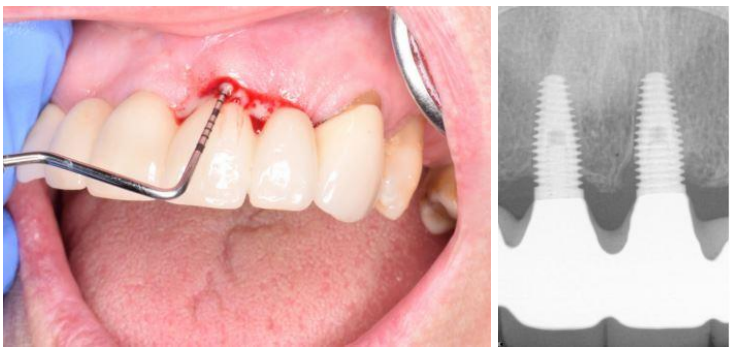
- If inflammation is still present, repeat non-surgical treatment and:
  - Arrange review at 3 months;
  - Consider further radiographic assessment at 3-6 months to review bone levels.
- Ensure regular, risk-based recall for maintenance of the implants and their restorations is arranged.

8.6 Treatment of peri-implantitis

Peri-implantitis is defined as a pathological condition occurring in tissues around dental implants, characterized by inflammation in the peri-implant mucosa and progressive loss of supporting bone.[114] The tissues will appear red and swollen, bleed on gentle palpation or probing and there may be suppuration (see figure 8.8). Soft tissue inflammation is detected by probing (bleeding on probing indicates the presence of inflammation), while progressive bone loss is identified on radiographs. Recession of the surrounding mucosa can occur, exposing the implant threads. Peri-implantitis can progress rapidly. The patient may also experience pain around the implant. However, this usually only occurs during episodes of acute infection.

The goals of treatment are residual peri-implant probing depths of ≤5 mm, BOP at ≤1 site (bleeding should not be profuse) and absence of suppuration around the affected implant.[10]

Figure 8.8 Failed implant with peri-implantitis



A B

Clinical (A) and radiographic (B) images showing peri-implant inflammation and bone loss in a patient with peri-implantitis.

KEY RECOMMENDATIONS

For patients with peri-implantitis, the routine use of adjunctive or alternative measures to professional mechanical plaque removal is not recommended.
(Conditional recommendation; low certainty evidence)

The routine use of local or systemic antibiotics for the treatment of peri-implantitis primary care is not recommended.
(Conditional recommendation; low certainty evidence)

A consensus statement from the World Dental Federation noted that conventional non-surgical professional mechanical plaque removal (PMPR) may result in short-term improvements in inflammatory parameters but is unlikely to resolve the disease.[124] Evidence suggests that specific alternative or adjunctive therapies, such as antiseptics, antibiotics or treatment using lasers, do not significantly improve clinical outcomes when compared with PMPR alone.[127-133] The certainty of the evidence ranges from moderate to low due to factors such as risk of bias, inconsistency and small study sizes.

Non-surgical interventions to manage peri-implantitis (i.e. the re-establishment of effective self-performed oral hygiene and professional removal of supra- and submucosal plaque biofilm and calculus deposits and excess residual cement) may be helpful in the initial stages of treatment to reduce inflammation and pathogenic microbiota.[124,131]

The EFP *Prevention and treatment of peri-implant diseases* guideline[10] recommends initial non-surgical management. This includes oral hygiene instruction and motivation, risk factor control, prosthesis cleaning/removal/modification (including controlling biofilm retentive factors and evaluation of the components of the prosthesis where required and feasible), and supramucosal and submucosal PMPR around the implant. In addition, where periodontal disease is present elsewhere in the mouth, this should be treated. PMPR around the implant can be performed with ultrasonic or sonic devices or hand instruments. The guideline suggests not to use air polishers, lasers, photodynamic therapy, antiseptic gel or probiotics as monotherapies or as adjuncts to PMPR. Regarding antimicrobial therapy, the guideline does not recommend the use of systemic antibiotics as adjuncts to PMPR and suggests not to use locally administered antimicrobials as an adjunct to PMPR or as a monotherapy.

Further details on the development of the recommendations in this guidance can be found in Appendix 1.

The management of peri-implantitis is difficult and unpredictable and surgical management is often required.* However, even this may not be sufficient to control the disease and in cases where there is progressive bone loss around the implant, implant removal may be a valid management option. Initial non-surgical options around implant-supported restorations can be challenging to deliver and referral to the clinical team which placed the implants, especially where complex restorations are present, may be appropriate if peri-implantitis develops.

It is recognised that referral for management of peri-implantitis may either not be possible (e.g. for example the clinical team that placed the implant cannot provide ongoing maintenance care) or may not be straightforward (e.g. local services to support the patient post-placement may not be available). In these cases, the primary care team is encouraged to provide treatment and support, within their skill mix where possible, and on an ongoing basis.

* While surgical management of peri-implantitis is often indicated, this is beyond the scope of the guidance and specific aspects and techniques will not be discussed here.

If soft tissue inflammation is present:

- Carry out a radiographic examination of the implant using periapical radiographs, taken using the long cone paralleling technique, to evaluate peri-implant bone levels compared with the baseline radiograph.
- If progressing crestal bone loss is detected, refer back to the clinician who placed the implant.
  - Surgical management may be considered in these cases.
- If referral is not possible, consider whether the implant is saveable. For example, 80% bone loss around the implant indicates that it is likely to fail in the short-term.
  - If it is not clear whether the implant is saveable, discuss the situation with the patient and review the options for referral.
- If the implant is saveable, carry out initial non-surgical management.
  - Check the restoration contour to ensure that patient performed oral hygiene is possible. If the restoration does not allow access for home care, consider whether it is possible to recontour or replace the restoration to allow adequate oral hygiene.
  - Check for the presence of retained cement around the restoration.
  - Provide personalised oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
  - Encourage the use of implant-specific oral hygiene aids such as implant floss and interdental brushes.
  - Where applicable, give smoking cessation advice and support (see Section 5.1.1: Smoking cessation).
  - Remove supramucosal and submucosal plaque and calculus and any retained cement using an appropriate method. Local anaesthesia may be required.
    - If access for debridement is difficult, and there are indications not to remove the restoration, consider the use of adjunctive or alternative therapies.
  - Arrange a follow-up appointment after 1-2 months to assess the outcome of treatment. Re-examine the peri-implant tissues. Where there is no improvement or in the presence of acute pain and infection, seek advice from secondary care.
  - If referral to secondary care is not possible and there is persistent inflammation, discuss the situation with the patient, repeat non-surgical management and review the options for referral. In some cases, the only option may be for the primary care team to provide care to control symptoms and superficial inflammation around the implant.
  - If the inflammation has settled, arrange radiographic follow-up in 6-12 months to check crestal bone levels. If bone loss is ongoing, seek advice from secondary care.
  - Ensure regular, risk-based recall for maintenance of the implants and their restorations is arranged.

9 Referral

9.1 Referral criteria

In some cases it may be appropriate to refer a patient to a practitioner with advanced skills, a specialist practitioner or to secondary care for further periodontal care. These cases include patients with severe disease or where the treatment required is complex or complicated by other factors. The British Society of Periodontology has devised guidelines for referral based on three levels of case complexity, based on the 2018 *Classification of Periodontal Diseases*, with provision for modifying factors to be taken into account.[134] Referral centres may also have local guidelines in place which will state the criteria for referrals from primary care.

In general, patients with uncomplicated periodontal diseases (Level 1 Complexity) should be treated in general dental practice. Patients with stage II, III or IV periodontitis (>30% bone loss) and residual true pocketing of 6mm and above (Level 2 Complexity) should receive initial non-surgical treatment (Steps 1 and 2 of therapy) in general dental practice but may be accepted for referral in specific situations. Patients with Grade C or Stage IV periodontitis (bone loss >⅔ root length) and true pocketing of 6 mm or more (Level 3 Complexity) should be referred once lifestyle or behavioural risk factors have been addressed and appropriate non-surgical treatment (Steps 1 and 2 of therapy) undertaken in general practice. For more information see the British Society of Periodontology *BSP Guidelines for Periodontal Patient Referral*.[134]

- Consult any locally produced guidelines and the British Society of Periodontology *BSP Guidelines for Periodontal Patient Referral*[134] to determine if the patient is a suitable candidate for referral.
- In cases where referral is considered, carry out initial therapy (i.e. Steps 1 and 2 of therapy).
  - Provide oral hygiene advice and instruction to assist and encourage the patient to improve their oral hygiene skills as well as their understanding of the value of good self-care routines (see Section 5.1.3).
  - Remove supragingival plaque, calculus and subgingival deposits using an appropriate method and ensure that local plaque retentive factors are corrected.
- Where applicable, give information regarding personal risk factors and modifying them, for example, smoking cessation advice and diabetes control (see Section 5.1.1).

In general, patients accepted for referral for periodontal care are expected to continue to attend their own dental practice for recall examinations and treatment, such as extractions or restorations, and are likely to be referred back for maintenance care.

