Quality Resource Guide

Dental Care for Patients with Bleeding Disorders

Author Acknowledgements

MICHAELL A. HUBER, DDS

Department of Comprehensive Dentistry
UT Health San Antonio School of Dentistry
San Antonio, Texas

Dr. Huber has no relevant financial relationships to disclose.

Educational Objectives

Following this unit of instruction, the practitioner should be able to:

1. Understand basic physiologic elements of normal hemostasis and common hematologic impairments.
2. Recognize the importance of the medical history in identifying the patient at risk for a bleeding disorder.
3. Recognize clinical signs suggestive of a hematologic impairment.
4. Develop a protocol to manage commonly encountered bleeding risk scenarios in dental practice.

MetLife designates this activity for **1.0 continuing education credits** for the review of this Quality Resource Guide and successful completion of the post test.

The following commentary highlights fundamental and commonly accepted practices on the subject matter. The information is intended as a general overview and is for educational purposes only. This information does not constitute legal advice, which can only be provided by an attorney.

Originally published February 2013. Updated and revised June 2016, October 2019 and November 2022. Expiration date: November 2025.

The content of this Guide is subject to change as new scientific information becomes available.

ADA C·E·R·P® | Continuing Education Recognition Program

Accepted Program Provider FAGD/MAGD Credit **05/01/21 - 06/31/25.**

MetLife is an ADA CERP Recognized Provider. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry. Concerns or complaints about a CE provider may be directed to the provider or to ADA CERP at https://ccepr.ada.org/en/ada-cerp-recognition.

Address comments or questions to:
DentalQuality@metlife.com - or -
MetLife Dental Continuing Education
501 US Hwy 22
Bridgewater, NJ 08807

Cancellation/Refund Policy:
Any participant who is not 100% satisfied with this course can request a full refund by contacting us.

Introduction

Numerous routine dental therapies often cause some level of bleeding, which may be quickly and effectively controlled for most patients. However, for the patient with an underlying hematologic impairment, bleeding associated with dental therapy may lead to serious and potentially grave consequences.

Fortunately, the majority of these patients are easily identified with a thorough medical history and clinical examination.[1] The purpose of this guide is to briefly review: 1) the physiology of hemostasis; 2) types of hemostatic impairment, and; 3) a suggested protocol to identify and manage the dental patient with an increased bleeding risk.

Review of Physiology

Normal hemostasis is defined as the physiologic balance of procoagulant and anticoagulant factors that maintain the fluid flow of blood and the structural integrity of the vasculature. A simplified view is that either extrinsic or intrinsic vascular injury initiates a series of physiologic responses (platelet activation, coagulation cascade) that ultimately lead to the formation of a platelet-fibrin thrombus (clot) that arrests bleeding. Subsequent tissue repair results in the degradation and ultimate destruction of the no longer necessary clot. A simplified illustration of the coagulation cascade is presented in **Figure 1**. [Figure 1 is for illustrative purposes only and the inferred linear flow to hemostasis does not represent the complexity that occurs in vivo][2]

Impairment of any component or components of the hemostatic process may result in a bleeding disorder. Underlying causes may be either acquired or inherited and are summarized in **Table 1.** Acquired coagulation disorders due to prescribed medical therapy (iatrogenic), are the most frequently encountered hematologic impairments in clinical dental practice.[1]

Identifying the Patient with a Hematologic Impairment

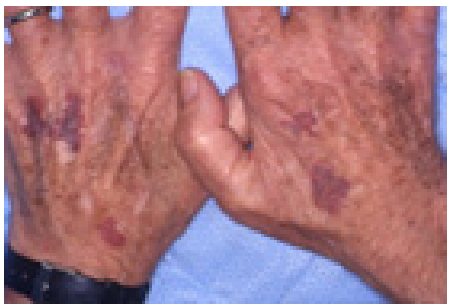
The majority of patients with a hematologic impairment are identified through the completion of a thorough medical history and clinical examination.[1] Questions during obtainment of the medical history include:

1) current or past bleeding problems (prolonged bleeding) affecting the patient or blood relatives;
2) bleeding problems related to past surgical or traumatic events;
3) exposure to agents (drugs, chemicals, supplements) associated with increased bleeding risk, and;
4) the presence of diseases associated with increased bleeding risk, are useful to help identify the "at risk" patient.

Affirmative responses must be pursued for further explanation and detail. As an example, if the patient answers "yes" to an inquiry pertaining to easy bleeding or bruising, the clinician should inquire further to determine the clinical pattern. This allows the practitioner to separate the less concerning ("I got these bruises after I bumped into the coffee table") from the more concerning ("These bruises appeared without hitting anything" or "I just started noticing them"). Episodes of prolonged bleeding that resulted in a visit to the doctor's office or hospital are also important historical findings.

