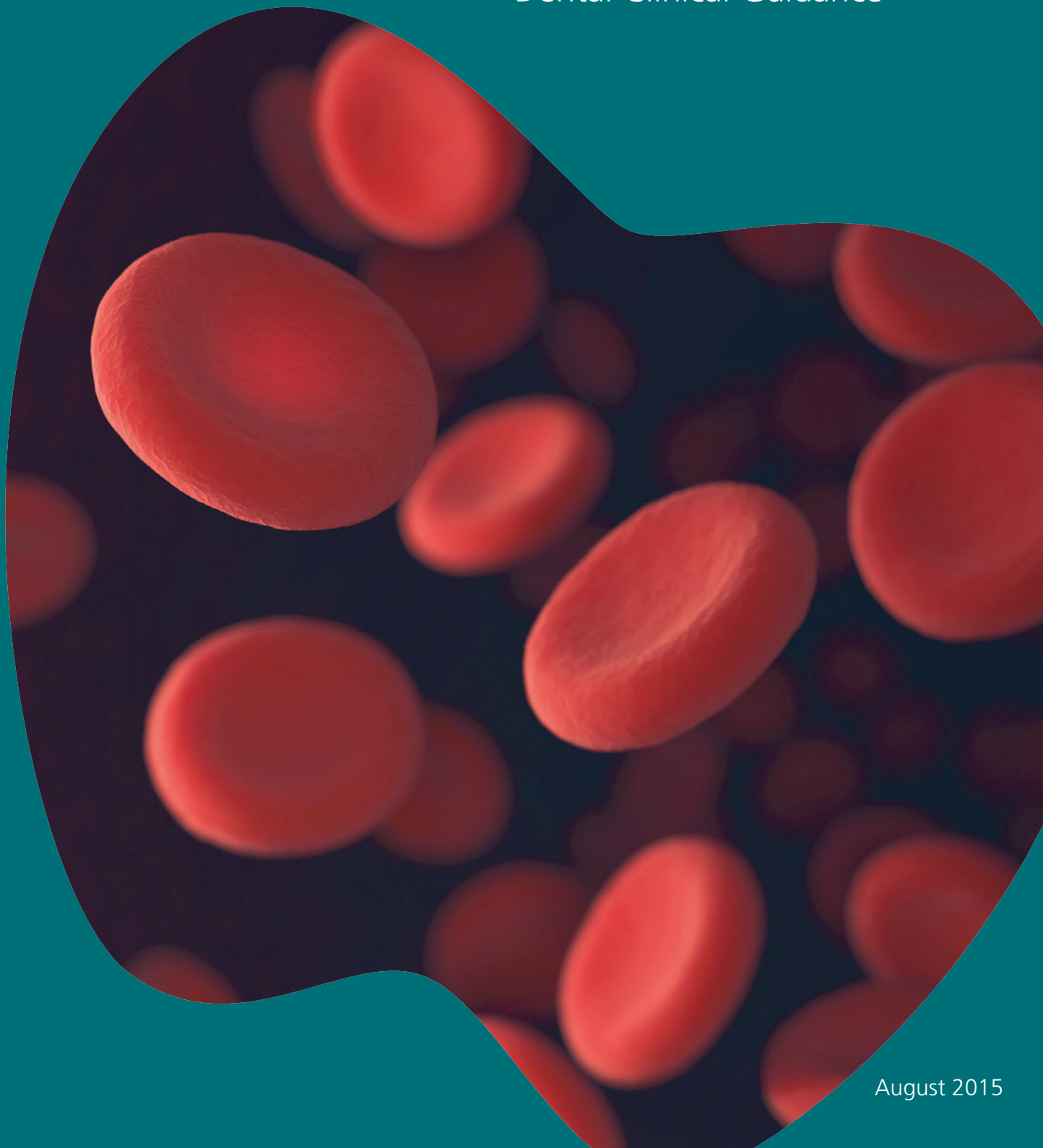
Scottish Dental
Clinical Effectiveness Programme

SDCEP

Management of Dental Patients Taking Anticoagulants or Antiplatelet Drugs

Dental Clinical Guidance



August 2015

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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 the provision of safe, effective, person-centred care

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Management of Dental Patients Taking Anticoagulants or Antiplatelet Drugs

Summary of Recommendations

This summary lists the key recommendations and abbreviated versions of the advice provided within the guidance. 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.

Assessing Bleeding Risk [Refer to Section 3]

- Assess whether the required dental treatment is likely to cause bleeding and, if so, whether it has a low or higher risk of bleeding complications (Table 1).
- Ask the patient about their current or planned use of anticoagulants or antiplatelet drugs and other prescribed and non-prescribed medications.
- Ask the patient whether their drug treatment is lifelong or for a limited time.
- Ask the patient about any medical conditions that they have.
- Ask about the patient's bleeding history.

Managing Bleeding Risk – General Advice [Refer to Section 4]

For a patient who is taking an anticoagulant or antiplatelet drug(s) and requires dental treatment **unlikely to cause bleeding** (Table 1):

- Treat the patient following standard procedures, taking care to avoid causing bleeding.

For a patient who is taking an anticoagulant or antiplatelet drug(s) and requires dental treatment **likely to cause bleeding**, with a low or higher risk of bleeding complications (Table 1):

- If the patient has another relevant medical condition(s) or is taking other medications that may increase bleeding risk (Sections 3.2.2 and 3.2.3), consult with the patient's general medical practitioner or specialist, if required.
- If the patient is on a time-limited course of anticoagulant or antiplatelet medication, delay non-urgent procedures where possible.
- Plan treatment for early in the day and week.
- Perform the procedure as atraumatically as possible, use appropriate local measures and only discharge the patient once haemostasis has been achieved.
- If travel time to emergency care is a concern, place particular emphasis at the time of the initial treatment on the use of measures to avoid complications.
- Advise the patient to take paracetamol, unless contraindicated, for pain relief.
- Provide the patient with written post-treatment advice and emergency contact details.
- Follow the drug group specific recommendations and advice (Sections 5 to 8).

Summary of Recommendations

Treating a Patient Taking Warfarin [Refer to Section 5]

For a patient who is taking warfarin or another VKA, with an INR below 4, treat without interrupting their anticoagulant medication.
(Strong recommendation; low quality evidence)

For dental treatment **likely to cause bleeding**, with a low or higher risk of bleeding complications (Table 1):

- Ensure that the patient's INR has been checked, ideally no more than 24 hours before the procedure. If the patient has a stable INR, checking the INR no more than 72 hours before is acceptable.
- If the patient's INR is 4 or above, delay treatment until their INR has been reduced. For urgent treatment, refer the patient to secondary dental care.
- If the patient's INR is below 4, treat according to the general advice for managing bleeding risk (Section 4) **and**:
  - Consider limiting the initial treatment area.
  - For procedures with a higher risk of post-operative bleeding complications (Table 1), consider carrying out the treatments in a staged manner.
  - Actively consider suturing and packing (Section 4).

Treating a Patient Taking an Antiplatelet Drug(s) [Refer to Section 6]

For a patient who is taking single or dual antiplatelet drugs, treat without interrupting their antiplatelet medication.
(Strong recommendation; low quality evidence)

For dental treatment **likely to cause bleeding**, with a low or higher risk of bleeding complications (Table 1):

- Treat the patient according to the general advice for managing bleeding risk (Section 4) **and**:

  If the patient is taking aspirin alone

  - Consider limiting the initial treatment area.
  - For procedures with a higher risk of post-operative bleeding complications (Table 1), consider carrying out the treatments in a staged manner.
  - Use local haemostatic measures to achieve haemostasis.

  If the patient is taking another single antiplatelet drug or dual antiplatelet drugs

  - Be aware that bleeding may be prolonged (up to an hour).
  - Limit the initial treatment area.
  - For procedures with a higher risk of post-operative bleeding complications (Table 1), consider carrying out the treatments in a staged manner.
  - Actively consider suturing and packing (Section 4).

Summary of Recommendations

If the patient is taking another drug combination

- Consult with the patient's general medical practitioner or prescribing physician.

Treating a Patient Taking a Novel Oral Anticoagulant (NOAC) [Refer to Section 7]

For a patient who is taking a NOAC and requires a dental procedure with a **low risk of bleeding complications**, treat without interrupting their anticoagulant medication.
(Conditional recommendation; very low quality evidence)

- Treat the patient according to the general advice for managing bleeding risk (Section 4) **and**:
  - Plan treatment for early in the day.
  - Limit the initial treatment area.
  - Actively consider suturing and packing (Section 4).

For a patient who is taking a NOAC and requires a dental procedure with a **higher risk of bleeding complications**, advise them to miss (apixaban, dabigatran) / delay (rivaroxaban) their morning dose on the day of their dental treatment.
(Conditional recommendation; very low quality evidence)

- Treat the patient according to the general advice for managing bleeding risk (Section 4) **and**:
  - Plan treatment for early in the day.
  - Consider carrying out the treatments in a staged manner.
  - Actively consider suturing and packing (Section 4).
  - Advise the patient when to restart their medication.

Treating a Patient Taking an Injectable Anticoagulant [Refer to Section 8]

For a patient who is taking an injectable anticoagulant and requires dental treatment **likely to cause bleeding,** with a low or higher risk of bleeding complications (Table 1):

- Consult with the patient's general medical practitioner or specialist.