9.2 Formal referral

- Make referrals formally in writing or via the relevant online referral system and consider sending a copy to the patient. It can also often be helpful to make an initial contact, either by telephone or via a digital triage system, to discuss the case.
- Keep a copy of the referral with the patient's clinical notes.
- Record in the patient's notes the date of the referral and the reason for the referral.
  - Follow up with the referral centre to ensure that the referral request has been received.
- Include in the referral letter:

Referrer details:

- Name of referring General Dental Practitioner;
- Address of referring practice;
- Email address of referring practice;
- Date of referral;
- Telephone number.

Patient details:

- Full forename, surname and title;
- Full postal address including post code;
- Gender;
- Date of birth;
- Age;
- Home telephone and mobile telephone numbers;
- Email address;
- CHI/NHS Number (if known);
- Details of the patient's General Medical Practitioner.

Medical History:

- Medical history, including details of any current medication.

Social History:

- Smoking history;
- Information regarding special/social circumstances (i.e. Is there a family history of periodontal disease? Does the patient have hearing, visual, mental health difficulties or mobility impairment? Is an interpreter needed?).

Clinical Information:

- Diagnosis and classification;
- Reason for referral;
- Details of periodontal treatment previously carried out, including oral hygiene demonstration and PMPR;
- Relevant radiographs* and periodontal charts;
- Clinical images, if available.

* Ensure that radiographs are correctly orientated and labelled, for example by including the patient name, DOB/CHI, date radiograph taken and site in the filename or by ensuring that this information is clearly visible on the image.

9.3 Continuing care of referred patients

Provide supportive periodontal care (Step 4 of therapy) for referred patients who have been discharged after referral.

- Good communication with the referral practitioner and with the patient is vital to ensure the success of the treatment and long-term maintenance.

10 Record keeping

10.1 General principles

Good record keeping underpins the provision of quality patient care. Increasingly, the care of patients is shared among dental team members and between other professionals. Therefore, it is important to practise good record keeping to ensure that all relevant information is available to facilitate the provision of effective, long-term shared care of patients. If records are completed accurately, they will provide a long-term record of the care provided for all of the dental team to access and which is essential for medico-legal reasons.

- Ensure all records are:
  - specific to the patient;
  - accurate;
  - dated;
  - confidential;
  - secure;
  - contemporaneous (recorded at each appointment);
  - comprehensive (note which elements of assessment and treatment have been completed at a given appointment; include positive results and any concerns of the patient or clinician);
  - written in language that can be understood by others to enable effective shared care.

  N.B. Using computerised systems avoids problems with legibility. However, if notes are handwritten, ensure that they can be read and understood by others.
- Do not remove or edit any entries from records.
- Ensure patient data are recorded, processed and stored in accordance with the General Data Protection Regulations (GDPR).

  N.B. Patients have a right under GDPR to access their dental records.

The SDCEP *Practice Support Manual*[15] has additional information on record keeping (e.g. systems and storage of record keeping) and the General Data Protection Regulations (GDPR). The SDCEP *Oral Health Assessment and Review*[135] guidance also covers general principles of record keeping.

10.2 Information specific to periodontal diseases

A significant number of complaints, claims or referrals to the General Dental Council (GDC) are due to allegations of undiagnosed and inappropriately managed periodontitis. Good record keeping is vital to show that each patient has received regular periodontal screening and, where necessary, the further charting, advice, treatment and monitoring appropriate to their level of disease.

The patient's clinical notes should record the diagnosis and classification and any risk factors for periodontal disease that have been identified, as well as more general aspects such as medical and

previous dental histories. A treatment plan, with details of necessary active treatment rather than only periodontal maintenance, is also part of the patient's medico-legal record and it is important that it is individualised and specific to each patient.

Records should include any discussions you have with a patient regarding the nature and extent of their periodontal disease, the significance of risk factors which complicate disease when present, treatment options and likely outcomes. It is also important to gauge the level of understanding of the patient and adjust your communication style and method to suit them.

- For each patient, record:
  - personal details;
  - dental history, including previous dental experience, oral hygiene habits and previous periodontal treatment;
  - medical history, including details of any medications (contact the patient's general medical practitioner if clarification is required) and systemic conditions which may be relevant to periodontal diseases (e.g. diabetes);
  - social history, including smoking status, alcohol consumption and any details of a family history of periodontal disease.
- At each recall appointment, ensure that all details of the patient's history are up to date.
- Record any specific complaints that the patient may have regarding their periodontal health, for example, gums which bleed on brushing or interdental cleaning or teeth which feel loose. Note whether these issues are recent or are recurrent.
- Record the patient's self-reported oral hygiene habits.
- Record the results of the Basic Periodontal Examination and the standard of oral hygiene.

  N.B. If the patient has a BPE score of 3 or 4 or already has a diagnosis of periodontitis, further examination is required.
- For patients who require further periodontal examination (see Section 2.4.1), record probing depths and presence or absence of bleeding on probing from the base of the pocket. Consider also recording:
  - gingival recession;
  - details of any furcation involvement;
  - tooth mobility;
  - plaque and gingivitis charts or indices.

  N.B. All of these parameters should be recorded at baseline when an initial diagnosis of periodontitis is made. Annual review charting is required for all patients with a diagnosis of periodontitis, including those who are stable and have shallow pockets.
- Record in the notes any provisional diagnosis and follow up with a definitive diagnostic statement once any special investigations have been performed.

- Keep any radiographs taken as part of the patient's record. Ensure that these are justified, authorised and clinically evaluated, with the findings documented in the patient's notes.
- Record the suggested treatment plan and details of costs.
- Document discussion of the options, risks and benefits of treatment, including the 'no treatment' option. If treatment is declined, record this in the notes.
- Record the details of discussions or treatment carried out, including oral hygiene advice and instruction. Record any discussions on smoking cessation, diabetes control, alcohol consumption or other lifestyle factors.
- Record details of referrals, including a copy of the referral letter and any response from the referral centre.
- Note in the clinical records the appropriate recall period.
- Where appropriate, record compliance with advice, for example, oral hygiene instruction or smoking cessation advice.

11 Quality Improvement and Research

11.1 Quality Improvement

Topics for quality improvement activities relevant to this guidance include:

- the completeness of periodontal charting, as appropriate to the patient's periodontal status;
- formal recording of a periodontal diagnosis;
- instrument maintenance;
- compliance with recommendations within the guidance, for example:
    - assigning a risk level;
    - provision of personalised oral hygiene instruction;
    - appropriate post-treatment review;
    - pre-implant placement periodontal assessment.

11.2 Research

There is a particular need for high quality research to improve the evidence base in the following areas:

- the impact of clinician-recorded, formal periodontal diagnosis on patient management;
- the relative importance of the different parameters used to inform a periodontal risk assessment;
- the impact of performing a risk assessment, and gaining knowledge of an individual's risk, on patient and clinician behaviour;
- comparison of the efficacy of different behaviour change methods to improve the delivery of oral hygiene instruction;
- the impact of periodontal treatment on systemic disease outcomes;
- the most effective pre-implant placement protocols.

Other potential research topics include:

- validation of the risk assessment tool presented in Appendix 3;
- the uptake of the BSP Stepwise approach to treatment in primary dental care and its impact on referrals to secondary care;
- the assessment of patient engagement using different parameters and their individual predictability in relation to the outcome of periodontal treatment;
- the use of patient engagement measurements by the clinical team.

Appendix 1 Guidance Development

The Scottish Dental Clinical Effectiveness Programme

The Scottish Dental Clinical Effectiveness Programme (SDCEP) is an initiative of the National Dental Advisory Committee (NDAC) and operates within NHS Education for Scotland (NES).

The NDAC comprises representatives of all branches of the dental profession and acts in an advisory capacity to the Chief Dental Officer. It considers issues that are of national importance in Scottish dentistry and also provides feedback to other bodies within the Scottish Government on related, relevant healthcare matters.

SDCEP was established in 2004 under the direction of the NDAC to give a structured approach to providing clinical guidance for the dental profession. The programme's primary aim is to develop guidance that supports dental teams to provide quality patient care. SDCEP brings together the best available information that is relevant to priority areas in dentistry, and presents guidance on best practice in a form that can be interpreted easily and implemented. The guidance recommendations may be based on a variety of sources of information including research evidence, guidelines, legislation, policies and expert opinion as appropriate to the subject. SDCEP guidance takes a variety of forms to suit the diverse topics being addressed.

Recognising that publication of guidance alone is likely to have a limited influence on practice, SDCEP also contributes to the research and development of interventions to enhance the translation of guidance recommendations into practice through its participation in the TRiaDS (Translation Research in a Dental Setting) collaboration.

All of SDCEP's activities are overseen by a steering group that includes representatives of guidance development groups and the dental institutions in Scotland. Current membership of this steering group is available via the SDCEP website.

SDCEP is funded by NHS Education for Scotland (NES). The views and opinions of NES have not influenced the recommendations made in this guidance.