A dentist's clinical examination should not be limited to the oral cavity. It should include inspection of exposed skin to determine the presence of ecchymoses (**Figure 2**), purpura, petechiae, spider

Figure 2



Ecchymoses observable on elderly individual taking warfarin.

Figure 1 - Simplified Coagulation Cascade

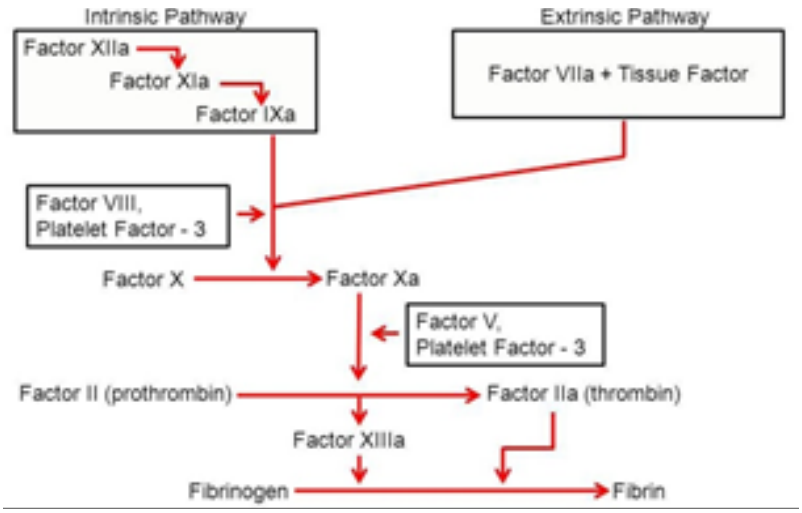


Table 1 - Summary of Conditions of Impaired Hemostasis

Acquired Conditions

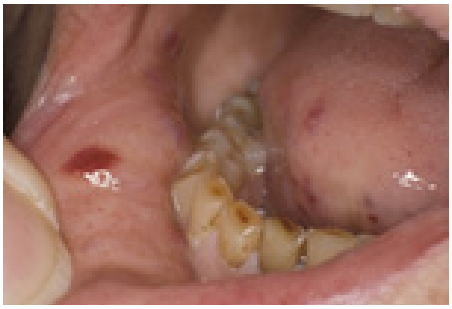
- **Acquired disorders of the vasculature**
  - Infection: Typhoid or meningococcal septicemia, measles
  - Nutritional: Scurvy
  - Allergic: Henoch-Schonlein purpura, serum sickness
- **Acquired disorders of platelets**
  - Increased destruction or inhibited production
    - Drugs (chemotherapy, thiazide diuretics, alcohol)
    - Infection (Human Immunodeficiency Virus)
    - Vitamin deficiency (Folate, B12)
    - Irradiation
    - Marrow infiltration (tumor, leukemia)
    - ITP – immune thrombocytopenic purpura
    - Hypersplenism
    - Others
  - Qualitative platelet impairment
    - Drugs (aspirin, non-steroidal anti-inflammatory drugs, ethanol)
    - Herbal supplements (Garlic, Ginko biloba, Ginger, Green tea)
    - Uremia
    - Liver disease
    - Acquired von Willebrand disease (often observed in autoimmune disease, lymphoproliferative disorders)
- **Acquired disorders of coagulation**
  - Liver disease
  - Vitamin deficiency (biliary tract obstruction, malabsorption, antibiotics)
  - Anticoagulant drugs (heparin, coumarin, dabigatran, rivaroxaban, edoxaban)

Inherited Conditions

- **Inherited disorders of the vasculature**
  - Hereditary hemorrhagic telangiectasia
  - Hereditary hemorrhagic thrombasthenia
- **Inherited disorders of platelets**
  - von Willebrand disease
  - Glanzman's thrombasthenia
  - Bernard-Soulier disease
- **Inherited disorders of coagulation**
  - Hemophilia A (Factor VIII deficiency)
  - Hemophilia B (Factor IX deficiency)
  - Other factor deficiencies

angiomas, jaundice, cyanosis or pallor. Ecchymoses, purpura and petechiae are bruises with dimensions of >1 cm, 2 mm to 1 cm and ≤ 2mm, respectively. Oral cavity findings suggestive of a potential bleeding problem include petechiae (**Figure 3**), purpura, ecchymoses, jaundice, pallor, enlarged gingival tissues, ulceration, and hemorrhage.