1 Introduction

The treatment of patients taking anticoagulant or antiplatelet medication raises safety concerns in terms of the potential risk of bleeding complications following invasive dental procedures. The anticoagulant warfarin, and antiplatelet agents aspirin and clopidogrel, have been widely used for many years and most dental practitioners will be familiar with well-established guidelines for the dental care of patients taking these drugs. However, in recent years several newer oral anticoagulants (NOACs*; Novel Oral Anticoagulants, also known as DOACs[1] or TSOACs; namely apixaban, dabigatran and rivaroxaban) and antiplatelet drugs (prasugrel and ticagrelor) have become available in the UK. A lack of evidence in the context of dentistry to inform the treatment of patients taking these newer drugs has led to uncertainty around the appropriate management of these patients.

This guidance aims to clarify the current recommendations and expert advice for the newer oral anticoagulants and antiplatelet drugs and presents these, along with up-to-date recommendations for the more established medications, within a single widely available information resource.

1.1 Scope of the Guidance

While there are a number of existing guidelines for the treatment of dental patients taking warfarin[2-4] or aspirin[4,5], national dental clinical practice guidelines addressing the newer medications are lacking.[6] This guidance aims to encourage a consistent approach to the management of dental treatment for patients who are taking anticoagulants or antiplatelet drugs by providing evidence, where available, and expert opinion based recommendations and information relevant to dental treatment, for the existing, new and emerging anticoagulants and antiplatelet drugs. Through the clinical practice advice provided, the guidance also aims to empower dental staff to treat this patient group within primary care thereby minimising the need for consultation and referral to secondary care. The clinical management of dental patients who are taking anticoagulants or antiplatelet drugs and being treated as inpatients within a medical hospital setting is beyond the scope of this guidance and is not discussed.

The guidance is primarily directed at dentists, hygienists and therapists in primary care dental practice, including the general dental service and public dental service, and will also be of relevance to the secondary care dental service, those involved in dental education and undergraduate trainees.

1.2 Development and Presentation of the Guidance Recommendations

To develop the recommendations for this guidance, SDCEP convened a multidisciplinary guidance development group including medical and dental practitioners and specialists along with a patient representative (Appendix 1). The key recommendations presented in the guidance were developed through considered judgements, made by the group, based on the existing guidelines, the available evidence, clinical experience, expert opinion and patient and practitioner perspectives. Details of these considered judgements are available at www.sdcep.org.uk.

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* NOAC may also be used to represent Non-vitamin K antagonist Oral Anticoagulant. NOACs are also known as TSOACs for Target Specific Oral Anticoagulants and DOACs for Direct Oral Anticoagulants (DOACs is the term recommended by the International Society on Thrombosis and Haemostasis).

1 Introduction

The impact of potential barriers identified during guidance development and through stakeholder involvement and external consultation was also considered when formulating the recommendations.

This process for development of recommendations followed the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) approach (www.gradeworkinggroup.org). The strength of each **key recommendation** is stated directly after the recommendation with a brief justification in the accompanying text. 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. Further details can be found in Appendix 1 and at www.sdcep.org.uk.

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

1.3 Supporting Tools

Tools to support the implementation of the guidance are available for access and download from the SDCEP website (www.sdcep.org.uk) and include:

- A quick reference guide with the recommendations provided as a treatment planning flow chart.
- Patient information leaflets for each of the main drug groups, which can be printed for providing to patients, ideally prior to treatment.
- Post-treatment patient advice sheets, which can be modified for use.
- A template form for recording local contact details for medical, pharmacy, haematology, cardiology and secondary dental care support.

1.4 Statement of Intent

This guidance is based on careful consideration of the available information and resources at the time of issue and has been developed through consultation with experts and end-users (see Appendix 1). As guidance, it does not override the healthcare professional's right, and duty, to make decisions appropriate to each patient, with their informed consent. However, it is advised that departures from this guidance, and the reasons for this, are fully documented in the patient's clinical record.

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

2 Anticoagulants and Antiplatelet Drugs

2.1 What are Anticoagulants and Antiplatelet Drugs?

Anticoagulants and antiplatelet drugs are agents that reduce the ability of blood to form clots, or coagulate. Blood clotting is a process triggered naturally in response to damage to blood vessels from injury or invasive procedures. Platelets within the blood become activated locally, resulting in an increased tendency to adhere to each other and to damaged blood vessel endothelium (primary haemostasis). At the same time a cascade of reactions is initiated converting inactive coagulation factors to their active forms, ultimately leading to the production of the protein fibrin, the activated cross-linking form of fibrinogen. Fibrin stabilises the primary platelet plug by cross-linking the platelets to each other and to the damaged blood vessel wall to prevent further blood loss (secondary haemostasis).

Anticoagulants and antiplatelet drugs exert their effects at different stages in the coagulation process. Antiplatelet drugs, including aspirin, dipyridamole and clopidogrel, interfere with platelet aggregation by reversibly or irreversibly inhibiting various steps in the platelet activation required for primary haemostasis. The various anticoagulant drugs inhibit the production or activity of the factors that are required for the coagulation cascade. For example, warfarin and the other vitamin K antagonists (VKAs; acenocoumarol and phenindione) work by inhibiting the vitamin K-dependent modification of prothrombin and other coagulation factors, which is required for their normal function, and in this way they impair secondary haemostasis.

Blood coagulation in response to injury is an essential process. However, certain medical conditions, including atherosclerosis and cardiac arrhythmias, can predispose individuals to the risk of a thrombosis, where a blood clot (thrombus) blocks a blood vessel, either at the site of formation or after travelling to another critical site (thromboembolism), with potentially catastrophic consequences such as heart attack, pulmonary embolism or stroke. Anticoagulants and antiplatelet drugs are prescribed to reduce the risk of such an event in patients with vascular, thromboembolic or cardiac conditions, a history of stroke or following surgical procedures such as heart valve replacements, cardiac stents and joint replacements. However, this reduction in risk of thromboembolic events comes at the cost of an increased risk of bleeding, either spontaneously or associated with invasive procedures. The balance of these risks for an individual patient is the primary consideration in the management of dental patients who are taking anticoagulants or antiplatelet drugs and require dental treatment.

The anticoagulants and antiplatelet drugs prescribed in the UK are listed in Appendix 2, and the conditions for which they are commonly prescribed are indicated in Appendix 3.

2 Anticoagulants and Antiplatelet Drugs

2.2 The New Anticoagulants and Antiplatelet Drugs

Warfarin has been in use for over 50 years and is still one of the most widely used medications for the treatment and prophylaxis of thromboembolism. However, it does have a number of limitations, including a narrow therapeutic range, sensitivity to diet and drug interactions and the requirement for frequent monitoring and dose adjustment.[7] Since 2008, a group of newer oral anticoagulants has been available which overcome many of these limitations.[8] Dabigatran (Pradaxa) is a direct inhibitor of the coagulation factor thrombin, while apixaban (Eliquis) and rivaroxaban (Xarelto) inhibit Factor Xa of the coagulation cascade. These drugs produce a more predictable level of anticoagulation than warfarin[9] and so do not require monitoring, are easier to manage and are potentially more effective and safer. These drugs are now licensed for use in the UK for a number of indications (see Appendix 3) and consequently the number of patients who present for dental treatment while taking these drugs is increasing. Notably, the National Institute for Health and Care Excellence (NICE) now recommends the use of apixaban, rivaroxaban and dabigatran in preference to aspirin for stroke prevention in patients with atrial fibrillation.[10]

Two new generation antiplatelet drugs[11], namely prasugrel (Efient) and ticagrelor (Brilique), have also become available in recent years, providing alternatives to clopidogrel. These are more potent antiplatelet agents with a more rapid onset of action, more predictable absorption and improved efficacy for some outcomes. Their use is currently limited to patients with acute coronary syndrome and coronary stents and each is usually prescribed in combination with aspirin, as a dual therapy.[12,13]

A number of other new anticoagulants and antiplatelet drugs are currently in development. The two which are closest to being available in the UK are the oral anticoagulant, edoxaban, and the antiplatelet drug, vorapaxar (current in June 2015). Edoxaban (Lixiana), a once a day factor Xa inhibitor like rivaroxaban, was granted EU marketing authorisation in June 2015. Vorapaxar (Zontivity) was granted EU marketing authorisation in January 2015. More information about these drugs will be available via the electronic Medicines Compendium website (www.medicines.org.uk) when they are marketed in the UK.

3 Assessing Bleeding Risk

Before providing dental treatment for a patient taking anticoagulants or antiplatelet drugs, their bleeding risk should be assessed. This involves consideration of both the likely risk of bleeding associated with the required dental procedure and the patient's individual level of bleeding risk, which can be affected by the anticoagulants or antiplatelet drugs that they are taking, in addition to their other medical conditions and medications. These issues are addressed in Sections 3.1 and 3.2. Guidance on the management of the patient's dental treatment based on this risk assessment is presented in Sections 4 to 8.