The Guidance Development Group

The Guidance Development Group (GDG) for this guidance update comprised individuals from a range of branches of the dental professions, including general dental practitioners, dental hygienists and dental therapists, and a patient representative.

Name	Role
Madeleine Murray (Chair)	Specialist in Restorative Dentistry, Edinburgh; Honorary Senior Clinical Lecturer, University of Glasgow
Sabina Camber	Dental Hygienist, Devon; Representative of the British Society of Dental Hygiene and Therapy
Susan Carson	Consultant in Public Health/Dental Public Health, NHS Forth Valley/ Southeast and Tayside Dental Public Health Network
Grant Creaney	Clinical Lecturer and Honorary Specialist Registrar in Dental Public Health, University of Glasgow
Shauna Culshaw	Professor of Periodontology and Immunology, University of Glasgow; Honorary Consultant in Periodontics, NHS Greater Glasgow and Clyde; Honorary Researcher, Public Health Scotland
Ian Dunn	Specialist Periodontist, Liverpool; Representative of the British Society of Periodontology and Implant Dentistry
Julian Ekiert	Patient Representative
Paul Friel	General Dental Practitioner, Paisley
Rose Marie Goutcher	General Dental Practitioner, Glasgow; Specialty Dentist in Restorative Dentistry, Glasgow Dental Hospital, NHS Greater Glasgow and Clyde
Maxine Lee	BSc Oral Health Sciences Programme Lead and Honorary Clinical Teacher, Dundee Dental Hospital and School, University of Dundee
Michael Paterson	Consultant and Specialist in Restorative Dentistry, James Cook University Hospital, Middlesborough; Specialist Periodontist, Leeds
Philip Preshaw	Dean of Dentistry and Professor of Periodontology, Dundee Dental Hospital and School, University of Dundee; Representative of the British Society of Periodontology and Implant Dentistry
Amir Savage	Specialist Periodontist and Implant Dentist, Winchester
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The GDG would like to thank:

- Anne Littlewood, Cochrane Oral Health Information Specialist, University of Manchester, and Alan Gillies, NHS Education for Scotland Knowledge Services, for performing the literature searches that underpin the development of this guidance.
- Beatriz Goulao, Research Fellow, Health Services Research Unit, University of Aberdeen, for supporting the development of patient information.
- Huma Aiman, Dental Core Trainee, for assisting with analysis of practitioner interviews.
- Julian Fisher, Director, Zero Water Day Partnership, for helpful discussions regarding sustainability.
- Bill Jenkins, Richard Wellbury and Michaela Zilinska for supplying clinical photographs.
- Sarah Griffin for supplying non-clinical photographs of dental equipment.

The Programme Development Team

The Programme Development Team (PDT) operates within NES and is responsible for the guidance development methodology. Working with members of the GDG, the team facilitates all aspects of guidance development. The following members of the PDT were directly involved in the development of this edition of *Prevention and Treatment of Periodontal Diseases in Primary Care*.

Name	Role
Jan Clarkson	Programme Director, SDCEP; Associate Postgraduate Dental Dean, NHS Education for Scotland; Professor of Clinical Effectiveness, University of Dundee
Douglas Stirling	Programme Lead (Guidance), SDCEP, NHS Education for Scotland
Samantha Rutherford	Specialist Research Lead, SDCEP, NHS Education for Scotland; SDCEP Lead for Periodontal guidance update
Iain Colthart	Specialist Research Lead, SDCEP, NHS Education for Scotland
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Linda Young	Programme Lead (Implementation), TRiaDS, NHS Education for Scotland
Adalia Ikiroma	Senior Researcher, TRiaDS, NHS Education for Scotland
Laura Beaton	Specialist Research Lead, TRiaDS, NHS Education for Scotland
Margaret Mooney	Senior Administrative Officer, NHS Education for Scotland
Anne Coats	Senior Administrative Officer, NHS Education for Scotland

Guidance Development Methodology

SDCEP uses a methodology for guidance development that aims to be transparent, systematic and to adhere as far as possible to international standards set out by the AGREE (Appraisal of Guidelines for Research and Evaluation) Collaboration (www.agreetrust.org). The guidance development methodology used by SDCEP is NICE accredited, which signifies independent recognition of the rigorous, high-quality process used to produce guidance. Details are available at www.sdcep.org.uk/how-we-work.

SDCEP first published guidance entitled *Prevention and Treatment of Periodontal Diseases in Primary Care* in 2014. A full review of the topic was initiated in 2022 and this updated second edition of the guidance was developed following the NICE accredited methodology described in the *SDCEP Guidance Development Process Manual* (Version 2.0, February 2019). The specific details of the updating process are documented in the *Prevention and Treatment of Periodontal Diseases in Primary Care Methodology (2024).*

Prior to updating this guidance, SDCEP's partner programme TRiaDS conducted two surveys to ascertain dentists' attitudes towards the guidance and to obtain feedback on how they felt it could be improved. The findings of these surveys were considered during the development of the updated guidance.

The scope and aims of the guidance do not vary substantially from those of the first edition. The GDG agreed that the twenty clinical questions from the first edition of the guidance were applicable for the guidance update, with some edits made for clarity. Eight new clinical questions related to risk assessment and treatment planning, periodontitis and systemic conditions, management of furcations, periodontal maintenance, and management of patients with dental implants were added. The clinical questions covered by the guidance are listed below:

1. In patients accessing dental services, does conducting/recording a structured periodontal risk assessment, compared to no structured periodontal risk assessment, aid in the prediction of long-term outcomes of periodontal disease status such as attachment level, bone loss and tooth loss?
2. Does conducting/recording a structured periodontal risk assessment, compared to no structured periodontal risk assessment, influence the treatment (e.g. targeted risk factor control, oral hygiene instruction, individual recall intervals) provided by the dental team?
3. In patients who are at increased risk of periodontitis, does receiving information about their periodontal risk result in behaviour changes to reduce this risk, such as smoking cessation or improved oral hygiene?
4. In the general population, what are the self-care oral hygiene practices that constitute an effective regime to prevent plaque-induced gingivitis and periodontitis?
5. In patients accessing dental services, does the provision of oral hygiene instruction, compared to no instruction, result in improved clinical outcomes, such as plaque levels and gingival health?
6. In the general population, are rechargeable powered toothbrushes, compared to manual toothbrushes, more effective at reducing levels of plaque and gingivitis?
7. In the general population, is interdental cleaning in addition to toothbrushing, compared to toothbrushing alone, more effective at reducing plaque levels and gingivitis?

8. In the general population, are toothpastes that contain fluoride and another active ingredient, compared to toothpastes which only contain fluoride, more effective at reducing plaque levels and gingivitis?
9. In patients with a diagnosis of periodontal health, is supragingival professional mechanical plaque removal (PMPR) alone, compared to no supragingival PMPR, effective in preventing periodontal diseases (gingivitis/periodontitis)?
10. In patients with a diagnosis of gingivitis, is supragingival professional mechanical plaque removal (PMPR) and oral hygiene instruction (OHI) compared to no supragingival PMPR and OHI, effective in improving gingival health?
11. In patients with a diagnosis of periodontitis who also have a specific medical condition, does control of their periodontitis improve the control of their medical condition?
12. In patients with a diagnosis of periodontitis who are pregnant, does control of their periodontitis improve their pregnancy outcomes?
13. In patients with a diagnosis of periodontitis, is subgingival professional mechanical plaque removal (PMPR), compared to supragingival PMPR alone or no treatment, effective in stabilising their disease?
14. In patients with a diagnosis of periodontitis, is power driven professional mechanical plaque removal (PMPR), compared to hand PMPR, more effective in stabilising their disease?
15. In patients with a diagnosis of periodontitis, is full mouth professional mechanical plaque removal (PMPR) more effective than quadrant PMPR in stabilising their disease?
16. In patients with a diagnosis of periodontitis who have furcation involvement of multi-rooted teeth, is nonsurgical periodontal treatment, compared to surgical periodontal treatment, effective in promoting long-term tooth retention?
17. In patients with a diagnosis of periodontitis, does the use of local antimicrobial therapy (antiseptics or antibiotics), as an adjunct to professional mechanical plaque removal (PMPR), compared to PMPR alone, result in improvements in clinical parameters such as probing depth and clinical attachment level?
18. In patients with a diagnosis of periodontitis, does the use of systemic antibiotic therapy as an adjunct to professional mechanical plaque removal (PMPR), compared to PMPR alone, result in improvements in clinical outcomes such as probing depth and clinical attachment level?
19. In patients with a diagnosis of periodontitis, does the use of adjunctive host modulation therapy in conjunction with professional mechanical plaque removal (PMPR), compared to PMPR alone, result in improvements in clinical outcomes such as probing depth and clinical attachment level?
20. In patients with a diagnosis of periodontitis, what treatments are effective in reducing dentine sensitivity following professional mechanical plaque removal (PMPR)?
21. In a patient with a diagnosis of periodontitis, does supportive periodontal therapy, compared to no supportive periodontal therapy, maintain stability of the patient's disease status?
22. In a patient with a diagnosis of periodontitis who is undergoing supportive periodontal therapy (SPT), is there evidence to inform which SPT care regime is most effective at maintaining the stabilisation of the patient's disease status?