Figure 3



Intraoral petechiae and purpura in individual undergoing cancer chemotherapy.

Any patient presenting with an equivocal history or clinical signs and symptoms suggestive of an undiagnosed, or poorly controlled, bleeding disorder requires further medical evaluation to establish a diagnosis.[1] While an experienced dental practitioner may choose to order basic laboratory testing (**Table 2**) to assess bleeding risk status, (*e.g.*, activated partial thromboplastin time [aPTT], prothrombin time [PT, thrombin time [TT], platelet count), most dentists will refer the patient to their physician for further evaluation and diagnosis. Once the specific hematologic impairment is identified, it must be documented in the patient's chart.

In spite of obtaining a noncontributory medical history and noting no abnormalities on clinical examination, direct observation of excessive bleeding during or after a dental procedure may represent the first and only clue for the presence of a patient's underlying hematologic impairment.

Suggested Management Guidelines

Establishment of a diagnosis allows the dentist to develop a plan tailored to address the dental needs of the individual patient. Such a plan must

not only consider the extent of surgical therapy needed, but also the patient's overall medical status and the clinical experience of the dentist.[1,3-5] For infrequently encountered scenarios such as an inherited disorder, a medical consultation is warranted to determine the patient's current status and his/her ability to tolerate the anticipated dental care in either a general practice or specialist setting. The dentist should clearly describe in the consult the anticipated bleeding associated with necessary dental care ("restore tooth #2 with no anticipated mucosal incisions or tearing – no, or minimal, bleeding anticipated", "simple extraction of two teeth with primary soft tissue closure following the procedure – moderate, locally controllable bleeding anticipated"). In general, a patient determined to have extensive surgical needs, a labile hemostatic profile, or the need for treatment modifications not routinely available in the dental office setting warrants referral to a practitioner with expertise in managing such cases (Oral and Maxillofacial Surgeon, Hospital Dentist or Oral Medicine clinician).

General therapeutic principles recommended when treating any patient with a hematologic impairment include:

1. judiciously administering local anesthesia;
2. employing meticulous surgical technique;
3. removing granulation tissue that could mediate continued bleeding;
4. accomplishing primary soft tissue closure when possible;
5. using adjunctive hemostatic agents when appropriate (see **Table 3**), and;
6. follow-up contact to ensure no complications.

Postoperative instructions should be clearly explained and given in written form to the patient and/or their caregiver to ensure that activities that may increase the risk of clot disruption (sucking through a straw, sucking candy, smoking, rinsing, strenuous activity) are avoided. The use of any medication that may adversely affect the underlying hematologic condition, such as aspirin and NSAIDs, is to be avoided.[1,5,6] Patients with a hematologic impairment should be scheduled early in the day, and early in the week, since immediate complications occur within hours following a procedure and delayed complications usually occur within a couple days following a procedure. The dental practitioner should never independently adjust the dosage of any medically prescribed medication (aspirin, NSAID, warfarin, etc.) intended to affect the patient's hemostatic profile. Such adjustments are under the purview of the managing physician.

The most likely bleeding-risk scenario the general dentist will encounter is the patient being medically managed to reduce thromboembolic risk. Contemporary guidance generally recommends against the routine interruption or reduction of antithrombotic medication when such a patient requires a minor surgical procedure in the dental setting. The preponderance of evidence reveals that properly prescribed antithrombotic medication results in manageable bleeding risk following "minor dental surgery", while reduction of

Table 2 - Common Laboratory Tests to Assess Hemostasis

Test	Purpose	Normal Range
aPTT	Evaluate intrinsic and common pathways of coagulation	25 - 30 seconds
PT	Evaluate extrinsic and common pathways of coagulation	11 - 15 seconds
TT	Evaluate the level and function of fibrinogen	9 - 13 seconds
Platelet count	Measure of number of platelets	140,000-400,000/uL

Table 3 - Adjunctive Hemostatic Agents

Agent	Purpose
Gauze	For direct pressure.
Absorbable gelatin sponge (Gelfoam®)	Serves as a scaffolding to help stabilize clot. Recommend stabilization with suture or splint.
Chitosan (HemCon® Dental Dressing Pro)	Provides a physical barrier to protect wound bed, dissolves in 48 hours.
Absorbable collagen (Instat®)	Can be cut or shaped, similar benefit as gelatin sponge.
Microfibrillar collagen hemostat (Avitene™ Flour, Avitene™ Ultrafoam™)	Attracts platelets and triggers aggregation to promote platelet plug formation.
Absorbable collagen dressing (CollaTape®, CollaPlug® CollaCote®)	Sutured over the wound or placed under stent.
Resorbable oxidized cellulose (Surgicel®, others)	Swells on contact with blood to increase pressure in socket to enhance hemostasis.
Topical thrombin (Thrombostat™, Thrombin-JMI®, others)	Promotes clot formation (topical thrombin should not be used with collagen and cellulose products due to inactivation from pH factors).
ε-Aminocaproic acid (Amicar®)	A rinse that inhibits plasminogen activation.
Tranexamic acid (Cyklokapron®)	A rinse that inhibits plasminogen activation.

