There are conflicting guidelines when dental hygiene care may resume after a patient/client has had a myocardial infarction. Many textbook authors recommend that a patient/client wait 6 months post-MI before commencing non-emergent elective oral care. However, emerging evidence suggests that a shorter time (e.g., 4 to 6 weeks) may be appropriate for many patients/clients post-MI, with individualization according to the patient/client’s functional capacity.

**Is the initiation of non-invasive dental hygiene procedures contra-indicated?**

**Functional capacity approach:** Yes, if MI has occurred within the past 4 to 6 weeks, with functional capacity (FC) being determined before proceeding with professional oral care. [No, if the patient/client has a history of MI > 4 to 6 weeks ago, with no evidence of cardiac symptoms and is able to meet a four-metabolic equivalent (MET) demand during daily activities, and who has a systolic blood pressure < 180 mm Hg and a diastolic pressure < 110 mm Hg with a normal pulse rhythm. Under these circumstances, non-invasive dental hygiene procedures can be provided with little to no risk for a cardiovascular event (including re-infarction).] See Box 1 for determination of functional capacity (four-MET level).

- **Is medical consult advised?** Yes, if patient/client’s medical status is suspected to be unstable (e.g., complaints of chest pain, symptoms compatible with congestive heart failure such as shortness of breath or ankle swelling, etc.) and/or drug toxicity (e.g., digitalis) is suspected. Even if a recent stress test does not reveal poor myocardial function, the patient/client with a recent MI (i.e., within past two months) should undergo a consultation with a cardiologist to determine that FC meets the four-MET level before proceeding with professional oral care.

**Is the initiation of invasive dental hygiene procedures contra-indicated?**

**Functional capacity approach:** Yes, periodontal debridement should be delayed 4 to 6 weeks after an MI, with functional capacity (FC) being determined before proceeding with professional oral care. [No, if the patient/client has a history of MI > 4 to 6 weeks ago, with no evidence of cardiac symptoms and is able to meet a four-metabolic equivalent (MET) demand during daily activities, and who has a systolic blood pressure < 160 mm Hg and a diastolic pressure < 110 mm Hg with a normal pulse rhythm. Under these circumstances, invasive dental hygiene procedures can be provided with little to no risk for a cardiovascular event (including re-infarction). If the patient is taking an antiplatelet agent such as clopidogrel for prevention of coronary stent thrombosis, elective procedures involving significant bleeding should be deferred until the clopidogrel is discontinued — typically six weeks for bare metal stents and one year for drug-coated stents.] See Box 1 for determination of functional capacity (four-MET level).

- **Is medical consult advised?** Yes, if patient/client’s medical status is suspected to be unstable (e.g., complaints of chest pain, symptoms compatible with congestive heart failure such as shortness of breath or ankle swelling, etc.) and/or drugs have been prescribed that may necessitate care plan alterations (e.g., antiplatelet agents such as clopidogrel or anticoagulants such as warfarin) and/or pacemaker shielding is unclear and/or drug toxicity (e.g., digitalis) is suspected. Also, for the patient/client with a recent MI (i.e., within past two months) who has undergone a recent stress test that does not reveal poor myocardial function, a consultation with a cardiologist should occur to determine that FC meets the four-MET level before proceeding with professional oral care.

- **Is medical clearance required?** Yes, if there are medical complications or comorbid conditions that may impact patient/client safety. Oral procedures should be deferred for a patient/client unable to attain the four-MET level until further medical testing has been completed to quantify the level of cardiac risk involved with treatment — the decision to proceed with dental hygiene treatment should be made in conjunction with the patient/client’s cardiologist. Periodontal debridement is generally safe for individuals with neither major nor intermediate predictors of clinical risk (see appended Box 2) and moderate or excellent FC (four METs or greater). For persons with intermediate predictors of clinical risk and moderate to excellent FC, dental hygiene procedures pose little likelihood of peri-procedural death or MI.

- **Is antibiotic prophylaxis required?** No, not generally (for the prevention of infective endocarditis) unless cardiac pacemaker (intravascular or epicardial) or implantable cardioverter defibrillator (ICD) implantation has occurred within the past 6 months. (Antibiotic prophylaxis is not indicated for patients/clients who have had balloon angioplasty with placement of a coronary stent or who have undergone a coronary artery bypass graft — CABG — procedure.)