23. Is the risk of peri-implant disease higher in patients with a diagnosis of periodontitis before implant placement compared to patients with no previous periodontal disease?
24. In patients with a diagnosis of periodontitis who are considering dental implant(s), what interventions carried out before implant placement, compared to no interventions, reduce the risk of peri-implant disease?
25. In patients with dental implants, does implant-specific supportive therapy, compared to no therapy, reduce the risk of peri-implant disease?
26. In patients with peri-implant mucositis, is there evidence to support a specific intervention to recover peri-implant tissue health?
27. In patients with peri-implantitis, is there evidence to support a specific intervention to recover peri-implant tissue health?
28. In patients with peri-implant mucositis or peri-implantitis, does the use of antibiotic therapy as an adjunct to peri-implant therapy, compared to peri-implant therapy alone, result in improved peri-implant tissue health?

For this guidance update, the BSP implementation of European S3 – level evidence-based treatment guidelines for stage I-III periodontitis in UK clinical practice (**BSP-S3**) and the Delivering Better Oral Health toolkit (**DBOH**) were used as the basis for the SDCEP guidance recommendations.[6,7] The methodological quality of these guidelines was assessed using the AGREE II instrument (www.agreetrust.org). A summary of the evidence cited by these core guidelines, including an assessment of the evidence certainty, was presented to the GDG to inform and facilitate the review and updating and/or development of the recommendations in the guidance. This was supplemented by other relevant evidence identified. The process for the review/development of the recommendations followed the GRADE approach, with considered judgements based on the certainty of evidence, balance of risks, values and preferences, and the acceptability and feasibility of the treatment options. Decisions on the wording of the recommendations and their strength were reached by group consensus.

For clinical questions not covered by the **BSP-S3** or **DBOH** guidelines, comprehensive literature searches of online databases, including MEDLINE, EMBASE, the Cochrane Database of Systematic Reviews, Epistemonikos and Database of Abstracts of Reviews of Effects, were performed (see table A1). Filters for systematic reviews were applied.

Potentially eligible articles were identified independently by at least two reviewers from the list of titles and abstracts retrieved. A third reviewer was available to resolve any disagreement. An article was considered potentially eligible if it met both of the following criteria:

1. The article was a systematic review or a guideline. An article would be included as a systematic review, if it included a methods section, a search of one or more electronic databases and details of included studies. An article was included as a guideline if it made recommendations for clinical practice.
2. The article was relevant to the clinical question(s).

Additional manual searching of guideline repositories and other resources, and follow up of citations from relevant articles found through the systematic searching, was carried out. Other sources of evidence identified by GDG members were considered, taking relevance and methodological quality into account.

Table A1 Details of literature searches

Question	Date of search	Databases and date limits
1-3	7 June 2022	Cochrane Database of Systematic Reviews (Issue 6, 2022) MEDLINE Ovid (1946 to 7 June 2022) EMBASE Ovid (1980 to 7 June 2022) Epistemonikos (whole database to 7 June 2022) Centre for Reviews and Dissemination database (1994 to March 2015)
16	8 June 2022	Cochrane Database of Systematic Reviews (Issue 6, 2022) MEDLINE Ovid (1946 to 8 June 2022) EMBASE Ovid (1980 to 8 June 2022) Epistemonikos (whole database to 8 June 2022) Centre for Reviews and Dissemination database (1994 to March 2015)
20	11 July 2022	Cochrane Database of Systematic Reviews (Issue 7, 2022); MEDLINE Ovid (1946 to 11 July 2022) EMBASE Ovid (1980 to 11 July 2022) Epistemonikos (whole database to 11 July 2022) Centre for Reviews and Dissemination database (1994 to March 2015)
24	18 November 2022	Cochrane Database of Systematic Reviews (Limit 2019-2022); MEDLINE Ovid (1946 to 17 November 2022) EMBASE Ovid (1974 to 17 Nov 2022) Epistemonikos (whole database to 17 Nov 2022); TRIP (Limit 2019-2022) Google Scholar (Limit 2013-2023); Centre for Reviews and Dissemination (whole database)
25	18 November 2022	Cochrane Database of Systematic Reviews (Limit 2019-2022) MEDLINE Ovid (1946 to 15 Nov 2022) EMBASE Ovid (1974 to 15 Nov 2022) Epistemonikos (whole database to 17 Nov 2022) TRIP (Limit 2019-2022) Google Scholar (Limit 2013-2023);
26-28	6 January 2023	Cochrane Database of Systematic Reviews (Limit 2013-2023) MEDLINE Ovid (1946 to 5 Jan 2023); EMBASE Ovid (1974 to 5 Jan 2023); Epistemonikos (Limit 2013-2023); TRIP (Limit 2013-2023); Google Scholar (Limit 2013-2023); Centre for Reviews and Dissemination database (Limit 2013-2023)

Eligible systematic reviews and guidelines were appraised for their quality of development, evidence base and applicability to the clinical questions, with precedence given to the most recent articles. Systematic reviews were assessed for methodological quality using criteria informed by AMSTAR,[136] relevant information was extracted, and the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) approach used to assess and rate evidence certainty.

The synthesised evidence for each of these clinical questions was summarised and distributed to the GDG to inform and facilitate the development of the recommendations in the guidance as described above.

Open consultation and targeted external peer review of a draft of the updated guidance was carried out in July and August 2023. End-users of the guidance, dentists, dental therapists and dental hygienists in Scotland, were notified that the consultation draft of the guidance was available on the SDCEP website and invited to comment. Individuals and bodies with specific interest in the management of patients with periodontal diseases, those involved in the organisation of dental services and education in the UK and patient interest groups were also informed of the consultation and invited to comment.

Targeted external peer review is a process that occurs in parallel with open consultation and is primarily a means of additional quality assurance. Peer reviewers, representing a range of expertise and experience in relevant dental fields and individuals with knowledge of guidance methodology, were asked to comment on the applicability and suitability of the guidance to the intended audience (mainly primary dental care in Scotland) and to indicate whether they thought the process used to develop the guidance was satisfactory. They were also asked to provide any other relevant feedback.

All consultee and peer reviewer comments were considered, and the guidance amended accordingly prior to publication.

Patient feedback on the content of patient information leaflets was obtained via a focus group.

During the development of the first edition of the guidance, potential barriers to the implementation of this guidance were identified. These were reconsidered during the guidance updating. A *Guidance Implementation Summary* for this guidance is available at SDCEP Periodontal Care. An assessment of the potential impact of this guidance on equality target groups was also conducted.

The environmental impact of the recommendations and advice was considered during the development of this guidance update. Details of the environmental sustainability considerations for this guidance are provided in the *Prevention and Treatment of Periodontal Diseases in Primary Care Methodology (2024)*.

For this guidance, a further review of the topic will take place five years after publication of this edition, and if there are significant changes the guidance will be updated accordingly.

Conflict of interest

All contributors to SDCEP are required to declare their financial, intellectual and other relevant interests. At each group meeting, participants are asked to confirm whether there are any changes to these. Should any potential conflicts of interest arise, these are discussed and actions for their management agreed. All declarations of interest and decisions about potential conflicts of interest are available on request.

Appendix 2 Monitoring plaque biofilm and bleeding

Monitoring and recording plaque biofilm and bleeding levels enables the dental team to objectively assess the levels of plaque biofilm and gingival bleeding over time. In addition, if the patient is informed of their scores and understands what they mean, plaque and bleeding scores can be useful tools as part of motivation and behaviour change strategies. While a full mouth assessment is useful in specific circumstances, charting plaque and bleeding indices for index teeth on a more regular basis may be more practical.

Modified plaque biofilm and bleeding scores

The use of modified plaque biofilm and bleeding scores allows more rapid, objective assessment of oral hygiene and an indication of patient skill in oral hygiene and superficial gingival inflammation. Both tools utilise Ramfjord's Teeth, six index teeth (16, 21, 24, 36, 41, 44) that are distributed to best reflect the condition of the whole mouth. The scores can be communicated to the patient to aid in behaviour change strategies and they form an objective long-term assessment for the clinical team.

Modified plaque biofilm score

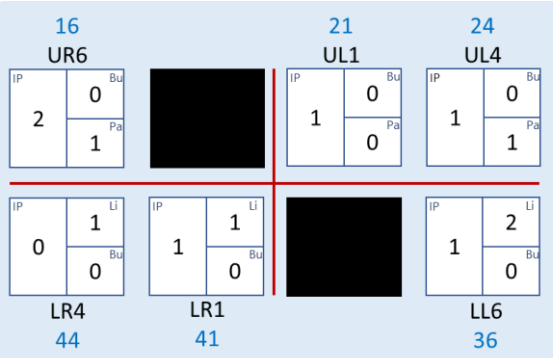
The plaque score relies on both the visual detection of plaque biofilm and detection using a probe at three sites on the index teeth (interproximal, buccal and palatal/lingual).