antithrombotic medication leads to an increased risk for a potentially fatal thromboembolic event.[3,4,6-8] While the definition of a "minor surgical procedure" is debatable, it may be defined as the simple extraction of ≤3 teeth; crown and bridge procedures; and scaling or periodontal surgery initially restricted to a limited area to allow assessment of bleeding.[6,9-10]

The Patient on Antiplatelet Medication (Asprin, or Asprin & Clopidogrel)

Low dose aspirin (81-325 mg/day) is commonly prescribed for a patient as a first line agent to reduce risk of stroke or heart attack. Aspirin acts to irreversibly reduce platelet activation aggregation. Another antiplatelet drug such as clopidogrel (Plavix®) is added to the regimen to further reduce platelet activity.[11] Available research indicates the increased bleeding risk associated with a limited surgical intervention in patients taking low-dose aspirin or aspirin plus clopidogrel is usually easily managed using good surgical technique, appropriate gelatin or collagen hemostatic agents, primary soft tissue closure and direct pressure for 15-30 minutes.[1,12,13,14]

The Patient on Warfarin

Warfarin (Coumadin®) is a vitamin K antagonist commonly prescribed to reduce the risk of stroke and systemic thromboembolism associated with atrial fibrillation and as treatment for deep vein thrombosis, pulmonary embolism, and venous thromboembolism.[15] Warfarin interferes with the production of coagulation Factors II, VII, IX, and X in the liver. It has a narrow therapeutic index, individual patient response is highly variable, and it is affected by numerous food and drug interactions (**Table 4**). As a consequence, both patient compliance and drug efficacy is often compromised, resulting in the need for frequent laboratory monitoring.[16,17] The laboratory test used to monitor warfarin efficacy is the international normalized ratio (INR) and targeted therapeutic values typically run between 2.0 and 3.5.

Table 4 - Common Warfarin Drug Interactions

Drugs That Potentiate Warfarin (CYP2C9, 1A2, and/or 3A4 inhibitors)		**Drugs That Antagonize Warfarin (CYP2C9, 1A2, and/or 3A4 inducers)**
Alprazolam Cimetidine Clarithromycin Ketoconazole Miconazole Phenytoin*	Amiodarone Ciprofloxacin Fluconazole Metronidazole Oral contraceptives Propranolol	Barbiturates Carbamazepine Nafcillin Omeprazole Phenytoin* Prednisone Pioglitazone Rifampin
Drugs That Augment Bleeding Risk		
Anticoagulants	Antiplatelets NSAIDs Serotonin Reuptake Inhibitors Acetaminophen**	
Foods & Herbal Supplements That Affect Bleeding Risk		
Foods and Herbal Supplements That Potentiate Warfarin		**Foods and Herbal Supplements That Antagonize Warfarin**
Alfalfa, Anise, Bilberry, Cranberry juice, Garlic, Ginkgo biloba, Green tea		St. John's wort, Ginseng, foods high in Vitamin K (green leafy vegetables, cruciferous vegetables)

* Phenytoin administration initially augments warfarin effect, but after time may act to antagonize warfarin effect. The mechanism is unknown.[18]

** Acetaminophen may potentiate warfarin and other oral anticoagulants. The interaction has generally been associated with prolonged ingestion of relatively high acetaminophen dosages (2 g/day for at least 3 consecutive days), not with brief, intermittent exposures of average doses.[19]

Table 5 - Available Formulations of Plasminogen Inhibitors

Agent	Instructions for Use
ε-Aminocaproic acid (Amicar®): 1.25g/5mL oral solution **Disp:** 50mL	Hold 5mL in the surgical area for 2 minutes just prior to surgery and every 2 hours after the surgery for 1-2 days.
ε-Aminocaproic acid (Amicar®): 250mg/mL solution for injection* **Disp:** Dilute 20mL with 80 mL sterile water	Hold 10 mL in the surgical area for 2 minutes just prior to surgery and every 2 hours until gone.
Tranexamic acid (Cyklokapron®): 100mg/mL solution for injection* **Disp:** Dilute 100 mL with 100 mL sterile water	Hold 10 mL in the surgical area for 2 minutes just prior to surgery and every 2 hours until gone.

