### ADVISORY TITLE

Use of the dental hygiene interventions of scaling of teeth and root planing including curetting surrounding tissue, orthodontic and restorative practices, and other invasive interventions for persons\(^1\) with myocardial infarction or cardiac arrest, or who have a history of either of these.

### ADVISORY STATUS

Cite as

*College of Dental Hygienists of Ontario, CDHO Advisory Myocardial Infarction and Cardiac Arrest, 2011-03-01*

### INTERVENTIONS AND PRACTICES CONSIDERED

Scaling of teeth and root planing including curetting surrounding tissue, orthodontic and restorative practices, and other invasive interventions (“the Procedures”).

### SCOPE

### DISEASE/CONDITION(S)/PROCEDURE(S)

**Myocardial infarction or cardiac arrest**

### INTENDED USERS

- Advanced practice nurses
- Dental assistants
- Dental hygienists
- Dentists
- Denturists
- Dieticians
- Health professional students
- Nurses
- Patients/clients
- Pharmacists
- Physicians
- Public health departments
- Regulatory bodies

### ADVISORY OBJECTIVE(S)

To guide dental hygienists at the point of care relative to the use of the Procedures for persons with myocardial infarction or cardiac arrest, or who have a history of either of these, chiefly as follows.

1. Understanding the medical condition.
2. Sourcing medications information.
3. Taking the medical and medications history.

\[^1\] Persons includes young persons and children
4. Identifying and contacting the most appropriate healthcare provider(s) for medical advice.
5. Understanding and taking appropriate precautions prior to and during the Procedures proposed.
6. Deciding when and when not to proceed with the Procedures proposed.
7. Dealing with adverse events arising during the Procedures.
8. Keeping records.

**TARGET POPULATION**

Child (2 to 12 years)
Adolescent (13 to 18 years)
Adult (19 to 44 years)
Middle Age (45 to 64 years)
Aged (65 to 79 years)
Aged 80 and over
Male
Female
Parents, guardians, and family caregivers of children, young persons and adults with myocardial infarction or cardiac arrest, or who have a history of either of these.

**MAJOR OUTCOMES CONSIDERED**

For persons who have myocardial infarction or cardiac arrest or who have a history of either of these: to maximize health benefits and minimize adverse effects by promoting the performance of the Procedures at the right time with the appropriate precautions, and by discouraging the performance of the Procedures at the wrong time or in the absence of appropriate precautions.

**RECOMMENDATIONS**

**UNDERSTANDING THE MEDICAL CONDITION**

Terminology used in this Advisory

Resources consulted

- Angina Definition: About.com
- Angina: New World Encyclopedia
- Angina: The Free Dictionary
- Cardiac Arrest: Heart & Stroke Foundation
- Glossary of vascular terms: Medtronic
- Glossary: Heart-Healthy Living
- Glossary: San Antonio Community Hospital
- Glossary: Sanger Heart & Vascular Institute
- Value and Limitations of Chest Pain History in the Evaluation of Patients With Suspected Acute Coronary Syndromes: Journal of the American Medical Association
1. **Angina pectoris** *(CDHO Advisory)*
   a. is recurring symptoms of pressure, tightness or pain in the chest, arm, neck, back or jaw owing to *ischemia*
   b. is pain or discomfort that is spasmodic and that may produce sensations of
      i. cramp-like choking
      ii. suffocation
   c. results from insufficient oxygen supply to the *myocardium*, commonly caused by *coronary artery disease*
   d. is not a *heart attack* but rather pain and discomfort that results when the heart muscle temporarily receives too little blood
   e. is usually a symptom of underlying heart disease, such as *coronary artery disease*
   f. occurs chiefly as
      i. *stable angina*
      ii. *unstable angina*.

2. **Arrhythmia**, disorder of the heart rate or heart rhythm, which
   a. may be fatal if not treated promptly
   b. causes the ventricles to quiver irregularly
   c. involves the heart beating
      i. too quickly, *tachycardia*
      ii. too slowly, *bradycardia*
      iii. irregularly.

3. **Atherosclerosis**, disease of large and medium-sized arteries in muscles, which
   a. is characterized by hardening and narrowing of the arteries caused by the accumulation of fatty deposits called plaques
   b. may cause a blood clot to form at the site of the narrowing, which
      i. completely blocks the artery
      ii. in a coronary artery, causes *myocardial infarction*.

4. **Blood clots**
   a. form if *plaque* in an artery ruptures or breaks open
   b. may form, partially dissolve and form again
   c. may create a larger blockage, with clots becoming large enough to completely block the artery
   d. cause pain when an artery is blocked.

5. **Cardiac arrest**, sudden cardiac arrest, sudden cardiac death, a *medical emergency* of the first order, which
   a. occurs when
      i. the heart stops beating
      ii. breathing stops
   b. is not the same things as a *heart attack*.