While the risk of bleeding complications associated with dental treatment for these patients should be taken seriously, it should be noted that existing evidence and clinical experience suggest that serious adverse bleeding events are rare. For example, the incidence of significant bleeding after dental procedures (defined as that requiring an unplanned intervention including repacking and resuturing, or transfusion in extreme cases) for patients who have continued their warfarin therapy perioperatively, is estimated at less than 4%.[2]

3.1 Which Dental Procedures Have the Highest Bleeding Risk?

Table 1 categorises dental procedures into those that are unlikely, under normal circumstances, to cause bleeding and those that can be expected to cause some level of bleeding. The management of patients taking anticoagulants or antiplatelet drugs whose dental treatment involves procedures from the first category should be straightforward and these patients can be treated according to standard practice, with care taken to avoid causing bleeding (see Section 4). More careful consideration should be given to patients who require procedures likely to result in bleeding (see Sections 4 to 8). Dental procedures that are likely to result in bleeding are further categorised in Table 1 into those with a low risk of post-operative bleeding complications and those that are judged to be more invasive and potentially carry a relatively higher risk of bleeding complications. By bleeding complications we mean prolonged or excessive bleeding or bleeding not controlled by initial haemostatic measures. Note that the use of the term 'higher risk' is not intended to suggest that these are high risk dental treatments.

Table 1 is intended to be a guide only and bleeding risk assessment for a patient's dental treatment is likely to require further judgement on an individual case basis. Before performing a dental procedure that is likely to cause bleeding on a patient taking anticoagulants or antiplatelet drugs, the dentist or dental care professional should use their clinical judgement to determine whether they are sufficiently confident and skilled in the procedure and management of the associated peri-operative bleeding. If in doubt they should seek advice from or refer the patient to a more experienced colleague in primary or secondary dental care. This may be an experienced senior colleague in practice, a speciality dentist/dentist with enhanced skills or senior dental officer (e.g. special care or oral surgery), or for very complex cases, a consultant in primary or secondary dental care. If the dentist needs to seek specialist advice from the hospital dental service, they should be aware that it may take time to receive a reply from a suitably senior member of the hospital dental team.

3 Assessing Bleeding Risk

Table 1 Post-operative bleeding risks for dental procedures

Dental procedures that are **unlikely to cause bleeding**	Dental procedures that are **likely to cause bleeding**	
	Low risk of post-operative bleeding complications	**Higher risk** of post-operative bleeding complications
Local anaesthesia by infiltration, intraligamentary or mental nerve block[a] Local anaesthesia by inferior dental block or other regional nerve blocks[a,b] Basic periodontal examination (BPE)[c] Supragingival removal of plaque, calculus and stain Direct or indirect restorations with supragingival margins Endodontics - orthograde Impressions and other prosthetics procedures Fitting and adjustment of orthodontic appliances	Simple extractions (1-3 teeth, with restricted wound size)[d] Incision and drainage of intra-oral swellings Detailed six point full periodontal examination Root surface instrumentation (RSI) and subgingival scaling Direct or indirect restorations with subgingival margins	Complex extractions[e], adjacent extractions that will cause a large wound or more than 3 extractions at once Flap raising procedures: • Elective surgical extractions • Periodontal surgery • Preprosthetic surgery • Periradicular surgery • Crown lengthening • Dental implant surgery Gingival recontouring Biopsies

[a] Local anaesthesia should be delivered using an aspirating syringe and should include a vasoconstrictor, unless contraindicated. Note that other methods of local anaesthetic delivery are preferred over regional nerve blocks, whether the patient is taking an anticoagulant or not.

[b] There is no evidence to suggest that an inferior dental block performed on an anticoagulated patient poses a significant risk of bleeding. However, for patients taking warfarin, if there are any indications that the patient has an unstable INR (see Section 5), or other signs of excessive anticoagulation, an INR should be requested before the procedure.

[c] Although a BPE can result in some bleeding from gingival margins, this is extremely unlikely to lead to complications.

[d] Simple extractions refers to those which are expected to be straightforward, without surgical complications.

[e] Complex extractions refers to those which may be likely to have surgical complications.

3 Assessing Bleeding Risk

3.2 Which Patients Have the Highest Bleeding Risk?

A patient's individual risk of bleeding complications is dependent on a variety of factors, including the type and combination of anticoagulants or antiplatelet drugs they are taking, their underlying health conditions and other medications that they may be taking. The patient's medical history and details of the prescribed and non-prescribed medication they are taking should be noted at the start of each course of treatment and checked for any changes at each visit (see Section 3.3).

3.2.1 Bleeding risks associated with different anticoagulants and antiplatelet drugs

There is currently insufficient evidence to directly compare the relative bleeding risks associated with the various anticoagulants and antiplatelet medications, including the newer drugs, for dental patients. According to the clinical trials conducted by the drug manufacturers, incidences of major bleeding events for patients with atrial fibrillation taking dabigatran, apixaban or rivaroxaban were similar or lower than for those taking warfarin.[14-16] However, it should be noted that these bleeding rates included spontaneous and procedural bleeding and may not be meaningful for dental treatments.

Patients who are on dual or combination therapies and are taking more than one anticoagulant or antiplatelet drug are likely to have a higher bleeding risk than those on single drug therapies.

The clinical experience of dental professionals suggests that dual antiplatelet medication can lead to prolonged bleeding following an invasive procedure. However, once formed, the clot tends to be reasonably stable. Conversely, clinical experience suggests that for patients taking anticoagulants, blood clots may form more quickly than with antiplatelet drugs but can also be more easily dislodged. The use of sutures at the time of treatment, in addition to haemostatic packing, usually stabilises the wound and may reduce the likelihood of prolonged or subsequent rebleeding and the need for the patient to return for further treatment.

3.2.2 Bleeding risks associated with other medical conditions

Certain medical conditions are known to be associated with an increased bleeding risk, due to effects on either coagulation or platelet function and should be taken into consideration when planning dental treatment for any patient. These include liver, kidney and bone marrow disorders.[17] Although these effects are not dependent on the patient's anticoagulation medication, it is especially important that the dentist recognises these as additional risk factors that can contribute to post-operative bleeding complications in patients taking anticoagulants or antiplatelet drugs. It is not possible to give an exhaustive list but the main conditions which could be relevant for patients also being treated with anticoagulants or antiplatelet drugs are shown in Table 2.

3 Assessing Bleeding Risk

Table 2 Main medical conditions associated with increased bleeding risk

Medical condition	Increased bleeding due to:
Chronic **renal failure**	Associated platelet dysfunction
Liver disease (e.g. caused by alcohol dependence, chronic viral hepatitis, autoimmune hepatitis, primary biliary cirrhosis)	Reduced production of coagulation factors. Reduction in platelet number and function due to splenomegaly. Alcohol excess can also result in direct bone marrow toxicity and reduced platelet numbers.
Haematological malignancy or myelodysplastic disorder	Impaired coagulation or platelet function (even in remission).
Recent[a] or current **chemotherapy**	Pancytopenia including reduced platelet numbers.
Advanced **heart failure**	Resulting liver failure.
Mild forms of **inherited bleeding disorders** including all types of haemophilia and von Willebrand's disease	Defective or reduced levels of coagulation factors.
Idiopathic thrombocytopenic purpura (ITP)	Reduced platelet numbers.

[a] Have received chemotherapy or radiotherapy to the head or neck less than three months ago, or total body irradiation less than six months ago.

For medically complex patients such as these, the patient's general medical practitioner or specialist should be consulted to establish the extent of the disease in order to assess the likely impact on the bleeding risk for the dental procedure.

3.2.3 Bleeding risks associated with prescribed or non-prescribed medications

In addition to the medical conditions discussed above, a number of different medications can exacerbate a patient's bleeding risk over and above the effects of the anticoagulants or antiplatelet drugs they are taking. Although not an exhaustive list, groups of drugs to be aware of include those described in Table 3.

3 Assessing Bleeding Risk

Table 3 Main drug groups associated with increased bleeding risk

Drug group	Effect
Other **Anticoagulants or antiplatelet drugs**[a] See Appendix 2 for listings.	Patients can be on dual, multiple or combined antiplatelet or anticoagulant therapies. These patients are likely to have a higher risk of bleeding complications than those on single drug regimes.
Cytotoxic drugs or drugs associated with bone marrow suppression[b] e.g. leflunamide, hydrochloroquine, adalimumab, infliximab, etanercept, sulfasalazine, penicillamine, gold, methotrexate, azathioprine, mycophenolate	These can reduce platelet numbers and/or impair liver function affecting production of coagulation factors.
Non-steroidal anti-inflammatory drugs (NSAIDs) e.g. aspirin, ibuprofen, diclofenac and naproxen	Impair platelet function to various extents.
Drugs affecting the nervous system Selective serotonin reuptake inhibitors (SSRIs)	SSRIs have the potential to impair platelet aggregation and, although unlikely to be clinically significant in isolation, may in combination with other antiplatelet drugs increase the bleeding time.
Carbamazepine	Carbamazepine can affect both liver function and bone marrow production of platelets. Patients most at risk are those recently started on this medication or following dose adjustment.

[a] Be aware that patients may also be taking non-prescribed aspirin, and this antiplatelet agent can in effect convert a prescribed monotherapy into a dual therapy.