* *Compounding pharmacy*

While increased bleeding is to be anticipated in the patient taking warfarin, limited dental surgery may be safely accomplished by verifying the patient's INR and using the adjunctive measures listed in **Table 3**. It is essential to verify and document that the INR is within the therapeutic range and that it was obtained within 24 hours prior to the procedure.[5,6,9] The use of appropriate gelatin or collagen hemostatic agents, primary tissue closure and direct pressure for 15-30 minutes is usually sufficient to establish hemostasis. The use of a topical thrombin rinse or plasminogen inhibitor oral rinse for 2 days post-surgery may also be beneficial (see **Table 5**).[5,6,20] If the pre-operative INR exceeds the therapeutic range, the surgery should be deferred, and the patient should be evaluated by his/her physician. This is for the benefit of the patient, as it is estimated that for each increase of 1 unit over an INR of 3.5, the bleeding risk doubles.[1]

The Patient on a Combined Antiplatelet/Anticoagulant Regimen

In select scenarios, such as for a patient with a mechanical heart valve and a history of vascular disease, or a patient with additional risk factors for thromboembolism, a combined warfarin and low dose aspirin regimen may be in place. A recently published study[21] determined that even in this scenario, minor surgical care may be safely accomplished with verification of the patient's INR and use of appropriate adjunctive hemostatic measures.

The Patient on a Direct Oral Anticoagulant (DOAC)

DOACs include the reversible direct thrombin inhibitor Dabigatran etexilate (Pradaxa®) and the reversible Factor Xa inhibitors Rivaroxaban (Xarelto®), apixaban (Eliquis®) and edoxaban (Savaysa®)[22-25] The medical indications for these agents is extensive (see **Table 6**).

Table 6 - Available DOACs

Agent	Indications for Use
Dabigatran etexilate (Pradaxa®)	• To reduce the risk of stroke and systemic embolism in adult patients with non-valvular atrial fibrillation • For the treatment of deep venous thrombosis (DVT) and pulmonary embolism (PE) in adult patients who have been treated with a parenteral anticoagulant for 5-10 days • To reduce the risk of recurrence of DVT and PE in adult patients who have been previously treated • For the prophylaxis of DVT and PE in adult patients who have undergone hip replacement surgery • For the treatment of venous thromboembolic events (VTE) in pediatric patients 8 to less than 18 years of age who have been treated with a parenteral anticoagulant for at least 5 days • To reduce the risk of recurrence of VTE in pediatric patients 8 to less than 18 years of age who have been previously treated
Rivaroxaban (Xarelto®)	• To reduce risk of stroke and systemic embolism in nonvalvular atrial fibrillation • For treatment of deep vein thrombosis (DVT) • For treatment of pulmonary embolism (PE) • For reduction in the risk of recurrence of DVT or PE • For the prophylaxis of DVT, which may lead to PE in patients undergoing knee or hip replacement surgery • For prophylaxis of venous thromboembolism (VTE) in acutely ill medical patients • To reduce the risk of major cardiovascular events in patients with coronary artery disease (CAD) • To reduce the risk of major thrombotic vascular events in patients with peripheral artery disease (PAD), including patients after recent lower extremity revascularization due to symptomatic PAD • For treatment of VTE and reduction in the risk of recurrent VTE in pediatric patients from birth to less than 18 years • For thromboprophylaxis in pediatric patients 2 years and older with congenital heart disease after the Fontan procedure
Apixaban (Eliquis®)	• To reduce the risk of stroke and systemic embolism in patients with nonvalvular atrial fibrillation. • For the prophylaxis of deep vein thrombosis (DVT), which may lead to pulmonary embolism (PE), in patients who have undergone hip or knee replacement surgery. • For the treatment of DVT and PE, and for the reduction in the risk of recurrent DVT and PE following initial therapy.
Edoxaban (Savaysa®)	• To reduce the risk of stroke and systemic embolism (SE) in patients with nonvalvular atrial fibrillation (NVAF)

When compared to warfarin, DOACs exhibit more predictable bioavailability, have fewer drug interactions (see **Table 7**), are prescribed on a fixed dose schedule, and since they produce a more stable anticoagulant effect, do not require routine anticoagulation monitoring.[16,17,26]

Based on improved patient convenience and compliance compared to the use of warfarin, the number of patients prescribed these medications has steadily risen since their introduction. Recent studies and reviews support the premise that for the patient on a DOAC, minor surgical procedures (as previously defined) performed in the dental office are manageable using the same protocol previously discussed for warfarin.[6,27-31]

Summary

Dental treatments may cause bleeding, which is quickly and effectively physiologically controlled for most patients. However, the patient with an underlying hematologic impairment may incur serious and potentially grave consequences from dental therapy. Fortunately, the majority of these patients may be easily identified through the medical history and clinical examination. The general dentist will most frequently encounter "patients at risk for bleeding" who are taking medication(s) to reduce thromboembolic risk. Contemporary guidance generally recommends against the routine interruption or reduction of antithrombotic medication when such a patient requires a minor dental surgical procedure. This guide reviewed the physiology of hemostasis, types of hemostatic impairment, and provided a suggested protocol to identify and manage the dental patient with an increased bleeding risk.