6. **Cardiovascular disease (CVD)**, comprises various diseases of the circulatory system which
   a. involve blood vessels of the heart
   b. involve blood vessels supplying the
      i. lungs
      ii. brain
      iii. kidneys or other parts of the body
   c. are the leading cause of death in adult Canadian men and women.
7. Cholesterol, is
   a. a waxy fat called a lipid that is produced naturally in the body
   b. essential for the body to make
      i. cell membranes
      ii. vitamin D
      iii. hormones
   c. of two types
      i. low-density lipoprotein (LDL), the ‘bad’ cholesterol which when in excess causes atherosclerosis
      ii. high-density lipoprotein (HDL), the ‘good’ cholesterol because it carries LDL away from the arterial walls where the atherosclerosis accumulates.
8. Coronary heart disease (CHD), coronary artery disease (CAD), narrowing
   a. of the small blood vessels that supply blood and oxygen to the heart
   b. most likely to be caused by atherosclerosis.
9. Diaphoresis, excessive sweating, commonly associated with shock and other conditions of medical emergency such as myocardial infarction.
10. Heart attack, myocardial infarction, occurs when there is a blockage in one of the coronary arteries which obstructs the blood supply to a part of the heart, which may
    a. damage the heart and cause heart muscle death
    b. lead to disability or death of the persons depending on the extent of the heart muscle damage.
11. Ischemia, decrease or restriction in blood supply to an organ or body part, often resulting in pain.
12. Myocardial infarction, acute myocardial infarction, heart attack, when arteries that supply blood to the heart are blocked, preventing enough oxygen from getting to the heart; the heart muscle dies or becomes permanently damaged.
13. Myocardium, thick muscle layer of the heart that forms the bulk of the heart wall that contracts as heart beats.
14. Negative affectivity, Type D Personality, the full spectrum of negative emotions, including
    a. anger
    b. anxiety
    c. depression
    d. guilt
    e. sadness.
15. Peripheral vascular disease, peripheral arterial disease, peripheral artery occlusive disease, the narrowing or blockage of blood vessels in the limbs.
16. Prevalence, total of persons in a given population with a health-related condition during a specified period of time, usually expressed as a percentage.
17. Prinzmetal’s or variant angina, the rarest form of angina which usually occurs at rest during sleeping hours and is usually easily treated with medication.
18. Stable angina, angina of effort, which
    a. is the most common form of angina
    b. is stable in pattern
    c. occurs when the heart is working harder than usual
    d. is often predictable because of its association with particular types of activity
    e. is usually relieved with rest or with angina medications.
19. Stent, a wire mesh tube sometimes used in angioplasty that is inserted into an artery to open it, prevent re-blockage and allow blood flow needed by the heart.

20. Syncope, temporary loss of consciousness and posture, which
   a. is described as fainting or passing out
   b. is usually related to temporarily insufficient blood flow to the brain
   c. most often occurs
      i. with hypotension
      ii. when the heart fails to provide a normal supply of oxygen to the brain.

21. Triglycerides, the chemical form, which
   a. are the chemical makeup of most fat in food as well as in the body
   b. are present in blood plasma
   c. in association with cholesterol form the plasma lipids.

22. Unstable angina
   a. is a serious condition that may herald an impending myocardial infarction
   b. does not follow a predictable pattern
   c. can happen during strenuous activity or at rest
   d. is not always relieved by rest and medication.

23. Variant angina, chest pain originating in coronary artery spasm, a sudden constriction of a coronary artery depriving the myocardium of blood and oxygen.

Overview of myocardial infarction

Resources consulted
- Association of Episodic Physical and Sexual Activity With Triggering of Acute Cardiac Events: Journal of the American Medical Association
- Ethnic variation in acute myocardial infarction presentation and access to care: PubMed
- Healthy Living: Heart & Stroke Foundation
- Heart Attack and Unstable Angina – Prevention: EverydayHealth
- Heart attack warning signs and cardiac arrest warning signs: Heart & Stroke Foundation
- Heart attack: PubMed Health
- Heart Disease - Myocardial Infarction (Heart Attack): Imaginis
- Heart Disease: Heart & Stroke Foundation
- HeartSmart™ Women: A guide to living with and preventing heart disease and stroke: Heart & Stroke Foundation
- Largest comparison of cardiovascular risk profiles of Canada's major ethnic groups: Heart & Stroke Foundation
- Living with Cholesterol: Heart & Stroke Foundation
- Myocardial Infarction in Childhood: eMedicine
- Myocardial Infarction: eMedicine
- Position Statement on Hormone Replacement Therapy: Heart & Stroke Foundation
- The effect of a charted history of depression on emergency department triage and outcomes in patients with acute myocardial infarction: Canadian Medical Association Journal
- The Heart Truth: Heart & Stroke Foundation
- Tooth loss is associated with increased risk of total death and death from upper gastrointestinal cancer, heart disease, and stroke in a Chinese population-based cohort: International Journal of Epidemiology
- Women’s Early Warning Symptoms of Acute Myocardial Infarction: Circulation
Myocardial infarction