Visually assess the presence of plaque at three surfaces (interproximal, buccal and palatal/lingual) of the Ramfjord teeth. If no plaque is visible, use a probe to determine if plaque is present or absent.

- There are three possible scores for each surface:
  2 = visible plaque without use of probe
  1 = no visible plaque but a probe skimmed over the tooth surface reveals plaque
  0 = no plaque
- A percentage score for the index teeth is obtained by adding together the scores for each surface of the six Ramfjord teeth, dividing by 36 (i.e. the maximum plaque score possible) and multiplying the result by 100 as follows:

$$\%\ \text{score} = \frac{\text{total score} \times 100}{36}$$

Example of a modified plaque biofilm score calculation:



Total score = 12

Plaque score: $\frac{12}{36} \times 100 = 33.33 = 33\%$

Modified plaque score = 33%

IP: interproximal; Bu: buccal; Pa: palatal; Li: lingual

Modified bleeding score

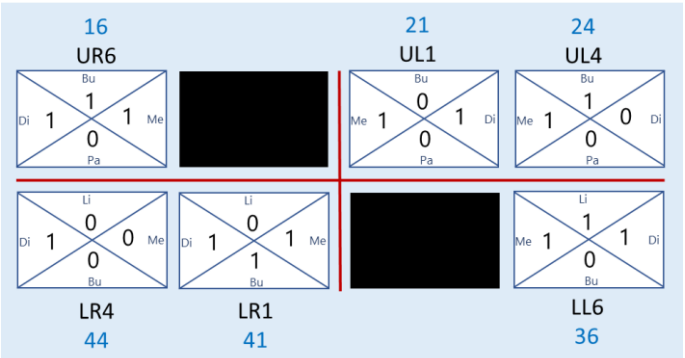
The bleeding score measures bleeding from the gingival margin, rather than bleeding on probing from the base of the pocket. Bleeding from the gingival margin reflects how well the patient is able to carry out regular, effective plaque control, whilst bleeding on probing from the base of pockets indicates disease activity and periodontal breakdown.

Gently run a periodontal probe at 45 degrees around the gingival sulcus in a continuous sweep and visually monitor the presence or absence of bleeding at four sites (mesial, distal, buccal and palatal/lingual) for up to 30 seconds afterwards.

- There are two possible scores for each surface:
  1= bleeding present
  0 = no bleeding
- A percentage score for the index teeth is obtained by adding together the scores for each surface of the six Ramfjord teeth, dividing by 24 (i.e. the maximum bleeding score possible) and multiplying the result by 100 as follows:

$$\% \text{ score} = \frac{\text{total score} \times 100}{24}$$

Example of a modified bleeding score calculation:



Total score = 14

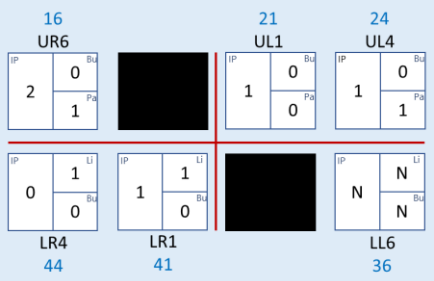
Bleeding score: $\frac{14}{24} \times 100 = 58.33 = 58\%$

Modified bleeding score = 58%

Di: distal; Bu: buccal; Me: mesial Pa: palatal; Li: lingual

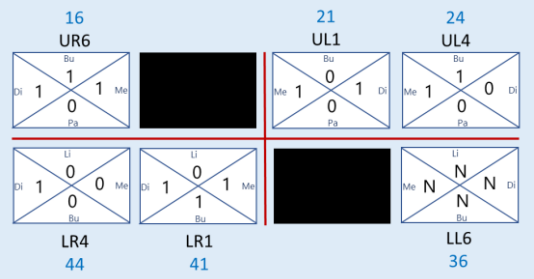
Dealing with missing teeth

If a Ramfjord tooth is absent, an appropriate alternative tooth can be substituted (e.g. a second premolar substituted for a first premolar). If no appropriate tooth is available, for example if all lower left molars are missing, a code N should be assigned. The calculation of plaque and bleeding scores must be adjusted to take account of the missing teeth (e.g. where one code N is assigned, the maximum plaque score is reduced from 36 to 30 and the maximum bleeding score is reduced from 24 to 20).



Total score = 9

Modified plaque score: $\frac{9}{30} \times 100 = 30\%$



Total score = 11

Modified bleeding score: $\frac{11}{20} \times 100 = 55\%$

What do the scores mean?

The modified plaque and bleeding scores are an indication of patient's skill in oral hygiene but these should not be used in isolation as indicators of patient engagement.* When considering which patients may benefit, or not, from more advanced treatment, a holistic assessment of patient engagement should consider other factors, such as patient attendance, level of oral hygiene knowledge/skill and patient wishes.

The **BSP-S3** guideline[6] includes a guide outlining the changes in plaque biofilm and bleeding scores which may indicate a favourable improvement in oral hygiene during Step 1 of therapy. These are:

- plaque levels of ≤20%, or ≥50% reduction in plaque from baseline measurements.
- marginal bleeding levels of ≤30%, or ≥50% reduction in marginal bleeding from baseline measurements.

Note that although some patients may engage to the best of their ability, they may not be able to achieve these levels of oral hygiene and plaque biofilm control due to factors such as manual dexterity or mental health problems. Whilst a 50% reduction in plaque or bleeding may indicate a favourable improvement, it might not be sufficient to achieve health and best treatment outcomes if the absolute percentage remains high. For instance a reduction from 80% to 40% plaque score is encouraging but for many patients with periodontitis will still impair treatment outcomes.

* Note that partial mouth recording systems tend to underestimate disease and that an abbreviated bleeding score obtained from index teeth may underestimate the true bleeding score that would be obtained from a full mouth assessment.

For patients who smoke, bleeding from the gingival margin and from the base of the periodontal pocket may be absent, even in the presence of periodontitis. Therefore, although bleeding scores can be recorded, they may not accurately reflect the clinical situation.

Full mouth plaque and bleeding assessment

A full mouth plaque biofilm and bleeding assessment can be performed as part of the full periodontal examination if additional information is needed about specific problem areas for plaque biofilm and inflammation control. This may also help the dental team to give their patient personalised oral hygiene instruction.

- Assess the presence or absence of plaque biofilm (at four sites per tooth where full periodontal charting has been recorded) by running a probe gently around the tooth at the gingival margin. Score 1 if plaque biofilm is present and 0 if plaque biofilm is absent.
  - A percentage score for the whole mouth is obtained by adding together the values for all teeth, dividing by the number of teeth and multiplying the result by 100 as follows:

$$\%\ \text{score} = \frac{\text{number of surfaces with plaque} \times 100}{\text{total number of teeth} \times 4}$$

- After assessing plaque biofilm, observe each tooth at the four sites for the presence or absence of bleeding and calculate a percentage score for the whole mouth as follows:

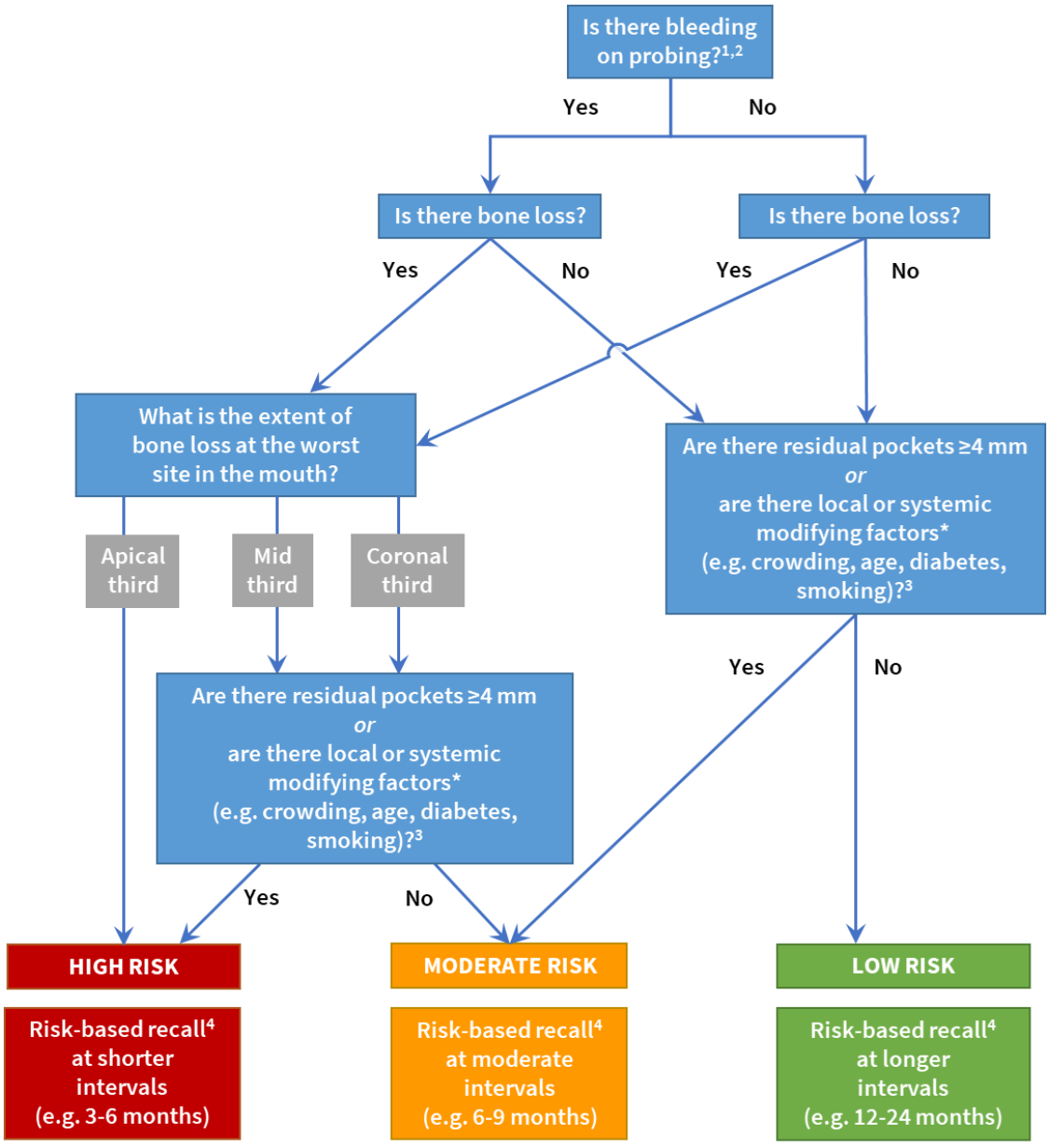
$$\%\ \text{score} = \frac{\text{number of surfaces with bleeding} \times 100}{\text{total number of teeth} \times 4}$$

Plaque disclosing tablets or solutions can aid in the detection of plaque and act as a visual demonstration of plaque levels for patients.

Appendix 3 Determining risk of periodontal diseases initiation/progression

The diagram below shows a basic risk assessment tool which might be helpful when determining the risk of periodontal disease initiation/progression in an individual patient and to inform the appropriate recall interval.

N.B. This is not a validated tool, but has been provided as a guide to aid in the assessment of risk.



[1]Assess bleeding from the base of the pocket and from the gingival margin.
[2]The level of bleeding on probing in patients who smoke does not reflect the level of disease and risk of disease initiation/progression should be assessed on the presence or absence of bone loss.
[3]Use clinical judgement to assess how the modifying factors affect the risk level.
[4]Other aspects of oral health (e.g. caries risk, oral cancer risk) should also be considered when determining a risk-based recall interval.

*See next page for information on modifying factors for periodontal diseases.

Modifying factors for periodontal diseases

These modifying factors are associated with the development and progression of periodontal diseases and should be considered when determining the risk of disease development and progression in an individual patient. The risk level will inform the frequency of the recall interval for long-term periodontal care.

- Age
- Previous tooth loss secondary to periodontitis
- Smoking
- Concurrent medical factor that may affect the periodontal tissues, for example:
    - diabetes
    - rheumatoid arthritis
    - osteoporosis
    - stress
    - obesity
    - certain medications (e.g. calcium channel blockers, nifedipine, ciclosporin)
- Pregnancy
- Family history of early tooth loss due to periodontal disease
- Social factors
- Pattern of engagement with dental services
- Diet
- Inadequate level of oral hygiene
- Presence of plaque-retentive factors
- Presence of furcation bone loss
- Presence of tooth restoration at gingival margin
- Root morphology that affects prognosis
- Rapid periodontal breakdown >2 mm attachment loss per year

Appendix 4 Treatment prescription

Where dental hygienists and dental therapists provide treatment under the direction of a dentist, the referring dentist must provide a treatment prescription. The treatment prescription can be simple or complex depending on the level of treatment required. A simple pro-forma can be useful but patient-specific information should be provided along with this. The referring dentist can ask the hygienist/therapist to set the recall interval following reassessment.

Example of a simple treatment prescription for maintenance care.

Treatment Prescription

- Please monitor risk factors and provide patient advice as needed.
  - Use the Oral Hygiene TIPPS behaviour change strategy.
- Monitor plaque biofilm and gingival bleeding levels.
- Carry out PMPR where required.
- Set risk-based recall interval with referring dentist.

Example of a complex treatment prescription for Step 1 of therapy in a patient with a diagnosis of periodontitis.

Treatment Prescription

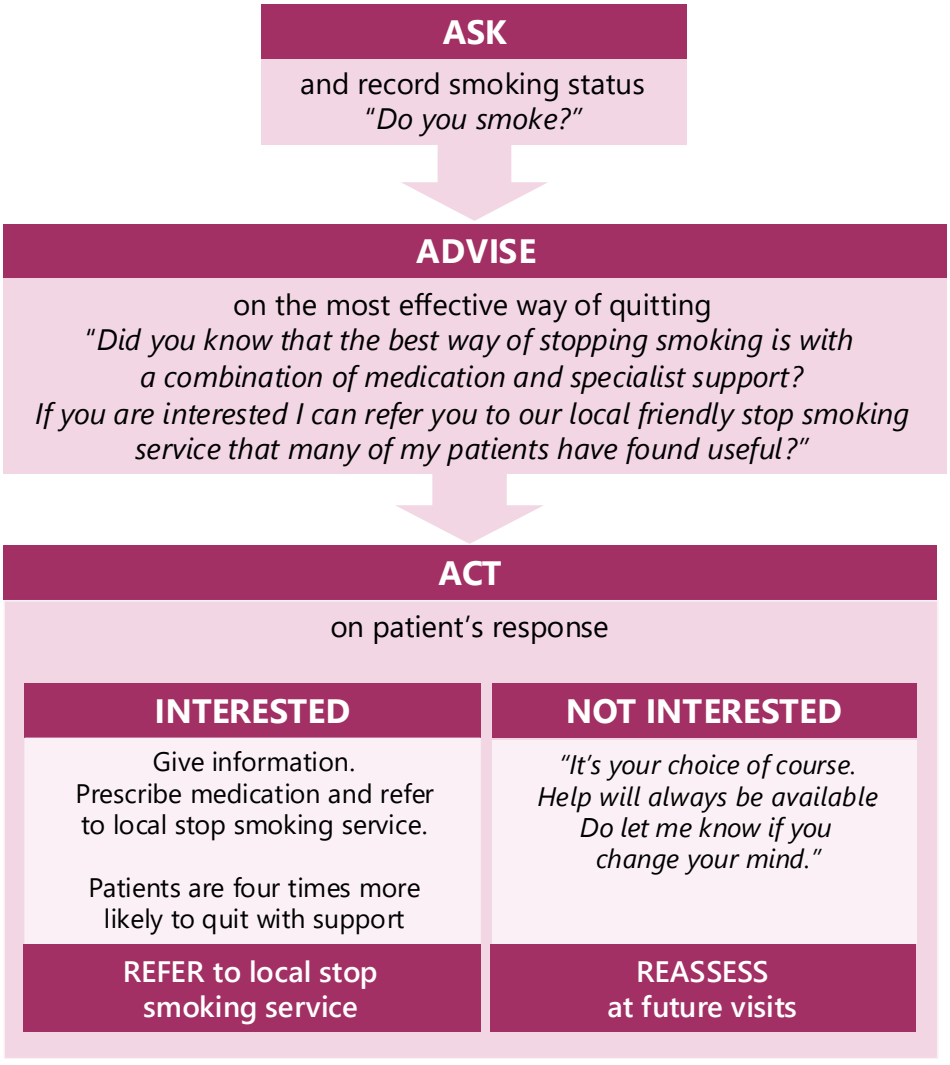
- Baseline indices to record plaque biofilm and marginal bleeding; full periodontal charting.
- Discuss risk factor control with the patient.
  - Use the Oral Hygiene TIPPS behaviour change strategy.
  - Discuss smoking cessation.
- Remove supragingival plaque, calculus and stain. Carry out PMPR at all sites with probing depths ≥4 mm with bleeding on probing and/or the presence of subgingival deposits.
- Use local anaesthesia as required for the above sites (Lidocaine 2% with Epinephrine 1:80000), maximum four cartridges (2.2 ml) per visit.
- Review with referring dentist at three months post-completion of treatment.

Appendix 5 Smoking cessation intervention (Very Brief Advice)

Dentists and dental care professionals have a unique opportunity to address smoking with patients due to the large proportion of the population that visit for regular check-ups, including key groups such as teenagers and those who are pregnant. Very Brief Advice (VBA) is a simple intervention that is designed to be used opportunistically in less than 30 seconds in almost any situation with a smoker.