Table 7 - Potential NOAC Drug Interactions

Dabigatran	Apixaban, Rivaroxaban, & Edoxaban
P-Glycoprotein inducers *reduce* dabigatran activity (*e.g.,* rifampin, carbamazepine, dexamethasone)	Strong inducers of both CYP34A and P-Glycoprotein (*e.g.,* rifampin, carbamazepine, phenytoin, St. John's wort) reduce activity
P-Glycoprotein inhibitors *increase* dabigatran activity (*e.g.,* ketoconazole, itraconazole, clarithromycin)	Strong inhibitors of both CYP34A and P-Glycoprotein (*e.g.,* itraconazole, ketoconazole, posaconazole, voriconazole) increase activity

References

1. Little JW, Miller CS, Rhodus NL. Acquired bleeding and hypercoagulable disorders. In Little JW, Miller CS, Rhodus NL (eds). Dental Management of the Medically Compromised Patient, 9th ed. St. Louis, Elsevier, 2018.
2. Romney G, Glick M. An updated concept of coagulation with clinical implications. J Am Dent Assoc 2009; 140:567-74.
3. Henry RG. Dental management of patients taking antiplatelet medications. Tex Dent J 2009; 126:608-16.
4. Nematullah A, Alabousi A, Blanas N, Douketis JD, Sutherland SE. Dental surgery for patients on anticoagulant therapy with warfarin: a systemic review and meta-analysis. J Can Dent Assoc 2009; 75:41.
5. Perry DJ, Noakes TJC, Helliwell PS. Guidelines for the management of patients on oral anticoagulants requiring dental surgery. Brit Dent J 2007; 203:389-393.
6. van Diermen DE, van der Waal, Hoogstraten J. Management recommendations for invasive dental treatment in patients using oral antithrombotic medication, including novel oral anticoagulants Oral Surg Oral Med Oral Pathol Oral Radiol 2013;1116:709-716.
7. Aldridge E, Cunningham LL. Current thoughts on treatment of patients receiving anticoagulation therapy. J Oral Maxillofac Surg 2010; 68:2879-2010.
8. Wahl MJ, Pinto A, Kilham J, Lalla RV. Dental surgery in anticoagulated patients – stop the interruption. Oral Surg Oral Med Oral Pathol Oral Radiol 2015; 119:136-157.
9. Pototski M, Amenabar JM. Dental management of patients receiving anticoagulation or antiplatelet treatment. J Oral Sci 2007; 49:253-258.
10. van Diermen DE, Aartman IH, Baart JA, Hoogstraten J, van der Waal I. Dental management of patients using antithrombotic drugs: critical appraisal of existing guidelines. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2009; 107:616-24.
11. Drugs.com website. Clopidogrel. Available at: http://www.drugs.com/ppa/clopidogrel.html Accessed June 13, 2019.
12. Napenas JJ, Hong CHL, Brennan MT, Furney SL, Fox PC, Lockhart PB. The frequency of bleeding complications after invasive dental treatment in patient receiving single and dual antiplatelet therapy. J Amer Dent Assoc 2009; 140:690-695.
13. Lillis T, Ziakas A, Koskinas k, Tsirlis A, Giannoglou G. Safety of dental extractions during uninterrupted single or dual antiplatelet treatment. Am J Cardiol 2011; 108:964-7.
14. Olmos-Carrasco O, Pastor-Ramos V, Espinilla-Blanco R, et al. Hemorrhagic complications of dental extractions in 181 patients undergoing double antiplatelet therapy. J Oral Maxillofac Surg
15. Drugs.com website. Warfarin. Available at: http://www.drugs.com/pro/warfarin.html Accessed June 13, 2019.
16. Galanis T, Thompson L, Palladino M, Merli GJ. New oral anticoagulants. J Thromb Thrombolysis 2011; 31:310-320.
17. Tsiara S, Pappas K, Boutsis D, Laffan M. New oral anticoagulants: should they replace heparins and warfarin? Hellenic J Cardiol 2011; 52:52-67.
18. Drugs.com website. Drug interactions between Coumadin and Dilantin. Available at: https://www.drugs.com/drug-interactions/coumadin-with-dilantin-2311-1529-1863-1205.html?professional=1 Accessed September 28, 2022.
19. Lopes RD, Horowitz JD, Garcia DA, Crowther MA, Hylek EM. Warfarin and acetaminophen interaction: a summary of the evidence and biologic plausibility. Blood 2011; 118:6269-74.
20. Ansell J, Hirsh J, Poller L, Bussey H, Jacobson A, Hylek E. The pharmacology and management of the vitamin K antagonists: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest 2004;126(3 Suppl):204S-233S.
21. Bajkin BV, Bajkin IA, Petrovic BB. The effects of combined oral anticoagulants-aspirin therapy in patients undergoing tooth extractions. J Am Dent Assoc 2012; 143:771-776.
22. Pradaxa (dabigatran etexilate) Official Site. Prescribing information. Available at: https://docs.boehringer-ingelheim.com/Prescribing%20Information/PIs/Pradaxa/Pradaxa.pdf. Accessed September 28, 2022.
23. Xarelto (rivaroxaban) Official Site. Prescribing information. Available at: https://www.janssenlabels.com/package-insert/product-monograph/prescribing-information/XARELTO-pi.pdf Accessed September 28, 2022.
24. Eliquis (apixaban) Official Site. Prescribing information. Available at: http://packageinserts.bms.com/pi/pi_eliquis.pdf Accessed September 28, 2022.
25. Savaysa (edoxaban) Official Site. Prescribing information. Available at: https://daiichisankyo.us/prescribing-information-portlet/getPIContent?productName=Savaysa&inline=true. Accessed September 28, 2022.
26. Firriolo FJ, Hupp WS. Beyond warfarin: the new generation of oral anticoagulants and their implications for the management of dental patients. Oral Surg Oral Med Oral Pathol Oral Radiol 2012; 113:431-441.
27. Green B, Mendes RA, Van der Valk R, Brennan PA. Novel anticoagulants - an update on the latest developments and management for clinicians treating patients on these drugs. J Oral Path Med 2016; 45:551-6
28. Berton F, Costantinides F, Rizzo R, et al. Should we fear direct oral anticoagulants more than vitamin K antagonists in simple single tooth extraction? A prospective comparative study. Clin Oral Investig 2019; 23:1497-8.
29. Lababidi E, Breik O, Savage J, et al. Assessing an oral surgery specific protocol for patients on direct oral anticoagulants: a retrospective controlled cohort study. Int J Oral Maxillofac Surg 2018; 47:940-6.
30. Mauprivez C, Khonsari RH, Razouk O, Goudot P, Lesclous P, Descroix V. Management of dental extraction in patients undergoing anticoagulant oral direct treatment: a pilot study. Oral Surg Oral Med Oral Pathol Oral Radiol. 2016; 122:e146-e155.
31. Wahl MJ. The mythology of anticoagulation therapy interruption for dental surgery. J Am Dent Assoc. 2018; 149:e1-e10.