1. is not the same thing as cardiac arrest
2. is a medical emergency of the first order in which the immediate medical history
   a. is critical in recognizing the condition and therefore invoking appropriate emergency medical procedures
   b. sometimes may provide the only clues that lead to the diagnosis in the initial phases of the emergency
3. is characterized by warning signs and symptoms, including
   a. pain
      i. located in one site, or several sites, or that moves between the sites that include the
         1. chest which
            a. is a major focal point of symptoms of heart attack that
               i. are usually across the anterior precordium
               ii. are typically described as tightness, pressure, or squeezing
               iii. may radiate to the jaw, neck, arms, back, and epigastrium
               iv. are more frequently experienced in the left arm though they do occur in both arms
            b. may be the site of vague or barely noticeable symptoms in
               i. elderly persons
               ii. persons with diabetes
               iii. women
         2. neck
         3. jaw
         4. shoulder
         5. arms
         6. back
         7. abdomen
         8. teeth
      ii. experienced as
         1. a tight band around the chest
         2. burning
         3. heaviness, akin to something heavy placed on the chest
         4. severe indigestion
         5. tightness, squeezing or heavy pressure
      iii. that
         1. may vary in intensity
         2. usually persists for more than 20 minutes
         3. is incompletely relieved or not relieved at all or by
            a. nitrates
            b. rest
      iv. that is
         1. sudden
         2. not relieved with rest
b. breathing problems, which
   i. include
      1. shortness of breath
      2. difficulty breathing
      3. cough
      4. wheezing
   ii. may accompany chest pain or occur as an isolated complaint
   iii. indicate that the heart’s performance is impaired by acute ischemia
   iv. may be the equivalent of angina in the particular patient
   v. may be the only complaint in a person who
      1. is elderly
      2. has diabetes

c. intestinal discomfort
   i. nausea, with or without
      1. vomiting
      2. abdominal pain
   ii. indigestion


d. skin
   i. diaphoresis
   ii. cool, clammy skin

e. fear
   i. anxiety
   ii. denial

f. circulation-related
   i. fainting
   ii. light-headedness, dizziness
   iii. palpitations

g. symptoms that differ from the usual because of particularly subtle presentations in elderly patients and persons with diabetes, such as
   i. fatigue
   ii. syncope
   iii. weakness
   iv. altered mental state or dementia resulting in absence of
      1. recollection of recent symptoms
      2. complaints relating to symptoms

h. symptoms lacking the classic patterns and which
   i. are clinically silent
   ii. may
      1. describe as many as 50 percent of all myocardial infarctions
      2. be unrecognized by the patient, which calls for a high index of suspicion for myocardial infarction especially in the evaluation of
         a. women
         b. older persons
         c. persons with
            i. diabetes
            ii. dementia
            iii. histories of heart failure
            iv. permanent pacemakers
4. is rare in childhood and adolescence, when the cause is usually on or other of
   a. acute inflammatory condition of the coronary arteries
   b. an anomalous origin of the left coronary artery
5. occurs when the blood supply to the heart is slowed or stopped because of a blockage
   a. caused
      i. in 90 percent of myocardial infarctions by plaque buildup associated with
         atherosclerosis which
         1. almost or completely blocks a coronary artery
         2. may be associated with a blood clot in a coronary artery
      ii. occasionally by sudden, significant emotional or physical stress, including
          an illness
   b. may also occur when a coronary artery temporarily contracts or goes into spasm
      severe enough to
      i. cut off the flow of blood to the heart
      ii. damage the heart to a degree determined by the duration of time the
          blood supply is cut off
6. is associated with risk factors that also relate to coronary artery disease, including
   a. abnormal cholesterol levels
   b. age over 65 years
   c. diabetes (CDHO Advisory)
   d. excessively fatty diet
   e. family history of coronary artery disease
   f. hypertension (CDHO Advisory)
   g. kidney disease (CDHO Advisory)
   h. male
   i. smoking
7. is investigated by means of
   a. pulse rate, likely to be rapid
   b. blood pressure, which may be normal, high, or low
   c. coronary angiography
   d. CT scan
   e. echocardiography
   f. electrocardiogram (ECG)
   g. MRI
   h. nuclear ventriculography
   i. blood tests for heart tissue damage or high risk for heart attack
8. is treated with hospital care, including some combination of
   a. intensive care involving
      i. close ECG monitoring for arrhythmias, the leading cause of death in the
         first few hours of a heart attack
      ii. oxygen
      iii. IV administration of medications and fluids
      iv. urinary catheterization
   b. medication
   c. surgery and other procedures, including
      i. ablation
      ii. angioplasty with stent, percutaneous coronary intervention (PCI)
      iii. cardioversion therapy
iv. **coronary artery bypass surgery**  
v. **heart transplant surgery**  
vi. **heart valve surgery: repair and replacement**  
vii. **implantable cardioverter defibrillator (ICD)**  
viii. **implantable pacemaker**  
ix. **mechanical assist device**  
x. **ventricular resection or remodeling**