- **Is postponing treatment advised?** **Functional capacity approach:** Yes, if the MI has occurred within the past 4 to 6 weeks or functional capacity is less than four METs.
POST-MYOCARDIAL INFARCTION
(also known as “post-MI” and “post-heart attack”)

Box 1: Determination of Functional Capacity
The medical interview should seek to determine the patient/client’s FC. The ability to perform daily tasks that require cardiac reserve is significantly related to cardiac risk during treatment and correlates with maximum oxygen uptake by treadmill stress testing. The following questions reflect abilities that meet the four-MET level:

⇒ Can you walk up a flight of stairs carrying groceries?
⇒ Can you run a short distance?
⇒ Can you participate in recreational activities such as doubles tennis, play nine holes of golf, or dance for at least five minutes?

Oral management implications

■ Potential risks relevant to dental hygiene care post-MI include cardiac arrest, new myocardial infarction, angina pectoris, congestive heart failure (CHF), bleeding tendency secondary to antiplatelet/anticoagulant use, and electrical interference with unipolar pacemaker.

■ Typical post-MI drugs include antihypertensives (usually an angiotensin-converting enzyme inhibitor — ACEI), anti-cholesterol agents, and low dose ASA.

■ Medical complications in the dental hygiene setting can be minimized by booking short appointments and by terminating the appointment if the patient/client becomes fatigued or short of breath, complains of chest pain, or develops change in pulse rhythm or rate; these signs and symptoms should prompt medical referral.

■ Because blood pressure is lowest in the afternoon, afternoon appointments may be preferred in post-MI patients/clients prone to hypertension. Alternatively, morning appointments may be preferred when the patient/client is well rested and has a greater physical reserve. The patient/client should be engaged to determine the best time of day for an appointment. A stress reduction protocol may be utilized where indicated.

■ General management strategies for patients/clients with a past history of MI without ischemic symptoms and no other risk factors may include the following: short appointments in the morning, comfortable chair position, pretreatment vital signs, and availability of nitroglycerin.

■ In addition to medical treatment, increasing numbers of persons experiencing MI undergo percutaneous coronary intervention (i.e., angioplasty + stent). To avoid stent thrombosis, patients/clients are typically placed on dual antiplatelet therapy (e.g., ASA and clopidogrel) following stent placement in the coronary arteries. For patients/clients who have received bare metal stents, dual antiplatelet therapy is typically continued for 6 weeks, after which clopidogrel may be discontinued. Elective surgery or procedures involving significant bleeding should be deferred until clopidogrel is discontinued. In contrast, in patients/clients receiving drug-coated (drug-eluting) stents, clopidogrel is usually continued for at least a year after implantation; elective surgery or procedures involving significant bleeding should be delayed until after this one-year period. For both types of stents, ASA is generally continued for life.

■ If the dental hygienist is concerned about potential peri-procedural or post-procedural bleeding, the patient/client’s cardiologist should be contacted regarding the patient/client’s antiplatelet regimen and optimal patient management should be discussed before discontinuing the antiplatelet medications. Such medications should not be discontinued prematurely given their importance in minimizing the risk of stent thrombosis, and discontinuation of these agents before dental hygiene procedures usually is unnecessary. However, if there is a concern that excessive bleeding may occur, clopidogrel may have to be stopped several days before dental hygiene care that involves tissue manipulation; medical consult/clearance should be sought in this regard. If scaling procedures are planned for a patient/client on the anticoagulant warfarin, the patient/client’s physician should be contacted to confirm that the PT ratio (prothrombin time) will be two times normal or less, or international normalized ratio (INR) is less than 3.0.

■ There is virtually no dental hygiene indication to discontinue aspirin (ASA) treatment in patients/clients with a history of MI.
Oral management implications (cont’d)

- **Digitalis** (e.g., digoxin), while less commonly used now than historically, is sometimes used as part of post-MI medical therapy to increase contractility of the heart, particularly if congestive heart failure is present. The dental hygienist should be alert to signs of digitalis toxicity in patients/clients (e.g., anorexia, nausea, vomiting, altered vision, neurologic abnormalities, and facial pain), which should prompt medical referral. If not detected and managed early, digitalis toxicity can lead to cardiac arrhythmias, which may be potentially life threatening.

- **Antiarhythmic agents** used post-MI (e.g., quinidine, procainamide) may result in nausea and vomiting, as well as hypotension. Oral ulcerations may indicate agranulocytosis.

- **Cardiac pacemakers** may be implanted in patients/clients post-MI who experience certain dysrhythmias (arrhythmias). These devices vary in their sensitivity to electrical interference. Newer bipolar models are shielded to protect against interference, and typically do not require any special consideration during dental hygiene care. Older unipolar models are less protected from electrical interference and can be negatively affected by mechanized dental instruments. If in doubt regarding model safety, the dental hygienist should seek the advice of the patient/client’s cardiologist prior to the use of mechanized devices such as ultrasonic scalers or ultrasonic bath cleaners. Nonelectrical alternatives to avoid functional interference (e.g., manual instruments) should be considered in patients/clients with unipolar pacemakers. Care should be taken in an open clinical setting where electrical dental equipment may be used for an adjacent patient/client.