POST-TEST

Internet Users: This page is intended to assist you in fast and accurate testing when completing the "Online Exam." We suggest reviewing the questions and then circling your answers on this page prior to completing the online exam.

(1.0 CE Credit Contact Hour) Please circle the correct answer. 70% equals passing grade.

1. Which of the following intraoral findings should raise suspicion of an underlying bleeding problem?
a. varicosity
b. ecchymosis
c. hemangioma
d. petechiae
e. a & b
f. b & d

2. Which of the following statements is not true?
a. Any patient presenting with an equivocal history or clinical signs and symptoms suggestive of an undiagnosed or poorly controlled bleeding disorder requires further medical evaluation to obtain a diagnosis.
b. Affirmative responses to a question concerning easy bruising or bleeding must be pursued for further explanation and detail.
c. Accomplishing a careful history will identify all patients at risk for excessive bleeding when undergoing a simple dental extraction.
d. Oral cavity findings suggestive of a potential bleeding problem include petechiae, jaundice, pallor, hyperplastic gingival tissues, and hemorrhage.

3. A basic laboratory test used to screen for a bleeding disorder include:
a. complete blood count.
b. hematocrit.
c. platelet count.
d. white blood cell count.

4. Bob has been instructed by his physician to take 81mg of aspirin a day. His tooth #2 is non-restorable and indicated for extraction. It is acceptable practice to advise him to stop taking his aspirin for 4 days prior to his appointment to have tooth #2 extracted.
a. True
b. False

5. Which of the following statements about warfarin is true?
a. Drug interactions may cause major changes in the efficacy of warfarin.
b. Dietary influences on warfarin activity are rare.
c. The laboratory test to monitor the efficacy of warfarin is the activated partial thromboplastin time (aPTT).
d. All the above statements are true.