9. is associated with age in that  
   a. four out of five patients with **coronary artery disease** are 65 years or older  
   b. there exists an association with socio-economic gradient in all age groups; for  
      i. older adults (age 45 to 64) the rate of heart attacks in the least affluent  
         neighbourhoods was 1.6 times higher (p<0.05) than in the most affluent  
         neighbourhoods  
      ii. smaller ratios were observed for young adults (age 20 to 44) and seniors  
         (age 65 and older)  
   c. age-standardized rates of hospitalized acute myocardial infarction or cardiac  
      arrest events in Canada  
      i. decreased from 251 per 100,000 in 2003–2004 to 217 per 100,000 in  
         2008–2009  
      ii. varied from 255 per 100,000 population from the least affluent  
         neighbourhoods to 186 per 100,000 from the most affluent  
         neighbourhoods

10. is associated with gender in that  
    a. men are  
      i. at higher risk of myocardial infarction or cardiac arrest than women  
      ii. more likely to suffer myocardial infarction or cardiac arrest earlier in life  
    b. women  
      i. die in greater numbers from myocardial infarction or cardiac arrest than  
         from any other disease, including **breast cancer**  
      ii. following menopause are more likely than men to die within the first year  
         of having a myocardial infarction or cardiac arrest  
      iii. prior to menopause  
         a. may be safeguarded from heart disease because of the protective  
            effect of estrogen  
         b. with diabetes have similar myocardial-infarction risk to men of  
            the same age because diabetes impairs the protective effect of  
            estrogen  
    iv. may not perceive heart disease as the greatest threat to their health even  
        though heart disease is the leading cause of death among both women  
        and men  
    v. may or may not differ from men in the nature or interpretation warning  
       signals of heart attack, because  
       a. the evidence is conflicting  
       b. women and men may experience typical and non-typical  
          symptoms such as nausea, sweating, pain in the arm, throat, jaw,  
          or other pain that is unusual  
       c. women may describe their pain differently than men, though the  
          most common symptom in women is chest pain
c. most of the risk factors, signs and symptoms are the same in women as they are in men, the unique aspects of female heart health include
   i. menopause, which is associated with an increased risk of
      1. heart disease because of the declining production of estrogen
      2. increase
         a. in LDL cholesterol
         b. triglyceride levels triglycerides, which
            i. may increase the risk of heart disease
            ii. often rise in level as
                1. total cholesterol and LDL rise
                2. HDL falls
                3. diabetes risk rises
      3. decrease HDL leading to
         a. hypertension
         b. increase in body fat above the waist
         c. impairment of
            i. blood clotting
            ii. metabolism of sugar, a precursor to diabetes
   ii. oral contraception which, in a small percentage of women, may increase the risk of hypertension and blood clots, especially
      1. in combination with smoking
      2. with age above 35 years
      3. with other risk factors for heart disease
      4. an existing blood-clotting problem
   iii. cholesterol which
      1. despite the presence of natural estrogen in women, is too high in 45 percent of women between the ages of 18 to 74
      2. after menopause, as natural estrogen levels drop, is too high among 80 percent of women between the ages of 65 to 74
   d. in both sexes, risk factors, such as
      i. smoking
         1. cigarette smokers are twice as likely to experience myocardial infarction or cardiac arrest compared to non-smokers
         2. smokers also have a two to four time higher risk of sudden cardiac death (within an hour of a heart attack)
      ii. hypertension alone or in association with obesity, smoking, abnormal blood cholesterol levels or diabetes increases the risk of myocardial infarction or cardiac arrest
      iii. abnormal cholesterol levels alone increase the risk of myocardial infarction or cardiac arrest
      iv. obesity, which increases
         1. the risk of coronary artery disease, myocardial infarction or cardiac arrest, and stroke
         2. strain on the heart, which raises blood pressure and cholesterol
         3. the risk of diabetes
      v. diabetes
         1. some two-thirds of persons with diabetes die from heart or blood vessel disease
2. adults with diabetes are three to seven times more likely to develop heart disease

vi. physical activity; insufficiency of exercise deprives the body of an important means for reducing the risks of some or all of
   1. coronary artery disease
   2. myocardial infarction or cardiac arrest
   3. abnormal cholesterol levels
   4. obesity
   5. diabetes
   6. hypertension

vii. stress, which may be linked to
   1. coronary artery disease
   2. myocardial infarction or cardiac arrest
   3. hypertension
   4. abnormal cholesterol levels
   5. increased tendencies to one or more of
      a. smoking
      b. gaining weight
      c. decreasing physical activity