[b] Patients with inflammatory bowel disease or autoimmune/rheumatological conditions are commonly prescribed these drugs.

For the management of patients taking these additional medications, the patient's general medical practitioner or specialist could be consulted in order to assess the likely impact on bleeding risk.

Be aware that some herbal and complementary medicines may affect bleeding risk, either on their own or when in combination with other anticoagulants or antiplatelet drugs. These include St. John's Wort, Ginkgo biloba and garlic.

3 Assessing Bleeding Risk

3.3 Advice for Assessing Bleeding Risk

The following best practice advice is based on clinical experience and expert opinion.

- Assess whether the required dental treatment is likely to cause bleeding and, if so, whether it has a low or higher risk of bleeding complications (see Table 1).
- Ask the patient about their current or planned use of anticoagulants or antiplatelet drugs and other prescribed and non-prescribed medications, when taking or confirming their medical history.
  - The patient should have been advised by their prescriber/dispenser about their anticoagulant or antiplatelet drug(s) and the need to inform their dentist.
  - Dentists should be aware, however, that a patient may not know that their medication is an anticoagulant or antiplatelet drug. A list of anticoagulants and antiplatelet drugs which may be encountered with outpatients in the UK can be found in Appendix 2.
  - Other medications that can also affect a patient's bleeding risk are listed in Section 3.2.3.
  - Be aware that many patients take non-prescribed medications such as aspirin, or other NSAIDs. Patients taking these may have a higher bleeding risk.
- Ask the patient whether their anticoagulant or antiplatelet treatment is lifelong or for a limited time.
  - If the patient is on time-limited medication, it may be possible to delay dental treatment until they have stopped taking the drug(s).
- Ask the patient about any medical conditions that they have.
  - The medical conditions for which anticoagulants and antiplatelet drugs are commonly prescribed in the UK are listed in Appendix 3. If a patient is suffering from one or more of these conditions, they may be taking an anticoagulant or antiplatelet drug.
  - Patients with prosthetic metal heart valves or coronary stents are at higher risk of a thromboembolic event and must not have their anticoagulant or antiplatelet medication altered, except under direct written instruction from their cardiologist.
  - Some patients may have other conditions such as kidney or liver disease or bone marrow disorders that can affect their coagulation and platelet function (see Section 3.2.2).
- Ask about the patient's bleeding history (e.g. incidences of bleeding requiring retreatment or a hospital visit, prolonged bleeding from other wounds, spontaneous bleeding, easy bruising etc).
  - A patient's previous experience of bleeding in response to invasive dental or surgical procedures or to trauma may be a useful indicator of the likelihood of bleeding complications from the current dental treatment.

4 Managing Bleeding Risk

Guidance on the management of dental treatment for a patient taking an anticoagulant or antiplatelet drug(s), based on the assessment of bleeding risk (see Section 3), is presented in the form of general advice in Section 4 and specific advice for the different drug groups in Sections 5 to 8.

The management of intra- and post-operative bleeding is the responsibility of the primary care practitioner who provides the dental treatment and they should take the appropriate steps to avoid bleeding complications. Practitioners should however be aware of the local arrangements for access to emergency care for the very rare occasions where bleeding cannot be controlled in the primary care setting.

4.1 Haemostatic Measures

The arrest of bleeding is a core skill for primary dental care and the dental practitioner should have the necessary equipment and skills to perform appropriate local haemostatic measures competently for dental procedures likely to cause bleeding. These include packing any open sockets with haemostatic material and placing sutures.[18] Suturing may be used to stabilise the clot, packing material and wound margins, unless it is likely to cause further trauma.

For all patients taking anticoagulants or antiplatelet drugs, haemostasis should be achieved using local measures prior to the patient being discharged from care. Active consideration should be given to suturing and packing, taking into account all relevant patient factors. These may include the drug or drug combination that the patient is taking, other medical conditions or medication that may impact on bleeding and the travel time for the patient to access emergency care if required (see Sections 3.2 and 4.2). Failure of initial haemostasis will necessitate packing and suturing at a later time.

Patients taking aspirin alone are unlikely to have a higher risk of bleeding complications than non-anticoagulated patients and may not require suturing.

The dental practitioner should have available‡:

- Absorbent gauze
- Haemostatic packing material (e.g. oxidized cellulose, collagen sponge)
- Suture kit (needle holders, tissue forceps, suture material, scissors)

Some guidelines recommend the use of tranexamic acid mouthwash as an additional haemostatic measure. However, there is insufficient evidence to indicate any additional benefit when used in conjunction with other haemostatic measures for dental procedures.[2]

‡ Some of these materials contain animal based protein which may not be acceptable to all patients, for ethical or religious reasons. Practices should ensure that non-animal based products are also available.

4 Managing Bleeding Risk

Tranexamic acid is not included in the List of Dental Preparations in the British National Formulary (BNF)[19] and therefore cannot be prescribed on the NHS. In addition, tranexamic acid is not available as a mouthwash so has to be prepared and prescribed off licence. Based on these considerations, this guidance does not advise primary care practitioners to prescribe tranexamic acid for dental procedures. However, if tranexamic acid is prescribed by the patient's medical practitioner then it should be used in addition to local measures.

4.2 Management of Patients in Remote and Rural Locations

Patients living in remote and rural locations may have to travel for longer to access primary care dental treatment, or secondary care in those very rare circumstances when a severe bleeding complication occurs. The individual circumstances should be taken into consideration for patients in remote and rural settings and particular emphasis should be placed on the use of measures to avoid complications (e.g. limiting the initial treatment area, staging treatment and haemostatic measures). In addition, extended post-operative monitoring of the patient prior to discharge is advisable. As with all patients, attitude to risk and the consequences of bleeding complications should be discussed and given due consideration when agreeing treatment.

4.3 Contacts and Referrals

If there is a lack of clarity regarding a patient's medical condition or their medication, in order to assess their bleeding risk and to inform treatment planning, consult with the patient's general medical practitioner, cardiologist or other medical specialist.

By following the recommendations in this guidance, dentists should be able to treat the vast majority of patients in primary care. If necessary, colleagues in primary or secondary dental care could be consulted for advice on treatment. This may be a more experienced senior colleague in practice, a speciality dentist/dentist with enhanced skills or senior dental officer (e.g. special care or oral surgery), or in very complex cases, a consultant in secondary dental care (see Section 3.1).

For exceptional cases, if there is concern about whether a patient can be treated safely in primary care, before any referral is made the first contact would be a colleague in secondary care to discuss the most appropriate management for the patient. This will avoid unnecessary or inappropriate referral and will ensure that the patient is referred to the most suitable service. If referring a patient, details of the patient's anticoagulation medication should be included in the referral.

4 Managing Bleeding Risk

4.4 General Advice for Managing Bleeding Risk

The following best practice advice is based on clinical experience and expert opinion.

For a patient who is taking an anticoagulant or antiplatelet drug(s) and requires dental treatment that is **unlikely to cause bleeding** (see Table 1):

- Treat the patient following standard procedures, taking care to avoid causing bleeding.

For a patient who is taking an anticoagulant or antiplatelet drug(s) and requires dental treatment that is **likely to cause bleeding**, with a **low or higher risk of bleeding complications** (see Table 1):

- If the patient has another relevant medical condition(s) or is taking other medications that may increase bleeding risk (see Sections 3.2.2 and 3.2.3), consult with the patient's general medical practitioner or specialist, if required, for more information in order to assess the likely impact on bleeding risk.
- If the patient is on a time-limited course of anticoagulant or antiplatelet medication, delay non-urgent, invasive dental procedures where possible until the medication has been discontinued.
  - If the medication is being taken in preparation for an elective surgical procedure it may be possible, in a dental emergency, to interrupt the drug treatment in liaison with the surgical consultant.
  - Patients with acute deep vein thrombosis or pulmonary embolism may be taking high dose apixaban or rivaroxaban for the first 1 to 3 weeks of treatment. It would be advisable to delay any dental procedures likely to cause bleeding until the patient is taking the standard dose.
- Plan treatment for early in the day and week, where possible, to allow time for the management of prolonged bleeding or rebleeding episodes, should they occur.
- Perform the procedure as atraumatically as possible, use appropriate local measures (see Section 4.1) and only discharge the patient once haemostasis has been achieved.
- If travel time to emergency care is a concern, place particular emphasis at the time of the initial treatment on the use of measures to avoid complications (e.g. limiting the initial treatment area, staging treatment, haemostatic measures and post-treatment monitoring).
- Advise the patient to take paracetamol, unless contraindicated, for pain relief rather than NSAIDs such as aspirin, ibuprofen, diclofenac or naproxen.
- Provide the patient with written post-treatment advice and emergency contact details. Printable post-treatment advice sheets are available at www.sdcep.org.uk.
- Follow the specific recommendations and advice given in Sections 5 to 8 for the management of patients taking the different anticoagulants or antiplatelet drugs.

5 Treating a Patient Taking Warfarin or another Vitamin K Antagonist

Although the use of warfarin is well established, managing its therapeutic anticoagulation activity can be complicated. Due to substantial drug and dietary interactions, variation in patients' responses to the drug and its narrow therapeutic range, warfarin activity has to be monitored frequently. This is achieved using the INR (International Normalised Ratio) test, which measures the time taken for a clot to form in a blood sample, relative to a standard. An INR value of 1 indicates a level of coagulation equivalent to that of an average patient not taking warfarin, and values greater than 1 indicate a longer clotting time and thus a longer bleeding time. The INR test is also used for patients taking the less commonly used VKAs, acenocoumarol and phenindione.