6. Mr. Jones is taking warfarin for his atrial fibrillation and he needs teeth #s 14 & 15 extracted due to severe periodontal bone loss. The day before his appointment he has his INR checked and it is determined to be 5.5. His risk is for excessive bleeding is roughly _____ the accepted therapeutic risk.
a. 2 b. 4 c. 8

7. Mr. Jones is taking warfarin for his atrial fibrillation and he needs ten teeth extracted due to severe periodontal bone loss. Of the following options, which is not an acceptable therapy approach?
a. Plan to extract 2-4 teeth at time using meticulous technique and establishing primary soft tissue closure following the procedure, and verify that the INR is within the therapeutic range within 24 hours of each appointment.
b. Advise the patient to half his warfarin dose and return to the clinic in 3 days for the surgery.
c. Refer the patient to an oral and maxillofacial surgeon, hospital dentist or oral medicine clinician.

8. Drugs which may potentiate warfarin activity include:
a. Ketoconazole
b. Carbamazepine
c. Prednisone
d. Pioglitazone
e. All the above

9. Mr. Jones is taking rivaroxaban for his atrial fibrillation and needs tooth #s 14 & 15 extracted due to severe periodontal bone loss. Your best option is to:
a. extract the teeth using meticulous technique and establishing primary soft tissue closure.
b. advise the patient to half his rivaroxaban dose and return to the clinic in 3 days for the surgery.
c. verify the day before his appointment that his INR is in the therapeutic range and proceed with therapy.
d. consult with his managing physician for guidance.

10. When compared to warfarin, the new anticoagulant drugs (dabigatran etexilate and rivaroxaban) exhibit more predictable pharmacokinetics and pharmacodynamics. The best measure to monitor their efficacy is the INR.
a. Both statements are true.
b. Both statements are false.
c. The first statement is true and the second statement is false.
d. The first statement is false and the second statement is true.

Registration/Certification Information (Necessary for proper certification)

Name (Last, First, Middle Initial): _____

PLEASE PRINT CLEARLY

Street Address: _____ Suite/Apt. Number _____

City: _____ State: _____ Zip: _____

Telephone: _____ Fax: _____

Date of Birth: _____ Email: _____

State(s) of Licensure: _____ License Number(s): _____

Preferred Dentist Program ID Number: _____ ☐ Check Box If Not A PDP Member

AGD Mastership: ☐ Yes ☐ No

AGD Fellowship: ☐ Yes ☐ No Date: _____

Please Check One: ☐ General Practitioner ☐ Specialist ☐ Dental Hygienist ☐ Other

FOR OFFICE USE ONLY

Evaluation - Dental Care for Patients with Bleeding Disorders 4th Edition

Providing dentists with the opportunity for continuing dental education is an essential part of MetLife's commitment to helping dentists improve the oral health of their patients through education. You can help in this effort by providing feedback regarding the continuing education offering you have just completed.

Please respond to the statements below by checking the appropriate box, using the scale on the right.

	1 = POOR 1	2	3	4	5 = Excellent 5	
1. How well did this course meet its stated educational objectives?	☐	☐	☐	☐	☐	
2. How would you rate the quality of the content?	☐	☐	☐	☐	☐	
3. Please rate the effectiveness of the author.	☐	☐	☐	☐	☐	
4. Please rate the written materials and visual aids used.	☐	☐	☐	☐	☐	
5. The use of evidence-based dentistry on the topic when applicable.	☐	☐	☐	☐	☐	☐ N/A
6. How relevant was the course material to your practice?	☐	☐	☐	☐	☐	
7. The extent to which the course enhanced your current knowledge or skill?	☐	☐	☐	☐	☐	
8. The level to which your personal objectives were satisfied.	☐	☐	☐	☐	☐	
9. Please rate the administrative arrangements for this course.	☐	☐	☐	☐	☐	

10. How likely are you to recommend MetLife's CE program to a friend or colleague? *(please circle one number below:)*

10 **9** **8** **7** **6** **5** **4** **3** **2** **1** **0**

extremely likely — neutral — not likely at all

What is the primary reason for your 0-10 recommendation rating above?

11. Please identify future topics that you would like to see:

Thank you for your time and feedback.

MetLife

To complete the program traditionally, please mail your post test and registration/evaluation form to:
MetLife Dental Quality Initiatives Program | 501 US Highway 22 | Bridgewater, NJ 08807