11. is associated with factors reflective of Canada's ethnic diversity; a 2010 study of 154,653 Whites, 3,364 South Asians, 3,038 Chinese and 2,742 Blacks who represented people living in Ontario between 1996 and 2007 found that

   a. the prevalence of
      i. heart disease or stroke in South Asians was almost twice that in Chinese
      ii. hypertension was in comparison with Whites
          1. 44 percent higher in Blacks
          2. 24 percent higher in the South Asians
   b. the risk of diabetes among the South Asian and Black groups was twice as high as among the Whites and Chinese
   c. with the cardiovascular risk-factor profile, which included two or more major cardiovascular risk factors (current smoking, obesity, diabetes, hypertension) the most favourable profile overall in descending order of reporting was
      i. Chinese, 4.3 percent
      ii. South Asian, 7.9 percent
      iii. White, 10.1 percent
      iv. Black, 11.1 percent
   d. smoking was
      i. almost three times higher in the Whites than in Chinese and South Asians
      ii. more common in men than women, but the difference between men and women was much smaller in Whites and Blacks than in Chinese and South Asians
   e. obesity was five times more prevalent in Whites and Blacks than in Chinese
   f. Blacks had a higher prevalence for cardiovascular risk factors, but a lower prevalence of heart disease
   g. Black women had higher prevalence of obesity, diabetes, hypertension and heart disease than Black men
   h. 63 percent to 75 percent of the study respondents
      i. did not participate in at least 15 minutes of daily physical activity
ii. the non-participation was greatest among
   1. South Asian men (70 percent), women (75 percent)
   2. Chinese men (71 percent), women (75 percent)
   3. Black women (71 percent).

12. exhibits risk factors
   a. risk factors that can be controlled, which include
      i. alcohol consumption that is excessive
      ii. atherosclerotic plaque
         1. diabetes
         2. high blood cholesterol
         3. hypertension
         4. smoking
      iii. overweight
   iv. physical inactivity
   v. risk factors that cannot be controlled
      vi. stress
   b. risk factors that may or may not be controllable but which may adversely influence recovery, which include
      i. personality type: high negative affectivity and social inhibition, which appear to be
         1. strong predictors of adverse effect on health outcomes after myocardial infarction or cardiac arrest
         2. important psychosocial factors to watch for in persons following myocardial infarction
         3. associated with a distinct profile of illness beliefs, which may help explain the adverse effect on health outcomes following myocardial infarction or cardiac arrest
         4. associated with
            a. lower-priority emergency department triage scores than those with other comorbidities
            b. lower performance on quality indicators in acute myocardial infarction or cardiac arrest care
      ii. sedentary lifestyle, which is considered a risk factor but so too is episodic physical and sexual activity because these appear to be associated with myocardial infarction and other acute cardiac events to a greater extent than for persons with high levels of habitual physical activity
      c. risk factors for myocardial infarction or cardiac arrest and atherosclerosis that cannot be controlled, which include
         i. age
         ii. ethnicity
         iii. family history
         iv. history of stroke or transient ischemic attack
         v. sex

13. presents a mixed prognosis because of
   a. a death rate as rate as high as 30 percent, with more than half of the deaths occurring in the pre-hospital setting
   b. its relation to the
      i. survival time: if death does not occur within the first two hours of the attack, the person is likely to survive though complications
1. may occur
   2. may or may not fully recover
      ii. extent of the infarct
      iii. timing and nature of intervention
      iv. success of the intervention
      v. post-infarction management
      vi. rehabilitation, regular follow-up care and attention to controllable and other risk factors
   c. recovery which may be sufficient for return to normal activities.

Overview of cardiac arrest

Resources consulted
- Cardiac arrest warning signs: Heart & Stroke Foundation
- Sudden cardiac arrest: National Heart Lung and Blood Institute

Cardiac arrest
1. is a first-order medical emergency
2. not the same thing as myocardial infarction
3. causes death in some 95 percent of persons who experience it
4. may be occurring when a person is
   a. suddenly not responsive, especially when called or tapped on the shoulder
   b. apparently pulseless and without heart beat
   c. not breathing when the head is
      i. tilted back
      ii. checked for at least five seconds
5. likely results in death if
   a. diagnosis is delayed
   b. appropriate action is not taken
   c. inappropriate treatment is given
6. is caused by
   a. ventricular fibrillation, a type of arrhythmia
   b. coronary artery disease
   c. abnormal electrical activity in the heart associated with
      i. severe physical stress
      ii. inherited disorders that disrupt the heart’s electrical activity
      iii. structural changes in the heart that cause electrical signals to spread abnormally.

Multimedia and images

Conduction system of the heart
Heart, front view
Heart, section through the middle
Medical Emergencies in the Dental Office iDentist
Comorbidity, complications and associated conditions

Comorbid conditions are those which co-exist with myocardial infarction or cardiac arrest but which are not believed to be caused by it. Complications and associated conditions are those that may have some link with it. Distinguishing among comorbid conditions, complications and associated conditions may be difficult in clinical practice.

Comorbid conditions, complications and associated conditions include the following.

1. Arrhythmia.
2. Cardiogenic shock, the state in which the heart has been damaged so much that it is unable to supply enough blood to the organs of the body.
3. Congestive heart failure, the condition in which the heart can no longer pump enough blood to the rest of the body.
4. Damage to heart valves or the septum between the two sides of the heart.
5. Infarct extension, damage extending past heart tissue, possibly leading to rupture of the heart.
6. Irregular heartbeats, including ventricular tachycardia and ventricular fibrillation.
7. Mental health conditions, which
   a. may not always be adequately recorded
   b. include
      i. dementia (CDHO Advisory)
      ii. depression (CDHO Advisory)
      iii. post-traumatic stress disorder
      iv. negative affectivity.
8. Pericarditis, inflammation around the lining of the heart.
10. Side effects of medications.