Target INR levels differ depending on the indication for which the drug is prescribed and can range from 2.5-3.5±0.5. A patient's warfarin therapy will be adjusted by their medical practitioner or anticoagulation service (or by the patient if self-monitoring) as necessary to achieve the target INR level appropriate for their medical condition. Warfarinised patients will have a record of their INR test results, which they should present when attending for dental treatment.

KEY RECOMMENDATION:

For a patient who is taking warfarin or another vitamin K antagonist, with an INR below 4, treat without interrupting their anticoagulant medication. (Strong recommendation; low quality evidence)

This recommendation is based on the available evidence[2,20-22] and extensive clinical experience. It should be considered a strong recommendation, because of emphasis placed on the potential risk of a thromboembolic event if warfarin treatment is interrupted. Further details on the development of the recommendations in this guidance can be found in Appendix 1 and at www.sdcep.org.uk.

For dental treatment that is **likely to cause bleeding**, with a **low or higher risk of bleeding complications** (see Table 1):

- Ensure that the patient's INR has been checked, ideally no more than 24 hours before the procedure. If the patient has a stable INR[a], checking the INR no more than 72 hours before is acceptable.
  - If there is reason to believe that a test result obtained up to 72 hours before dental treatment may not reflect the current level, then the patient's INR should be tested again no more than 24 hours before the dental procedure.
- If the patient's INR is 4 or above, inform the patient's general medical practitioner or anticoagulation service and delay treatment[b] until the patient's INR has been reduced to less than 4. For urgent treatment, refer the patient to secondary dental care.
- If the patient's INR is below 4, treat according to the general advice for managing bleeding risk (see Section 4), without interrupting their anticoagulant.

5 Treating a Patient Taking Warfarin or another Vitamin K Antagonist

In addition:

- Consider limiting the initial treatment area (e.g. perform a single extraction or limit subgingival periodontal scaling to 3 teeth, then assess bleeding before continuing).
- For procedures with a higher risk of post-operative bleeding complications (see Table 1), consider carrying out the treatments in a staged manner over separate visits or seek advice from a more experienced colleague in primary or secondary dental care (see Section 3.1).
- Use local haemostatic measures to achieve haemostasis. Actively consider suturing and packing, taking into account all relevant patient factors (see Section 4).

[a] Based on the BNF's definition, a stable patient would be one who does not require weekly monitoring and who has not had any INR measurements above 4 in the last 2 months[19]

[b] If the patient is prescribed amoxicillin for the dental condition, be aware that this may affect their INR level and this should be checked 24 hours after starting the antibiotic.

6 Treating a Patient Taking an Antiplatelet Drug(s)

Patients taking antiplatelet medications tend to have prolonged bleeding times[5], which is a consequence of the requirement for platelet aggregation in the formation of the initial platelet plug in primary haemostasis. This should be taken into consideration when planning dental treatments likely to cause bleeding, to ensure that sufficient time is available to achieve and monitor haemostasis.

There is no suitable test equivalent to the INR for measuring the antiplatelet effect of the various drugs that patients may be taking. Patients on dual antiplatelet therapies may have a higher risk of prolonged bleeding compared to those on a single antiplatelet drug and should be managed accordingly.

The most commonly encountered antiplatelet combination is aspirin with clopidogrel (for acute coronary syndrome). Dipyridamole with aspirin after a stroke or transient ischaemic attack (TIA) is less commonly prescribed, as clopidogrel monotherapy is considered to be more effective and better tolerated. The newer antiplatelet drugs prasugrel (Efient) and ticagrelor (Brilique) are only prescribed in combination with aspirin and are currently only licensed for patients with acute coronary syndrome.[23,24] Evidence relating to bleeding risks with prasugrel and ticagrelor in the context of dental procedures is very limited.

Patients with a coronary artery stent will be prescribed dual antiplatelet therapy for up to 12 months. It is extremely important that this treatment is not stopped prematurely or interrupted without prior discussion with and written advice from the patient's cardiologist because of the risk of major adverse cardiac events.

KEY RECOMMENDATION:

For a patient who is taking single or dual antiplatelet drugs, treat without interrupting their antiplatelet medication.
(Strong recommendation; low quality evidence)

This recommendation is based on the available evidence[5,21,22,25] and extensive clinical experience. It should be considered a strong recommendation, because of emphasis placed on the potential risk of a thromboembolic event if antiplatelet treatment is interrupted. Further details on the development of the recommendations in this guidance can be found in Appendix 1 and at www.sdcep.org.uk.

6 Treating a Patient Taking an Antiplatelet Drug(s)

For dental treatment that is **likely to cause bleeding**, with a **low or higher risk of bleeding complications** (see Table 1):

- Treat the patient according to the general advice for managing bleeding risk (see Section 4), without interrupting their antiplatelet medication.

In addition:

If the patient is taking aspirin alone

- Consider limiting the initial treatment area (e.g. perform a single extraction or limit subgingival periodontal scaling to 3 teeth, then assess bleeding before continuing).
- For procedures with a higher risk of post-operative bleeding complications (see Table 1), consider carrying out the treatments in a staged manner over separate visits or seek advice from a more experienced colleague in primary or secondary dental care (see Section 3.1).
- Use local haemostatic measures to achieve haemostasis.

If the patient is taking another single antiplatelet drug or dual antiplatelet drugs

- Be aware that bleeding may be prolonged (up to an hour). This should be taken into account when planning treatment time.
- Limit the initial treatment area (e.g. perform a single extraction or limit subgingival periodontal scaling to 3 teeth, then assess bleeding before continuing).
- For procedures with a higher risk of post-operative bleeding complications (see Table 1), consider carrying out the treatments in a staged manner over separate visits, or seek advice from a more experienced colleague in primary or secondary dental care (see Section 3.1).
- Use local haemostatic measures to achieve haemostasis. Actively consider suturing and packing, taking into account all relevant patient factors (see Section 4).

6 Treating a Patient Taking an Antiplatelet Drug(s)

Other drug combinations

For some patients other combinations of medications are prescribed, including aspirin with warfarin or clopidogrel with warfarin or in rare cases, triple drug combinations. These patients are likely to have a higher bleeding risk and may have additional medical complications.

For a patient who is taking another combination of antiplatelet drugs and/or anticoagulants and requires dental treatment that is **likely to cause bleeding**, with a **low or higher risk of bleeding complications** (see Table 1):

- Consult with the patient's general medical practitioner or prescribing physician in order to assess the likely impact of the particular drug combination and the patient's medical condition on their bleeding risk. If necessary seek advice from, or refer to, a more experienced colleague in primary or secondary dental care (see Section 3.1).

7 Treating a Patient Taking a Novel Oral Anticoagulant*

The INR test is not suitable for assessing coagulation levels in patients taking dabigatran, apixaban or rivaroxaban.[26] The effects of dabigatran on coagulation can be qualitatively assessed using the commonly available aPTT (activated partial thromboplastin time) coagulation assay.[27] Similarly, the PT (prothrombin time) test can give some indication of the relative levels of anticoagulation with rivaroxaban.[28] Although quantitative laboratory tests suitable for the NOACs are not yet widely available, since these drugs provide more predictable anticoagulation[9] monitoring is considered less important than for warfarin and is not carried out routinely.

Compared to warfarin, the NOACs exhibit a rapid onset of action (2-4 hours) and have relatively short half-lives (5-13 hours for rivaroxaban, ~12 hours for apixaban and ~13 hours for dabigatran, depending on renal function and age).[29-31] Because of these pharmacokinetic properties, it is possible to modify an individual's anticoagulation status quite rapidly, minimising the period where the anticoagulation activity is therapeutically sub-optimal. Although in development, there are not any simple reversal agents available for the NOACs as yet.[32] However, as before, the short half-lives of these drugs allow for the relatively rapid reduction of their anticoagulation effects.

Apixaban (Eliquis) and dabigatran (Pradaxa) are taken twice a day, while rivaroxaban (Xarelto) is most commonly taken once a day, either in the morning or at night. For each of the drugs, a lower dose is indicated for certain patients including those with various levels of renal impairment and in some cases elderly patients.[29-31] Patients with acute deep vein thrombosis or pulmonary embolism may be taking high dose apixaban or rivaroxaban for the first 1 to 3 weeks of treatment. It would be advisable to delay any dental procedures likely to cause bleeding until the patient is taking the standard doses.

There are currently no published clinical trials specifically assessing the bleeding risks associated with dental procedures for patients taking the NOACs.

KEY RECOMMENDATIONS:

For a patient who is taking a NOAC and requires a dental procedure with a **low risk of bleeding complications**, treat without interrupting their anticoagulant medication.
(Conditional recommendation; very low quality evidence)

For a patient who is taking a NOAC and requires a dental procedure with a **higher risk of bleeding complications**, advise them to miss (apixaban, dabigatran)/delay (rivaroxaban) their morning dose on the day of their dental treatment.
(Conditional recommendation; very low quality evidence)

*Also known as NOACs, DOACs or TSOACs (see Section 1).

