

## Recommendations Regarding Patients Taking Coumadin or Antiplatelet Medications

There are many different reasons a patient might bleed during or after surgery. There are primary bleeding disorders, bleeding disorders secondary to systemic diseases, local and environmental factors and effects of medications. In our current medical environment there are an increasing number of new medications used for a variety of different anticoagulation purposes. The indication for use, mechanism of action and treatment modifications are unique to each drug class and type of therapy. The management of these patients seems to present an ever increasing level of complexity. We will discuss two of the most common treatment groups: Coumadin and antiplatelet medications.

Patients may be taking Coumadin for a variety of conditions. Common indications include: prosthetic heart valve replacement, atrial fibrillation, venous thrombosis, hypercoagulable states and various types of indwelling catheters. Coumadin is an anticoagulant which acts by interfering with the production of the vitamin K dependent clotting factors, II, VII, IX and X. Interfering with these factors affects the extrinsic clotting pathway and increases the INR (international normalized ratio), which is a standardized test of prothrombin time.

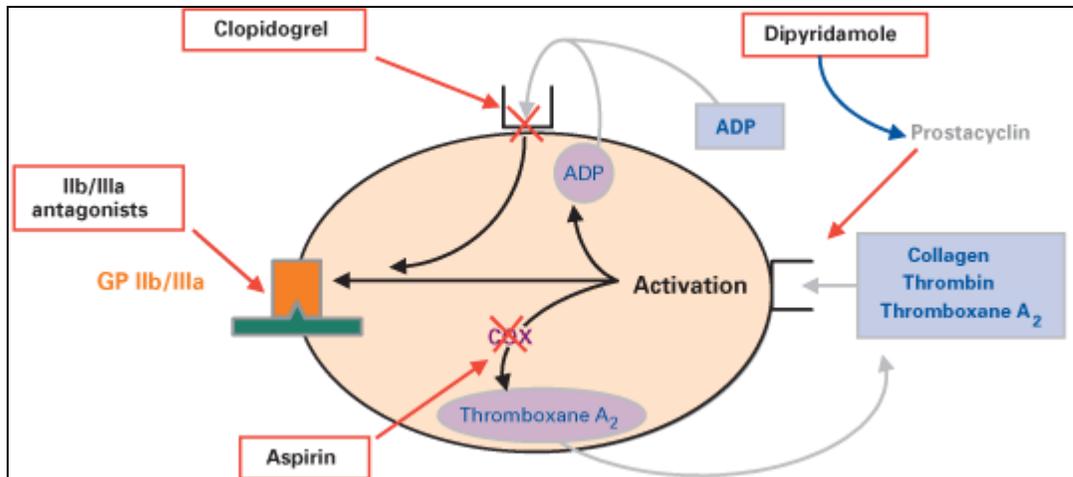
Depending on the indication for therapy there are different target INR ranges. The most common range is 2-3. However, patients with mechanical heart valves may have a range up to 3.5 or 4. Coumadin is often difficult to dose and a patient's diet can have a profound effect. Because of this, frequent monitoring is needed. The INR can change quite dramatically and quickly as the vitamin K clotting factors have short half-lives. Prior to surgical intervention a current INR (within 24hrs) must be obtained.

Traditionally a patient has been advised to stop Coumadin three days prior to surgery and start again after surgery. This advice is no longer recommended for two primary reasons. First, the outcome of serious thrombosis/embolism is more deleterious than the risk of surgical site bleeding. Second, surgical site bleeding is generally managed with simple local measures.

Correct management of the patient taking Coumadin takes into account the recent INR and the planned surgery. The routine extraction of five or fewer teeth does not require any adjustment to a patient's Coumadin dose if the INR is less than four. More invasive interventions such as the removal of impacted teeth or tori may require alteration in the Coumadin dose.

The second class of drug therapy is the antiplatelet group. These patients take a variety of different medications that inhibit platelets differently. The purpose of these medications is to prevent the platelet phase of coagulation. Common indications include prevention and treatment for cerebral, coronary and peripheral vascular disease, as well as, prevention of post therapeutic interventions such as vascular stent placement.

Following is a diagram showing the different locations of action for the various drugs. The most common is aspirin, but clopidogrel (Plavix) and dipyridamole, and Aggrenox are often times used as well or in combination. The oral G2b3a inhibitors are rarely used.