The VBA intervention is comprised of three elements: establishing and recording smoking status (**ASK**), advising on how to stop (**ADVISE**) and offering help (**ACT**). It is important to keep giving advice at every opportunity, as smokers may take several attempts to stop smoking successfully. Additionally, referring a patient to a local stop smoking service also increases their chances of a successful quit attempt.

(Adapted from the National Centre for Smoking Cessation and Training guidance on delivering *Very Brief Advice on Smoking for Dental Patients*.)



'*Quit Your Way*' is Scotland's national smoking cessation service. It offers telephone and online help and is able to directly refer people to local cessation services delivered by Health Boards.

Appendix 6 Alcohol consumption intervention (Identification and Brief Advice)

The flowchart below presents an alcohol identification and brief advice pathway (IBA) that can be used with dental patients to identify their alcohol health risks and to help tailor advice. The IBA pathway has three main stages: asking all patients about alcohol use as part of their medical history (using the AUDIT-C screening tool), and advising and acting based on the patient's AUDIT-C score.

ASK

How often do you have a drink containing alcohol?

Response	Score
Never	0
Monthly or less	1
2-4 times per month	2
2-3 times per week	3
4+ times per week	4

How many units* do you drink on a typical day when you are drinking?

Response	Score
0-2 units	0
3-4 units	1
5-6 units	2
7-9 units	3
10+ units	4

How often have you had:
6 or more units* (female patient)
8 or more units* (male patient)
on a single occasion in the last year?

Response	Score
Never	0
Less than monthly	1
Monthly	2
Weekly	3
Daily or almost daily	4

ADVISE AND ACT

Add the scores together to review the drinking level below:

Score	
0-4:	Lower risk
5-10:	Increasing or higher risk
11 or 12:	Possible dependence

LOWER RISK

- Advise the patient that their current drinking level does not pose significant risk to their health
- Encourage the patient to keep their drinking at lower risk levels

INCREASING OR HIGHER RISK

- Explain to the patient that their score indicates their drinking behaviour could be affecting their health
- Discuss ways of making small changes to reduce their risk and give an information leaflet

POSSIBLE DEPENDENCE

- Explain to the patient that their score indicates they may be drinking problematically
- Give an information leaflet
- Encourage the patient to speak to their GP or a specialist alcohol treatment service (e.g. **Drinkline**: 0800 7 314 314; calls are free; webchat function also available)

*See next page for information on units of alcohol in common drinks

Alcohol unit reference (1 unit = 10 ml pure alcohol):

One unit of alcohol	 Half a small glass of wine (87.5ml)	 Half a pint of beer, lager or cider	 One measure of spirits (25ml)	
More than one unit of alcohol	 2.2 units Small glass of wine (175ml)	 3.1 units Large glass of wine (250 ml)	 2.2 units Pint of beer, lager or cider	 1.7 units Bottle of beer, lager or cider (330ml)

More information and an alcohol unit calculator are available on the Drink Aware website.

Additional Resources:

Further guidance on alcohol in relation to oral health can be found in *Delivering Better Oral Health*, which includes additional information about the IBA pathway.

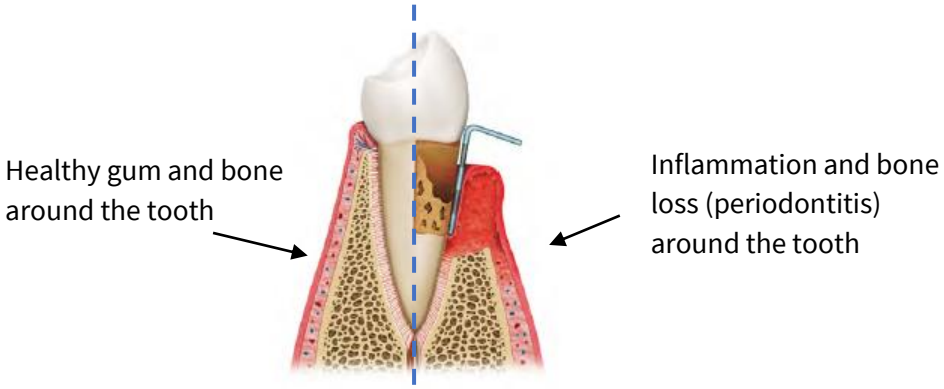
Additional resources for health professionals, including further information about screening tools can be found on the Public Health Scotland website.

Public Health Scotland also provide an information leaflet for patients, which includes additional information about units and advice on reducing alcohol intake.

Appendix 7 Advice for medical practitioners

Periodontal (gum) diseases are a group of related conditions, both acute and chronic, that affect the soft tissues and bone holding the teeth in place. In most cases these are primarily diseases associated with plaque micro-organisms present on the teeth which, in the early stages, cause local, reversible damage to soft tissues (gingivitis) and, at later stages, irreversible damage to the bone holding teeth in place (periodontitis). This loss of bone can lead to loss of teeth if undiagnosed and untreated in patients who are susceptible. Tooth loss is associated with reduced function and quality of life and impaired nutrition. In addition there is evidence that periodontal diseases have a systemic effect, increasing inflammation and activating immune mechanisms.

Differences in supporting tissues in health and periodontitis



Several medical conditions (e.g. diabetes) and social factors (e.g. smoking) put patients at higher risk of developing periodontal diseases. In addition, emerging evidence links periodontitis with a raised risk of developing or worsening existing systemic conditions.

Diabetes

Patients with type 1 and type 2 diabetes have a higher risk of developing periodontal (gum) disease. This is particularly true for patients whose diabetes is sub-optimally controlled. There is also evidence that periodontal treatment of patients with diabetes can lead to improved glycaemic control. This connection is recognised in the NICE guidelines on management of type 1 diabetes (NG17)[22] and type 2 diabetes (NG28),[23] and advice for the medical team in relation to diabetes and oral health is provided there.

Patients with diabetes should be advised to maintain good oral hygiene to both minimise their risk of periodontal disease and help control their diabetes.

Advise patients with diabetes:

- that their condition is associated with a higher risk of periodontal (gum) disease;
- to make an appointment with a dentist as soon as possible for a full oral assessment;
- to tell their dentist that they have diabetes.

N.B. Patient leaflets, which provide information about the link between diabetes and oral health, can be downloaded from the SDCEP *Periodontal Care* website.

Drug-influenced gingival enlargement

Certain types of medication can lead to gingival enlargement in some patients. These medications include calcium channel blockers, phenytoin and ciclosporin. This gingival enlargement can become unsightly, can limit chewing and comfort and the tissue is often inflamed. While good oral hygiene can limit the risk of gingival enlargement, some patients are particularly susceptible to the problem. In these situations, the dental team will initially try to control inflammation and the patient's symptoms but may contact you to discuss modification of the drug regimen.

Advise patients taking these medications:

- that a possible side effect of the medication is gingival enlargement;
- to make an appointment with a dentist as soon as possible for a full oral assessment;
- to tell their dentist that they are taking the medication.

Pregnancy gingivitis

The changes in hormone levels and to the immune response associated with pregnancy have been implicated in the development or worsening of gingivitis (superficial inflammation of the soft tissues around the teeth). This manifests as bleeding, swollen gums and can be painful. If the problem is limited to the soft tissues then good homecare and oral hygiene, with support from the dental team should resolve this. Most cases will resolve on delivery of the baby, although breastfeeding can extend the duration of the condition.

Advise pregnant patients:

- that they may experience red, swollen and bleeding gums during their pregnancy;
- to make an appointment with a dentist as soon as possible for a full oral assessment.

More severe periodontal disease, involving bone loss around teeth, has been linked with adverse pregnancy outcomes, such as pre-term birth and low birth weight. The nature of this relationship is complex and co-morbidities such as smoking may be important. The impact of periodontal treatment on adverse pregnancy outcomes is unclear but it is acknowledged that periodontal treatment is safe during pregnancy.

Puberty gingivitis

Gingivitis is commonly observed in pre-teens and young teenagers where the increased inflammatory response to plaque is thought to be aggravated by the hormonal changes associated with puberty. Gingival enlargement may also be observed in susceptible individuals.

Non-plaque biofilm-induced periodontal diseases

Non-plaque biofilm-induced periodontal diseases (e.g. lichen planus) are a less common group of conditions not directly caused by dental plaque characterised by atypically presenting gingival, and sometimes oral mucosal, lesions.[94] They may be manifestations of systemic conditions, a medical disorder or may represent pathologic changes in the gingival tissues. Their atypical appearance will often

extend beyond the mucogingival margin and will not respond to oral hygiene measures prescribed by a dental team.

If a medical practitioner is unsure about the nature of the oral condition, early referral to a general dental practitioner should be considered to confirm a diagnosis.