7 Treating a Patient Taking a Novel Oral Anticoagulant

There is a lack of direct clinical evidence and clinical experience to favour either continuing or interrupting NOAC medication for invasive dental treatments. The recommendations given here are based on the balance of likely effects of each option for each dental procedure, the known characteristics of the drugs, such as their short half-lives and rapid onset of action and consensus of expert opinion. They are judged to be conditional recommendations because of the lack of evidence and the fine balance between the potential risks and benefits of the treatment options.

Further details on the development of the recommendations in this guidance can be found in Appendix 1 and at www.sdcep.org.uk.

The estimated risk to the patient of a thromboembolic event resulting from brief NOAC interruption is judged to be extremely small, while the risk of a bleeding complication if the NOAC is continued is likely to be small but also depends on the procedure involved and the individual patient. However, both risks are judged to be uncertain, because of the lack of evidence. Because the potential risks from either continuing or interrupting a patient's NOAC medication are so finely balanced, the anticoagulant management options, risks and lack of evidence should be discussed with the patient.

For a patient who is taking a NOAC and requires dental treatment that is **likely to cause bleeding,** with a **low or higher risk of bleeding complications** (see Table 1):

- Discuss with the patient the possible benefits and harms and the balance of risks for continuing or interrupting their NOAC medication in the context of the required dental treatment, when gaining consent (see Sections 7.1 and 7.2).

Since the advice on interruption of medication is for a patient to miss at most a single dose of NOAC, or to delay for several hours, it is not usually necessary to consult with the patient's medical practitioner first. However, if the dental practitioner or patient has any concerns then they should discuss these with the patient's general medical practitioner, prescriber or medical specialist.

7.1 Management for Procedures with a Low Risk of Bleeding Complications

The consensus of expert opinion is that it is not necessary to interrupt NOAC medication for dental procedures that are likely to cause bleeding, but which have a low risk of bleeding complications (see Table 1). Because the bleeding risk for these procedures is considered to be low, the balance of effects is in favour of continuing the NOAC treatment without modification, to avoid increasing the risk of a thromboembolic event.

7 Treating a Patient Taking a Novel Oral Anticoagulant

Although treating a patient in the morning, as advised, is more likely to coincide with the relative peak of drug concentration, this risk was judged to be outweighed by the importance of being able to deal with a bleeding complication, should it occur, within surgery hours.

For a patient who is taking a NOAC and requires dental treatment that is **likely to cause bleeding,** with a **low risk of bleeding complications** (see Table 1):

- Treat the patient according to the general advice for managing bleeding risk (see Section 4), without advising the patient to miss or delay a dose of their medication.

In addition:

- Plan treatment for early in the day to allow for monitoring and management of bleeding complications, should they occur.
- Limit the initial treatment area (e.g. perform a single extraction or limit subgingival periodontal scaling to 3 teeth, then assess bleeding before continuing).
- Use local haemostatic measures to achieve haemostasis. Actively consider suturing and packing, taking into account all relevant patient factors (see Section 4).

7.2 Management for Procedures with a Higher Risk of Bleeding Complications

The consensus of expert opinion is that patients should be advised to miss (apixaban or dabigatran) or delay (rivaroxaban) a dose of their NOAC prior to dental procedures that are likely to cause bleeding and which have a higher risk of bleeding complications (see Table 1). Because the risk of bleeding complications for these procedures is considered to be higher, the balance of effects is in favour of missing or delaying the pre-treatment NOAC dose. The interruption is only for a short time to minimise the effect on thromboembolic risk. Missing or delaying the morning dose of NOAC will significantly reduce the level of anticoagulation at the time of dental treatment.

For a patient who is taking a NOAC and requires dental treatment that is **likely to cause bleeding,** with a **higher risk of bleeding complications** (see Table 1):

- Advise the patient to miss (apixaban or dabigatran)/delay (rivaroxaban) their morning dose on the day of their dental treatment, and treat according to the general advice for managing bleeding risk (see Section 4).
  - If the patient usually takes their once a day rivaroxaban in the evening, there is no need to modify their medication schedule prior to the dental treatment.

In addition:

- Plan treatment for early in the day to allow for monitoring and management of bleeding complications, should they occur.

7 Treating a Patient Taking a Novel Oral Anticoagulant

- Consider carrying out the treatments in a staged manner over separate visits, or seek advice from a more experienced colleague in primary or secondary dental care (see Section 3.1).
- Use local haemostatic measures to achieve haemostasis. Actively consider suturing and packing, taking into account all relevant patient factors (see Section 4).
- Advise the patient when to restart their medication.
  - For rivaroxaban (taken once a day), the delayed morning dose may be taken 4 hours after haemostasis has been achieved. The next dose should be taken as usual the following morning. If the patient normally takes their rivaroxaban in the evening, they can take this at the usual time on the day of treatment as long as it is no earlier than 4 hours after haemostasis has been achieved.
  - For apixaban or dabigatran (taken twice a day), having missed the morning dose, the patient should take their evening dose of NOAC at the usual time as long as it is no earlier than 4 hours after haemostasis has been achieved.
  - Advise the patient to recontact the practice for advice if rebleeding occurs prior to, or after, restarting their NOAC.
  - The patient should avoid missing subsequent doses of their NOAC, unless absolutely required in an emergency situation to control bleeding.

Although many of the higher risk procedures are likely to be elective, there may be rare occasions when they are required urgently in an emergency situation. In such cases, where the patient has already taken their morning dose of NOAC, it is advisable to delay the procedure until later in the day, where possible, to allow levels of anticoagulation to decrease.

8 Treating a Patient Taking an Injectable Anticoagulant

The low molecular weight heparins (LMWHs), dalteparin (Fragmin), enoxaparin (Clexane) and tinzaparin (Innohep) are administered parenterally by subcutaneous injection rather than orally as for the other anticoagulants discussed, and although used in limited patient groups they may still be encountered in a primary dental setting. Patients taking LMWHs may include pregnant women with indications for anticoagulation and patients with venous thrombosis with a background of cancer. These drugs may be administered once or twice a day at either prophylactic or therapeutic doses.[33-35] Like the NOACs, these drugs have a short onset of action and short half-lives.

There is a lack of direct clinical evidence regarding the dental treatment of patients taking injectable anticoagulants, including the LMWHs. Furthermore, patients taking these drugs are likely to have varied conditions and drug regimes such that further information is required to make a reasonable judgement on the management of their dental treatment.

For a patient who is taking an injectable anticoagulant and requires dental treatment that is **likely to cause bleeding** (see Table 1):

- Consult with the patient's general medical practitioner or specialist to establish the patient's medical condition and medication regime in order to assess the likely impact on bleeding risk for the dental procedure. If necessary seek advice from, or refer to, a more experienced colleague in primary or secondary dental care (see Section 3.1).

Note that patients are often given heparin or one of the LMWHs during kidney dialysis. The effects of these are relatively short-lived but where possible dental treatments likely to cause bleeding should be delayed until the following day.

9 Drug Interactions Between Anticoagulants or Antiplatelet Drugs and Other Medications

There are a large number of documented interactions between the anticoagulant or antiplatelet medications and other prescription drugs. The current BNF (available at www.medicinescomplete.com) or individual drug Summary of Product Characteristics (SPC) sheets (available on the electronic Medicines Compendium (eMC) website; www.medicines.org.uk) should be consulted for complete listings.

For the purposes of this guidance, only the interactions between anticoagulants and antiplatelet medications and drugs that are available in the BNF Dental Practitioner's Formulary are considered. These interactions are listed in Appendix 4.

10 Research and Audit

10.1 Recommendations for Research

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

- the effect of the Novel Oral Anticoagulants (NOACs) on bleeding complications following invasive dental procedures;
- the effect of the newer antiplatelet drugs (prasugrel, ticagrelor) on bleeding complications following invasive dental procedures.

10.2 Recommendations for Audit

Topics for audit and review that could improve safety for dental patients taking anticoagulants or antiplatelet drugs include:

- the accuracy and completeness of medical history records;
- compliance with recommendations within the guidance, for example the use of haemostatic measures.

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 (www.triads.org.uk).

SDCEP is funded by NHS Education for Scotland and has made important contributions to the implementation of the Scottish Government's Dental Action Plan, which aims to both modernise dental services and improve oral health in Scotland.

Appendix 1
Guidance Development

The Guidance Development Group

A Guidance Development Group (GDG), comprising individuals from a range of branches of the dental and medical professions and a patient representative, was convened to develop and write this guidance.