ADP adenosine diphosphate, GP IIb/IIIa glycoprotein IIb/IIIa complex, COX cyclo-oxygenase

As with Coumadin there is potential for great harm when stopping these medications. These medications should not be stopped for oral surgical procedures. There is no clinical data showing an increase in bleeding risk. On the contrary there is data showing a real risk for myocardial infarction, and death with suddenly stopping these medications.

Local measures to prevent and control bleeding include good surgical technique and local hemostatic agents. The careful handling of soft tissues is very important. Torn tissue is much more likely to bleed than properly incised tissue. Inflamed tissues such as chronic granulation tissue should be removed as this is a common site for post-operative bleeding. Several different hemostatic agents are available commercially. Surgicel, Gelfoam, Avitene, and HemCon are a few of the more common ones. Amicar mouth rinse is also available by prescription. (See table below)

While there exists no great randomized clinical trails to compare the effects of continuing and/or stopping Coumadin and the antiplatelet drugs for surgery, we have attempted to analyze the existing literature and make recommendations on the risks v. benefits of altering v not altering these medications. Since it is clear there is great risk from stopping these medications and post post-operative bleeding is a small risk that is easily controlled our recommendation would be to not stop or alter these medications for routine oral surgery.

Drug Type	Mechanism of Action	Treatment Indication	Lab Value Affected	Clinical Management
Coumadin	Inhibits production of Vitamin K dependant clotting factors II, VII, IX, X and Protein C and S	Chronic Anticoagulation  Treatment for venous thrombosis and embolism	Prolongs the prothrombin time PT/INR.	Check INR within 24hrs Good surgical technique Local measures if needed
Antiplatelet 1. ASA 2. Plavix 3. Dipyridamole  4. Aggrenox	COX inhibitor ADP inhibitor Inhibits Adenosine reuptake Combination COX and Adenosine inhibitors	Prevention of arterial and stent thrombosis	Platelet function test (bleeding time is <u>not</u> a good indicator)	Continue medications as prescribed. Good surgical technique Local hemostatic measures as indicated

Some Common Hemostatic Agents	Composition	Use	Effect on bleeding/clot	Adverse Effects
Gelfoam	Porcine Skin Gelatin	Applied in sockets or open wounds prior to suture placement	Unknown but creates local pressure as it expands. Promotes clot formation and stabilization.	Does not incorporate into the clot itself. Can be nidus for infection.
Surgicel	Oxidized regenerate cellulose	Primarily meant to be placed over a raw bleeding surface. Can be packed into sockets tightly.	Unknown. Promotes clot formation and stabilization. Does have mild antimicrobial activity.	Does not incorporate into the clot itself. Can be nidus for infection.
Avitene	Bovine Micor fibrillar collagen	Placed in extraction site or open wounds prior to suture placement	Stimulates the intrinsic cascade. Help to form and stabilize clot	Foreign body reaction. Allergic reaction.
Bone Wax	Primarily Beeswax	Rub/Smash into bleeding sites in bone	Physical tampanode	Giant cell reaction and granuloma formation
Amicar Mouth Wash Cyklokapron	Aminocaproic Acid (Tranexamic Acid)	Rinse pre and post operatively. Can soak gauze and have patient bite down on this for 1-2hours.	Prevents Fibrinolysis – stabilizes clot	Generally none when used as a rinse. Can cause systemic clotting with oral overdose.

Some Suggested Readings:

Corbin G. Partridge, John H. Campbell, Fernando Alvarado. *Journal of Oral and Maxillofacial Surgery*, Volume 66, Issue 1, January 2008, Pages 93-97

Blinder D, Manor Y, Martinowitz U, et al: Dental extractions in patients maintained on oral anticoagulant therapy: Comparison of INR value with occurrence of postoperative bleeding. *Int J Oral Maxillofac Surg* 30:518, 2001

Campbell JH, Alvarado F, Murray RA: Anticoagulation and minor oral surgery: Should the anticoagulation regimen be altered? *J Oral Maxillofac Surg* 58:131, 2000

B . Ward , M . Smith. Dentoalveolar Procedures for the Anticoagulated Patient: Literature Recommendations Versus Current Practice . *Journal of Oral and Maxillofacial Surgery* , Volume 65 , Issue 8 , Pages 1454 - 1460