Systemic conditions and periodontal disease

Links between periodontal diseases and other non-communicable diseases (NCDs) such as cardiovascular disease, rheumatoid arthritis, chronic kidney disease and Alzheimer's disease have been suggested. Common factors linking periodontal disease and NCDs relate to systemic inflammation. Treatment to control periodontitis leads to reductions in local and systemic inflammation but, with the exception of diabetes, it is unclear whether this leads to improved systemic disease outcomes. Periodontal treatment is safe in patients with NCDs and patients should be encouraged to attend the dentist for treatment.

Systemic conditions which may increase the risk of periodontal diseases include stress, diet, and obesity. The mechanisms for this are unclear but patients should be encouraged to adopt a healthy lifestyle.

Patients who present with an acute dental problem

A significant proportion of the population only seek dental care when they suffer an acute episode and may initially present to other providers of care (e.g. general medical practitioner, accident and emergency, pharmacy). Advice on dealing with acute dental problems can be found in the SDCEP *Management of Acute Dental Problems* guidance.[137]

To help find a dentist in Scotland, patients can consult Scotland's Service Directory via NHS Inform or by contacting their local NHS Health Board.

Appendix 8 Oral Hygiene TIPPS behaviour change strategy

Oral Hygiene TIPPS is based on behavioural change theory and aims to make patients feel more confident in their ability to perform effective plaque biofilm removal and to help them plan how and when they will look after their teeth and gums. It can be delivered by any suitably qualified member of the dental team and should be revisited and built upon at each return appointment.

A video illustrating the use of the Oral Hygiene TIPPS behaviour change strategy to improve patients' plaque removal is available on the SDCEP *Periodontal Care* website.

TALK


Photograph: www.angusbremner.com

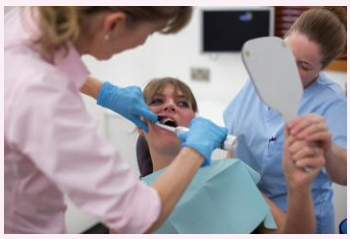
- Ask the patient what their current homecare regime involves and if they have any concerns or challenges with it.
- Ask what their understanding of the causes of periodontal diseases is.
- Listen to what they say, and explain any areas where information or support is needed.
  - Talk with the patient about the causes of periodontal disease and why good oral hygiene is important.
  - Use of a visual aid[1] may help patients understand the disease process and the effects of plaque on the periodontal tissues.
- Talk with the patient about what they have to do to achieve optimal plaque removal.
  - Brush regularly using an effective technique.
    - For gum health, focus on the area where the tooth and gum meet.
    - Clean the teeth methodically, for example cleaning all of the outside surfaces of the teeth then moving to the inside surfaces.
    - Brushing twice a day for at least 2 minutes will ensure that all tooth surfaces are adequately cleaned.
    - Both manual and rechargeable powered toothbrushes are effective for plaque removal when used correctly.
    - Manual and rechargeable powered toothbrush heads should be small and of a medium texture and should be changed when obvious signs of wear appear.
  - Use a fluoride-containing toothpaste and 'spit don't rinse' during tooth cleaning.
  - Clean interdentally as required.
    - Patients with a diagnosis of gingivitis should clean interdentally to control their inflammation.

[1] A visual aid to use during discussions with patients is provided below.

- Patients with a diagnosis of periodontitis should clean interdentally once a day.
- Evidence suggests that interdental brushes may be more effective than floss at reducing plaque and gingivitis indices in sites where the interdental space allows their use.
- To be effective, the brush should fit snugly into the interdental space without the wire rubbing against the tooth. More than one size of interdental brush may be required depending on the sizes of the interdental spaces present.
- Dental floss or tape may be appropriate for spaces which are too small for interdental brushes.

INSTRUCT

- Ask the patient to demonstrate their oral hygiene routine and watch while they do so to identify areas where they need support.
- Provide personalised instruction and coaching on the best ways to perform effective plaque removal, concentrating not only on improving their understanding of why it is important but also the patient's skill to remove plaque biofilm from the gingival margin and tooth surface.
- Instruct the patient in the use of oral hygiene tools personalised to their situation.
  - For patients with periodontitis, intrasulcular brushing with a narrow, single tufted toothbrush may be helpful.
- Demonstrate, in the patient's mouth while they hold a mirror, how to systematically clean each tooth using a toothbrush (manual or rechargeable powered) as well as how to use interdental brushes and/or floss. If appropriate, advise the patient to wear their spectacles (including reading glasses) while cleaning their teeth.



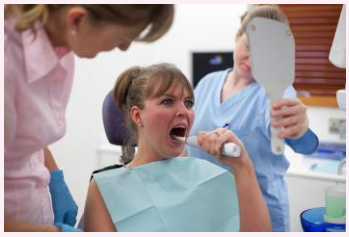
Photograph: www.angusbremner.com

Photograph: www.angusbremner.com

- Confirm that the patient knows what to do. If they do not, show the patient again.

PRACTISE

- Ask the patient to practise cleaning their teeth using a toothbrush and using the interdental cleaning aids while in the dental surgery and help them to improve their technique where needed.



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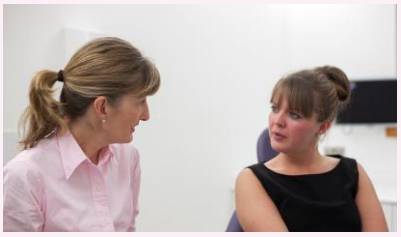
Photograph: www.angusbremner.com

  - This provides an opportunity to correct the patient's technique if required and ensures that the patient has really understood what they need to do.
  - Confirming that the patient is doing the task well will boost confidence and also help them to remember when at home.
- Ask the patient for some feedback.
  - Ask how their teeth feel, as clean teeth should feel smooth to the tongue.
  - Address any concerns the patient has if there is bleeding after brushing or interdental cleaning.
    - Gums may bleed more than normal in the first few days of using the correct oral hygiene technique and in patients who have recently stopped smoking.

PLAN

- Agree a plan which specifies how the patient will incorporate the new oral hygiene regime into their daily life.
  - Ask the patient when would be the best time for them to brush and clean interdentally. Suggest using another regular activity as a reminder – such as immediately before going to bed and after getting up.



Photograph: www.angusbremner.com

- Tell the patient that you will ask for feedback about how they are managing with the new oral hygiene regime at the next visit, for example:
  - "How are you managing with interdental cleaning aids?"
  - "How did your action plan work?"
  - "Are there any areas where you would like further support?"

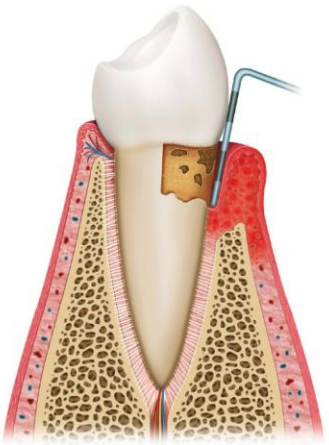
SUPPORT

- Ensure you support the patient to achieve effective plaque biofilm removal by following-up on the advice at subsequent appointments.

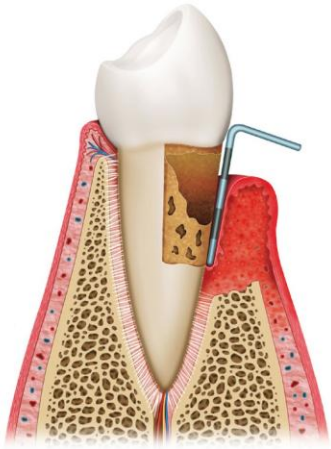
Stages of periodontal diseases

Healthy gums and supporting tissue (left)
Gingivitis – superficial inflammation caused by dental plaque, leading to reversible swelling and bleeding (right)

Gingivitis and periodontitis - initial destruction of the supporting bone and periodontal ligament (irreversible) leading to the formation of pockets



Progressive gingivitis and periodontitis – leading to further destruction of the supporting bone and deepening of pockets



Progressive gingivitis, periodontitis and recession - bone and periodontal ligament destruction can lead to tooth mobility and eventual loss

Note that the left hand side of each image illustrates healthy gums and supporting tissues.

This visual aid is available to download from the SDCEP *Periodontal Care* website.

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Scottish Dental
Clinical Effectiveness Programme

The Scottish Dental Clinical Effectiveness Programme (SDCEP) is an initiative of the National Dental Advisory Committee (NDAC) and operates within NHS Education for Scotland. The Programme provides user-friendly, evidence-based guidance on topics identified as priorities for oral health care.

SDCEP guidance supports improvements in patient care by bringing together, in a structured manner, the best available information that is relevant to the topic, and presenting this information in a form that can be interpreted easily and implemented.

The second edition of *Prevention and Management of Periodontal Diseases in Primary Care* provides clear and practical recommendations and advice to support dental teams to work with their patients to maintain or improve their periodontal health. The guidance describes the principles of periodontal care and covers patient assessment, diagnosis, treatment and long-term care. The guidance has been developed using SDCEP's NICE accredited methodology and brings together advice on disease classification and periodontal treatment within one resource.

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