Garry Sime (Chair)	Senior Dental Officer and Specialist in Special Care Dentistry, NHS Tayside
Carol Armstrong	Dental Tutor Therapist, UHISOHS, NHS Dumfries & Galloway
Dean Barker	Consultant in Restorative Dentistry/Honorary Clinical Senior Lecturer, University of Aberdeen Dental School and Hospital
Adrian Brady	Consultant Cardiologist, NHS Greater Glasgow & Clyde; Associate Professor, University of Glasgow
Patricia Green	Patient Representative and Anticoagulation Europe (ACE) Local Patient Contact, Aviemore
Steven Johnston	Salaried Dental Officer, Public Dental Service, NHS Orkney
Douglas Kennedy	Consultant in Oral & Maxillofacial Surgery, NHS Tayside
Clare Marney	Consultant in Oral Medicine, Dundee Dental Hospital and School
Steve McGlynn	Specialist Principal Pharmacist (Cardiology), NHS Greater Glasgow & Clyde; Honorary Senior Teaching Fellow, University of Strathclyde
Namita Nayyer	Specialty Registrar in Oral Surgery, Dundee Dental Hospital and School
Avril Neilson	Consultant in Oral Surgery, Dundee Dental Hospital and School
Gillian Nevin	General Dental Practitioner, Coupar Angus; Assistant Director of Postgraduate GDP Education, Dundee Dental Education Centre
Christine Randall	Senior Medicines Information Pharmacist and UKMi Representative, North West Medicines Information Centre, Liverpool
Simon Randfield	General Practitioner, NHS Forth Valley
Petrina Sweeney	Senior Lecturer/Honorary Consultant in Special Care Dentistry, University of Glasgow Dental School
Campbell Tait	Consultant Haematologist, NHS Greater Glasgow & Clyde
Liz Theaker	Consultant in Oral Medicine, Dundee Dental Hospital and School
John Wall	General Dental Practitioner, Perth

The GDG would like to thank Anne Littlewood, Trials Search Co-ordinator, Cochrane Oral Health Group, for performing the literature searches that underpin the development of this guidance.

Appendix 1
Guidance Development

The Programme Development Team

The GDG works closely with the Programme Development Team, which provides project management and administrative support and is responsible for the methodology of guidance development.

Jan Clarkson*	Professor of Clinical Effectiveness, University of Dundee; SDCEP Director
Douglas Stirling*	Programme Manager – Guidance and Programme Development
Michele West*	Research and Development Manager – Guidance Development and Lead for *Management of Dental Patients taking Anticoagulants or Antiplatelet Drugs*
Samantha Rutherford	Research and Development Manager – Guidance Development
Linda Young*	Research and Development Manager – Evaluation of Implementation
Catalina Martin*	Research Assistant
Margaret Mooney*	Administrator
Liz Payne	Administrator

*directly involved in the development of this guidance

Appendix 1
Guidance Development

Guidance Development Methodology

SDCEP endeavours to use a methodology for guidance development that reflects that used to develop high quality guidelines. It 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). Details of SDCEP guidance development methodology are available at www.sdcep.org.uk.

Following the TRiaDS framework for translating guidance recommendations into practice[36] the views of general dental practitioners on current practice, attitudes to the management of patients taking anticoagulants or antiplatelet drugs and preferred content of this guidance were obtained via telephone interviews. Patient experiences and views were obtained via a questionnaire posted online and distributed through local anticoagulation clinics. This research was used to inform the scope and content of the guidance and the strategy for identifying evidence.

For this guidance, a comprehensive search of MEDLINE, EMBASE and CINAHL was conducted by the Trials Search Co-ordinator of the Cochrane Oral Health Group on the 6th October 2014 and of the Cochrane Database of Systematic Reviews and the Cochrane Database of Abstracts of Reviews of Effects on the 10th October 2014. Potentially eligible articles were identified independently by two reviewers from the list of titles and abstracts retrieved. An article was considered potentially eligible if it met all 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 1 or more electronic databases and a table of included studies.

2. The article referred to (i) anticoagulants or antiplatelet drugs and (ii) bleeding or thromboembolic risk in the context of dental treatment.

Where insufficient evidence relevant to dental treatments was obtained, the search results from broader searches were queried using individual anticoagulant terms. The details of all of the searches can be found at www.sdcep.org.uk.

Additional manual searching of guideline repositories and other resources, and follow up of citations from relevant articles found through the systematic searching was also carried out. Other sources of evidence identified by GDG members were also considered, taking relevance and methodological quality into account.

A list of clinical questions related to the scope of the guidance was compiled by members of the GDG and eligible articles which were relevant for each question were identified. For the development of this guidance SDCEP used the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) approach to assess and rate the quality of evidence (www.gradeworkinggroup.org). For guidelines, the AGREE II instrument was used, in addition to GRADE, to assess the methodological quality of the retrieved articles (www.agreetrust.org).

Appendix 1
Guidance Development

The synthesised evidence was summarised and distributed to the GDG to inform and facilitate the development of the recommendations for the guidance. Where authoritative evidence was unavailable, the GDG was asked to make recommendations based on current best practice and expert opinion, reached by consensus. The process for development of recommendations also followed the GRADE approach, with considered judgements based on the quality of evidence, the balance of risks and benefits, the values and preferences of the patients, and the limitations and inconveniences of the treatment.

A four week external consultation was initiated on February 10th 2015. The consultation draft was made available through the SDCEP website and notification of this was sent to a wide range of individuals and organisations with a particular interest in this topic. To obtain feedback from the end-users of the guidance, a small number of dentists were contacted directly to evaluate the guidance, and all dentists, dental therapists and dental hygienists in Scotland notified that the consultation draft was available for comment. All comments received through the consultation process were considered by the GDG and the guidance amended accordingly prior to publication.

For this guidance, a review of the topic will take place in 2018, and, if this has changed significantly, the guidance will be updated accordingly.

Further information about SDCEP and guidance development is available at www.sdcep.org.uk.

Steering Group

The Steering Group oversees all the activities of the SDCEP and includes representatives of guidance development groups and the dental institutions in Scotland. For up-to-date membership of the Steering Group, refer to the SDCEP website (www.sdcep.org.uk).

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. Declarations of interest and decisions about potential conflicts of interest are available at www.sdcep.org.uk or on request.

Appendix 2
Anticoagulants and Antiplatelet Drugs Available in the UK

	UK Trade name(s)	Other names (non-UK)
Oral Anticoagulants		
warfarin[a]	Marevan	Coumadin, Jantoven, Uniwarfin, Aldocumar (There are another 10-20 trade names used)
phenindione	Dindevan	Phenyline, Pindione
acenocoumarol	Sinthrome	Sintrom, Sinkumar, Syncumar
Oral Antiplatelet Drugs		
aspirin[a] (acetylsalicylic acid, ASA)	Nu-Seals, Microprin, caprin Dual with dipyridamole: Asasantin Retard, Molita Modified Release	There are numerous brand names for aspirin
clopidogrel[a]	Plavix, Grepid	Iscover
dipyridamole	Persantin, Persantin Retard, Attia Modified Release, Ofcram PR. Dual with aspirin: Asasantin Retard, Molita Modified Release	
prasugrel	Efient	Effient, Prasita
ticagrelor	Brilique	Brilinta, Possia
NOACs[b]		
apixaban	Eliquis	
dabigatran	Pradaxa	Pradax, Prazaxa
rivaroxaban	Xarelto	
Injectable Anticoagulants		
dalteparin	Fragmin	Fragmine, Dalpin, Daltehep
enoxaparin	Clexane	Lovenox, Xaparin, Klexane
tinzaparin	Innohep	Logiparin

[a] These are currently the most commonly prescribed anticoagulants and antiplatelet drugs

[b] Also known as DOACs or TSOACs (see Section 1).

Appendix 3
Indications for Anticoagulant or Antiplatelet Therapy

This list is not comprehensive and is intended as a guide to reflect the current use of these drugs in the UK population. Conditions for which the new drugs in particular are licensed, are subject to change.

Medical condition	Commonly used treatments[a]	Treatment duration	Notes
Stroke or transient ischaemic attack (TIA) in the absence of atrial fibrillation (AF)	Single or dual antiplatelets	Lifelong	Occasionally warfarin
Stroke prevention in patients with **Atrial fibrillation** (AF)	Warfarin (other VKAs rarely) or a NOAC	Lifelong	Occasionally single or dual antiplatelets
Thromboembolic disease including, but not limited to **Deep Vein Thrombosis** (DVT) and **Pulmonary Embolism** (PE)	Warfarin, NOAC or injectable anticoagulant	Treatment usually 6 weeks to 6 months Prophylaxis can be lifelong	Can be lifelong if there is recurrence or an ongoing untreatable risk factor (e.g. malignancy)
Recent significant **surgery**	Injectable anticoagulant or NOAC	Usually 2-6 weeks	Occasionally warfarin
Any **heart surgery**, but especially prosthetic **replacement heart valve**	Warfarin (or other VKA) or single antiplatelet	Long term	Warfarin or similar for mechanical valves, aspirin for tissue valves
Coronary Heart Disease: Stable Angina Unstable Angina Heart Attack (STEMI[b] and Non-STEMI)	Single antiplatelet, dual antiplatelet, warfarin, warfarin with single antiplatelet or injectable anticoagulant	Dual therapy for up to 12 months, single aspirin, warfarin or clopidogrel lifelong	
Coronary stent	Single or dual antiplatelets	Dual therapy for up to 12 months, monotherapy lifelong	
Kidney **dialysis**	Heparin or injectable anticoagulants	On day of dialysis	

Appendix 3
Indications for Anticoagulant or Antiplatelet Therapy

Medical condition	Commonly used treatments[a]	Treatment duration	Notes
Pregnancy with associated risk factors for venous thromboembolism (VTE)	Aspirin (or injectable anticoagulants in some high risk cases)	Until delivery	Risks include obesity
Treatment of **DVT** in **pregnancy**	Injectable anticoagulant	Until at least 6 weeks after delivery	
Peripheral Vascular Disease (PVD)/**Peripheral Arterial Disease** (PAD)	Single or dual antiplatelets	Lifelong	
Apical/ventricular/mural thrombus	Warfarin	6 months (reviewed after echocardiography)	Often in combination with dual antiplatelets if recent heart attack

[a] Further combinations are possible if the patient has multiple indications

[b] STEMI: ST segment elevation myocardial infarction

Appendix 4
Interactions with Drugs Prescribed by Dentists

Appendix 4 shows a table of possible interactions and effects between anticoagulants or antiplatelet medications and drugs prescribed by dentists. This has been compiled from information contained in the current BNF[19], the individual drug Summary of Product Characteristics (SPCs; www.medicines.org.uk) and with expert advice. Drugs which are likely to increase the anticoagulant or antiplatelet effect of the existing medication, and therefore have the potential to increase bleeding risk, are indicated in **red**. Those which may decrease the anticoagulant or antiplatelet effect of the existing medication, and therefore have the potential to increase the patient's thromboembolic risk, are indicated in **blue**.