Oral health considerations

Resources consulted

- Aspirin Use and Post-operative Bleeding from Dental Extractions: Journal of Dental Research
- Blood pressure outcomes of dental patients screened chronobiologically: Journal of the American Dental Association
- Craniofacial pain as the sole symptom of cardiac ischemia: Journal of the American Dental Association
- Do Genetic Factors Explain the Association Between Poor Oral Health and Cardiovascular Disease?: American Journal of Epidemiology
- Influenza vaccination, pneumococcal vaccination and risk of acute myocardial infarction: matched case-control study: Canadian Medical Association Journal
- Oral Health Needs Among Adults in the United States With Chronic Diseases: Journal of the American Dental Association
- Periodontal disease and cardiovascular disease: Journal of the American Dental Association
Myocardial infarction

1. is a major concern for all healthcare professionals because
   a. it is a medical emergency of the first order
   b. it is the commonest cause of death for men and women
   c. many of the deaths could be prevented
   d. deaths occur when medical treatment is not provided quickly enough
   e. of high rates of severe, residual complications in many of those who survive

2. is therefore a point of clinical focus for dental hygienists, who should be able to
   a. recognize signs of possible myocardial infarction
   b. take the medical history, which may
      i. be critical for the diagnosis of myocardial infarction
      ii. sometimes provide the only clues that lead to the diagnosis in the initial phases of the patient presentation
   c. react quickly and appropriately to initiate the interventions that will ultimately prevent or limit damage to the myocardium by
      i. calling 911 with the first symptoms or signs of angina
      ii. seeking on-the-spot medical attention if circumstances permit

3. and its risk factors are a high priority for health promotion and prevention for all healthcare professionals, which requires dental hygienists to
   a. encourage patients/clients to manage their own control controllable risk factors
   b. be attentive to controllable risk factors within the scope of oral healthcare, including, in particular, monitoring
      i. blood pressure as a contribution to the overall health of patients/clients by referring them to their physicians when blood pressure levels signal that investigation is indicated (CDHO Advisory)
      ii. the various types of periodontal disease in elderly patients/clients because of the
         1. growing evidence linking periodontal disease and
            a. cardiovascular disease generally
            b. coronary artery disease in particular
         2. high level of unmet dental needs apparently existing in the elderly population, whose cardiac conditions and the comorbidities, complications and associated conditions decrease their accessibility to oral healthcare
   c. take clinical account of key factors such as that
      i. cardiovascular diseases are the leading cause of death among Canadian men and women
      ii. psychological conditions, such as negative affectivity, that affect patients post-infarction may also act to discourage some patients/clients from obtaining oral healthcare or pursuing oral self-care
      iii. the association between tooth loss and increased risk of death from cardiovascular disease likely applies to non-smokers as well as smokers
iv. new evidence suggests that annual influenza vaccination may be associated with some degree of protection against myocardial infarction, which should lead dental hygienists to
1. encourage patients/clients with cardiac risk factors to receive an annual influenza vaccination
2. view annual influenza vaccinations for themselves and their patients/clients as an important component of health promotion and prevention.

Cardiac arrest is an uncommon but nevertheless foreseeable emergency in an oral healthcare office for which dental hygienists should be prepared.

**MEDICATIONS SUMMARY**

**Sourcing medications information**

1. Adverse effect database
   - Health Canada’s Marketed Health Products Directorate
toll-free 1-866-234-2345
   - Health Canada’s Drug Product Database

2. Specialized organizations
   - US National Library of Medicine and the National Institutes of Health Medline Plus Drug Information
   - WebMD

3. Medications considerations
   All medications have potential side effects whether taken alone or in combination with other prescription medications, or as over-the-counter (OTC) or herbal medications.

4. Information on herbals and supplements
   - US National Library of Medicine and the National Institutes of Health Medline Plus Drug Information All Herbs and Supplements

**Types of medications**

**Resources consulted**
- Diuretics: Texas Heart Institute
- Drugs and Health Products: Health Canada
- How heart disease medications work: Heart and Stroke Foundation

**Guidelines**

1. Apart from medications used to treat angina (angina pectoris) the patient/client may also be prescribed medications for comorbidities, complications and associated conditions of angina.
2. Aspirin
   a. there is no indication to discontinue aspirin treatment of patient/clients with a history of myocardial infarction for persons requiring single-tooth extraction or the Procedures
b. antiplatelet therapy with aspirin
   i. has been shown to reduce cardiac events after coronary stenting
   ii. but patients and health care providers may prematurely discontinue dual antiplatelet therapy, which greatly increases the risk of stent thrombosis, myocardial infarction and death.