- Persons who have had an MI are at elevated risk of future adverse coronary events. Re-infarction or other emergency situations in the dental hygiene office need to be managed by emergency medical services (EMS).

- Annual influenza immunization may be associated with some degree of protection from myocardial infarction. Thus, dental hygienists should encourage post-MI patients/clients to receive an annual flu shot, and should undergo annual immunization themselves to decrease disease transmission.

- **Smoking cessation** should be encouraged if patient/client still smokes post-MI.

Oral manifestations

- None specific to myocardial infarction or coronary atherosclerotic heart disease; however, medications used in post-MI care and its complications can result in oral changes such as stomatitis (e.g., from antiarrhythmic use).

- **Side-effects of anti-hypertensive medications** that may be used in post-MI patients/clients include:
  - chronic cough (e.g., angiotensin converting enzyme inhibitors — ACEIs);
  - taste changes (e.g., ACEIs, beta blockers, alpha-adrenergic blockers);
  - angioedema of lips, face, tongue (ACEIs, angiotensin II receptor blockers — ARBs);
  - upper respiratory tract infections (e.g., ARBs);
  - gingival hyperplasia (e.g., calcium channel blockers — CCBs);
  - xerostomia (e.g., thiazide diuretics and alpha-adrenergic blockers);
  - lichenoid reactions (e.g., thiazide diuretics and beta blockers); and
  - lupus-like oral and skin lesions (e.g., direct vasodilators).

Refer to Hypertension Factsheet and Advisory for more information.

- Excessive salivation and an enhanced gag reflex (particularly in the elderly) can occur with the use of glycosides (e.g., digoxin), which are used to treat congestive heart failure and atrial fibrillation.

- In rare cases, patients/clients with angina occurring as a manifestation of atherosclerotic heart disease may experience pain referred to the neck, lower jaw, or teeth. Its cardiac origin is suggested by a pattern of onset of pain with physical activity and its disappearance with rest.
POST-MYOCARDIAL INFARCTION
(also known as “post-MI” and “post-heart attack”)

Related signs and symptoms

- Myocardial infarction (MI) results from a reduction in blood flow through one or more of the coronary arteries, resulting in infarct, or death, of myocardium (heart muscle).
- Peak mortality following an MI occurs in the first year, primarily resulting from the increased electrical instability of the myocardium (heart muscle) after the infarction.
- Inflammation may contribute to myocardial infarctions, strokes, and other cardiovascular events. Dental hygiene procedures such as scaling and root planing may release bacteria into the bloodstream, potentially increasing vascular inflammation and thereby increasing the risk of a vascular event.
- Congestive heart failure (CHF) — where a damaged heart can no longer pump sufficient blood to the body — is a potential post-MI complication. Signs/symptoms include swelling of the ankles, as well as shortness of breath and coughing (due to fluid accumulation in the lungs).
- Patients/clients who have experienced a myocardial infarction may experience depression, fear, and disturbances in body

Box 2: Clinical Predictors of Increased Cardiac Risk

Major
- Unstable coronary syndromes
- Acute or recent MI with evidence of ischemic risk
  - Unstable or severe angina
  - Decompensated heart failure
- Significant arrhythmias
  - High-grade atrioventricular block
  - Symptomatic ventricular arrhythmias with underlying cardiac disease
  - Supraventricular arrhythmias with uncontrolled ventricular rate
- Severe cardiac valve disease

Intermediate
- Mild angina pectoris
- Previous MI by history or ECG
- Compensated or prior heart failure
- Diabetes mellitus (especially Type 1)
- Renal insufficiency

Minor
- Advanced age
- Abnormal ECG (left ventricular hypertrophy, left bundle-branch block, ST abnormalities)
- Rhythm other than sinus (e.g., atrial fibrillation)
- Low FC (e.g., unable to climb one flight of stairs with a bag of groceries)
- History of stroke
- Uncontrolled systemic hypertension

Boxes 1 and 2 adapted from:
F Pickett. American College of Cardiology/American Heart Association updated guidelines for peri-operative care cardiovascular
evaluation prior to noncardiac surgery: implications for dental hygiene treatment in post-myocardial infarction. American

cont’d on next page...
Disease/Medical Condition

POST-MYOCARDIAL INFARCTION

(also known as “post-MI” and “post-heart attack”)

References and sources of more detailed information


* Includes oral hygiene instruction, fitting a mouth guard, taking an impression, etc.

** Ontario Regulation 501/07 made under the Dental Hygiene Act, 1991. Invasive dental hygiene procedures are scaling teeth and root planing, including curetting surrounding tissue.

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