The information provided summarises the main interactions and may not be exhaustive. The information is correct at time of publication but may be subject to change, especially for the newer drugs. For further information refer to the current version of the BNF at www.medicinescomplete.com, the individual drug SPCs at www.medicines.org.uk and SDCEP Drug Prescribing For Dentistry guidance.[37]

	Interactions (and possible effects)
Oral Anticoagulants	
warfarin **phenindione**	Penicillins[a] including co-amoxiclav (reports of increased INR with **amoxicillin**[b]) **Metronidazole**, **erythromycin**, **clarithromycin** (anticoagulant effect enhanced in a minority of patients) NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk) **Carbamazepine** (reduced anticoagulant effect) **Miconazole**, **fluconazole** (established and clinically important increase in anticoagulation effect)
acenocoumarol	
Oral Antiplatelet Drugs	
aspirin	NSAIDs[c]: **ibuprofen, diclofenac** (may increase bleeding risk although note that the antiplatelet effect of aspirin may be reduced by ibuprofen if used regularly)
clopidogrel	NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk) **Erythromycin** (may reduce antiplatelet effect) **Carbamazepine** (may reduce antiplatelet effect) **Fluconazole** (may reduce antiplatelet effect) **Omeprazole** (may reduce antiplatelet effect)

Appendix 4
Interactions with Drugs Prescribed by Dentists

	Interactions (and possible effects)
dipyridamole	**Aspirin**[c] (may increase bleeding risk)
prasugrel	NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk)
ticagrelor	NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk) **Clarithromycin** (plasma concentration of ticagrelor may be increased) **Carbamazepine** (plasma concentration of ticagrelor may be reduced)
NOACs[d]	
apixaban	NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk) **Carbamazepine** (plasma concentration of apixaban may be reduced)
dabigatran	NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk) **Clarithromycin** (may increase bleeding risk) **Carbamazepine** (plasma concentration of dabigatran may be reduced)
rivaroxaban	NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk) **Carbamazepine** (plasma concentration of rivaroxaban may be reduced)
Injectable Anticoagulants	
dalteparin	NSAIDs[c]; **aspirin**, **ibuprofen**, **diclofenac** (may increase bleeding risk)
enoxaparin	
tinzaparin	

[a] Fever or infection can affect coagulation or drug metabolism therefore any patient systemically unwell enough to require an antibiotic may have an altered coagulation status.

[b] Since the INR can be increased, if antibiotics such as amoxicillin are prescribed the patient's INR should be rechecked after 24 hours.

[c] The use of NSAIDs is discouraged in patients with vascular disease, because of their antiplatelet action. Simple analgesics (paracetamol, co-codamol) should be tried first. If an NSAID is required, treatment length should be kept to a minimum.

[d] Also known as DOACs or TSOACs (see Section 1).

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Notes

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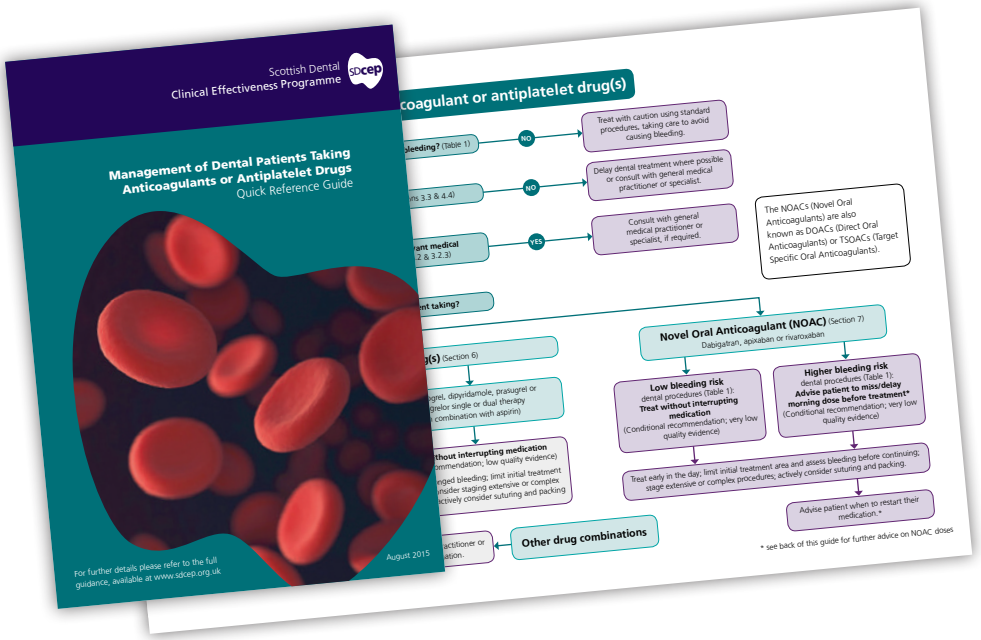
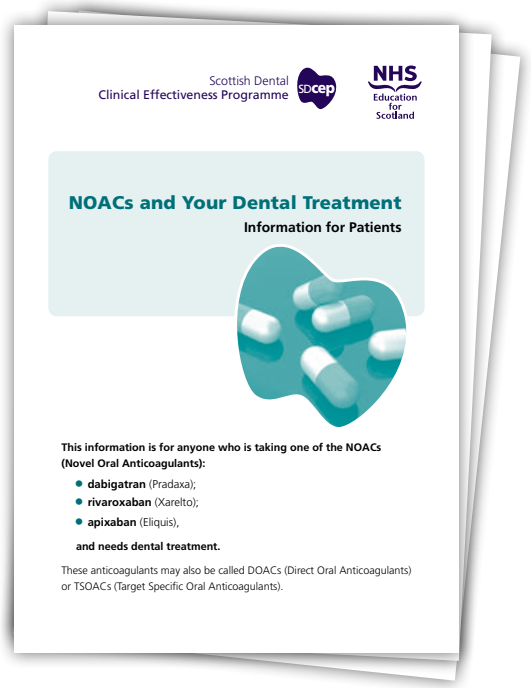
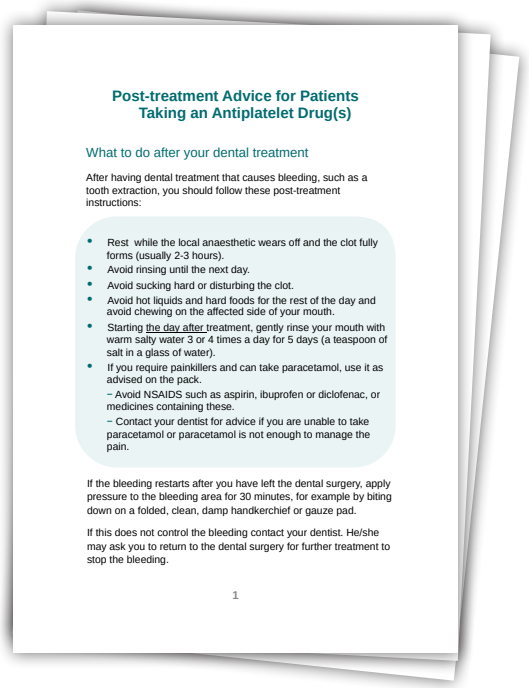
Additional supporting tools are also available to download from www.sdcep.org.uk.



Management of Dental Patients Taking Anticoagulants or Antiplatelet Drugs: Quick Reference Guide



Patient Information Leaflets



Post-treatment Advice Sheets

The Scottish Dental Clinical Effectiveness Programme (SDCEP) is an initiative of the National Dental Advisory Committee in partnership with NHS Education for Scotland. The Programme aims to provide 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.

Management of Dental Patients Taking Anticoagulants or Antiplatelet Drugs aims to provide clear and practical advice to enable the dental team to manage and treat this patient group. The guidance presents advice to inform the assessment of bleeding risk and decision making for treatment planning. Information about the newer anticoagulants and antiplatelet drugs as well as the more established medications is provided.

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