3. Epinephrine in local anesthesia in oral healthcare
   a. Pain and other stressors can provoke sudden and significant release of epinephrine, which can adversely affect the diseased heart.
   b. The addition of epinephrine to local anesthetics improves both the depth and duration of anesthesia. Given the importance of good local anesthesia technique, use of some exogenous epinephrine may be beneficial for some patients/clients with angina, but the dose needs careful consideration.
   c. One of the most frequently quoted suggestions for a safe dose specifies a maximum dose of 40 µg epinephrine per oral healthcare appointment. Nevertheless, epinephrine should
      i. be used with caution with patients/clients with a history of stable angina
      ii. not be used with patients/clients with a history of unstable angina or myocardial infarction without clear medical concurrence.

4. New guidelines for prevention of heart disease no longer recommend
   a. hormone replacement therapy
   b. vitamins E or C
   c. antioxidants
   d. folic acid.

Specific Medications

1. Thrombolytic therapy
   aspirin (ASA)
   clopidogrel (Plavix®)

2. Anti-platelets
   Prevent blood clots from forming
   aspirin (ASA)
   clopidogrel (Plavix®)
   dipyridamole (Permole®, Persantine®)
   ticlopidine (Ticlid®)

3. Anticoagulants
   aspirin (ASA)
   clopidogrel (Plavix®)
   warfarin (Coumadin®)

4. Nitrates
   Prevent or treat angina
   isosorbide (Dilatrate®-SR, Imdur®, Ismo®, Ismotic®, Isoditrate®, Isordil®, Monoket®)
   nitroglycerin (Nitromist®, Nitrostat®, Nitro-Time®)
   nitroglycerin topical (Nitro-Bid®)
   nitroglycerin transdermal (Minitran®, Nitro-Dur®)
5. **Beta-blockers**  
Heart failure and hypertension  
-carvedilol (Coreg®)  
-labetalol oral (Normodyne®, Trandate®)  
-metoprolol (Lopressor®, Toprol®)  
-pindolol (Visken®)  
-propranolol oral (Inderal®)

6. **Calcium channel blockers**  
Hypertension and angina  
-amiodipine (Norvasc®)  
-diltiazem (Cardizem®)  
-nifedipine (Procardia®)  
-verapamil (Calan®, Isoptin®)

7. **Cholesterol** absorption inhibition and dietary restriction  
-ezetimibe (Zetia®)  
-niacin (Niacor®)

8. **Resins (bile acid sequestrants)**  
Promote formation of bile, which reduces LDL-cholesterol  
-cholestyramine resin (Questran®)  
-colestipol (Colestid®)

9. **Statins**  
Lower cholesterol and other fats  
-atorvastatin (Lipitor®)  
-fluvastatin (Lescol®)  
-lovatatin (Mevacor®)  
-pravastatin (Pravachol®)  
-simvastatin (Zocor®)

10. **Angiotensin-converting enzyme (ACE) inhibitors**  
Hypertension and heart failure  
-captopril (Capoten®)  
-enalapril (Vasotec®)  
-lisinopril (Prinivil®, Zestril®)  
-ramipril (Altace®)  
-ranolazine (Ranexa®)

11. **Thiazide diuretics**  
Thiazide diuretics are used to treat high blood pressure by reducing the amount of sodium and water in the body. Thiazides are the only type of diuretic that dilates the blood vessels, which also helps to lower blood pressure.  
-chlorthalidone (Thalitone®, Hygroton®)  
-hydrochlorothiazide (HydroDIURIL®)  
-methyclothiazide (Duretic®)  
-metolazone (Zaroxolyn®)
12. Potassium-sparing diuretics
Potassium-sparing diuretics are used to reduce the amount of water in the body. Unlike the other diuretic medications, these do not cause the body to lose potassium.
- amiloride and hydrochlorothiazide (Moduretic®)
- spironolactone (Aldactone®)
- triamterene (Dyrenium®)

13. Loop-acting diuretics
Loop-acting diuretics cause the kidneys to increase the flow of urine. This helps reduce the amount of water in the body and lower the blood pressure.
- ethacrynic acid (Edecrin®)
- furosemide (Lasix®)

14. Heart failure, arrhythmia, hypertension
- digoxin oral (Cardoxin®)
- spironolactone (Aldactone®)

15. Fibrates (Fibric Acid Derivatives)
Reduce cholesterol and triglycerides, increase HDL
- fenofibrate (Lipidil®)
- gemfibrozil (Lopid®)

**Side effects of medications**

See the links above to the specific medications.

**THE MEDICAL AND MEDICATIONS HISTORY**

The dental hygienist in taking the medical and medications history-taking should

1. focus on screening the patient/client prior to treatment decision relative to
   a. key symptoms
   b. medications considerations
   c. contraindications
   d. complications
   e. comorbidities
   f. associated conditions
2. explore the need for advice from the primary or specialized care provider(s)
3. inquire about
   a. pointers in the history of myocardial infarction or cardiac arrest that signal the need for medical advice before implementing the Procedures, such as a recent history of intensive medical investigation and care
   b. symptoms indicative of
      i. instability in the heart condition, such as unstable angina
      ii. stability in the heart condition, such as stable angina
   c. the patient/client’s understanding and acceptance of the need for oral healthcare
   d. medications considerations, including over-the-counter medications, herbals and supplements, with specific reference to nitrates
   e. problems with previous dental/dental hygiene care
f. problems with infections generally and specifically associated with dental/dental hygiene care  
g. the patient/client’s current state of health  
h. how the patient/client’s current symptoms relate to  
i. oral health  
ii. health generally  
iii. recent changes in the patient/client’s condition.

**IDENTIFYING AND CONTACTING THE MOST APPROPRIATE HEALTHCARE PROVIDER(S) FOR ADVICE**

Identifying and contacting the most appropriate healthcare provider(s) from whom to obtain medical or other advice pertinent to a particular patient/client

The dental hygienist should  
1. record the name of the physician/primary care provider most closely associated with the patient/client’s healthcare, and the telephone number  
2. obtain from the patient/client or parent/guardian written, informed consent to contact the identified physician/primary healthcare provider  
3. use a consent/medical consultation form, and be prepared to fax the form to the provider  
4. include on the form a standardized statement of the Procedures proposed, with a request for advice on proceeding or not at the particular time, and any precautions to be observed.

**UNDERSTANDING AND TAKING APPROPRIATE PRECAUTIONS**

**Infection Control**

Dental hygienists are required to keep their practices current with infection control policies and procedures, especially in relation to  
1. the CDHO’s Infection Prevention and Control Guidelines (2019)  
2. relevant occupational health and safety legislative requirements  
3. relevant public health legislative requirements  
4. best practices or other protocols specific to the medical condition of the patient/client.

**DECIDING WHEN AND WHEN NOT TO INITIATE THE PROCEDURES PROPOSED**

The dental hygienist  
1. should not implement the Procedures without prior consultation with the appropriate primary or specialist care provider(s) if the patient/client any of the following  
   a. has a recent history of intensive medical investigation and care  
   b. is currently under intensive medical investigation and care  
   c. is experiencing  
      i. unstable angina  
      ii. pain or discomfort which could be attributable to heart disease  
2. may postpone the Procedures pending medical advice if the patient/client  
   a. appears debilitated  
   b. is experiencing symptoms suggestive of comorbidities, complications or associated conditions
c. has not complied with pre-medication, including antibiotic prophylaxis, as directed by the prescribing physician
d. has recently changed significant medications, under medical advice or otherwise
e. recently experienced changes in his/her medical condition such as medication or other side effects of treatment
f. is unable to provide the dental hygienist with sufficient information about
   i. current medications
   ii. current investigations and treatment
   iii. his or her recent medical history
g. has symptoms or signs with which the dental hygienist is insufficiently unfamiliar and which could be related to myocardial infarction
h. has not recently or ever sought and received medical advice relative to oral healthcare procedures
i. is deeply concerned about any aspect of his or her medical condition

### DEALING WITH ANY ADVERSE EVENTS ARISING DURING THE PROCEDURES

1. Dental hygienists are required to initiate emergency protocols as required by the College of Dental Hygienists of Ontario’s [Standards of Practice](#), and as appropriate for the condition of the patient/client.
2. First-aid provisions and responses as required for current certification in first aid.
3. Medical emergencies, resources and general principles

#### Resources
- [2010 Guidelines for CPR and Emergency Cardiac Care: Heart & Stroke Foundation](#)
- [Automated External Defibrillator (AED): Heart & Stroke Foundation](#)
- [CPR: Heart & Stroke Foundation](#)
- [Emergency care: Heart & Stroke Foundation](#)
- [Learning CPR: Heart & Stroke Foundation](#)
- [Medical Emergencies in the Dental Office iDentist](#)

Death and rates of severe, residual complications are significantly reduced if healthcare professionals, such as dental hygienists, and patients/clients and bystanders shorten the time to definitive treatment by prompt action according to pre-arranged plans and procedures.

### Myocardial infarction

Requires urgent actions by the dental hygienist, who should
1. be able to recognize symptoms early
2. immediately stop the Procedures
3. promptly activate the emergency medical service (EMS) system by immediately calling 911 or the local emergency number
4. instruct the patient/client to
   a. stop all activity
   b. sit or lie down, in whatever position is most comfortable, while awaiting the ambulance with emergency medical personnel
   c. take the normal dosage of nitroglycerin if either
i. this is already prescribed for him/her
ii. the dental hygienist has nitrates in an emergency kit
d. combat chest pain by chewing and swallowing ASA (acetylsalicylic acid, Aspirin)
in a dose of
   i. one adult 325 mg tablet
   ii. or two 80 mg tablets
e. be warned that pain medication such as acetaminophen (commonly known as TYLENOL®) or ibuprofen (commonly known as Advil®) do not act in the same way as ASA (Aspirin) and therefore will not help in a myocardial infarction emergency situation.

Cardiac arrest

Requires urgent actions by the dental hygienist, who should
1. immediately stop the Procedures
2. if there are bystanders
   a. instruct someone to immediately call 911 or the local emergency number
   b. instruct someone to immediately
      i. get an Automated External Defibrillator (AED) if one is available
      ii. use the Automated External Defibrillator (AED) as soon as it arrives
   c. begin CPR
3. if are there no bystanders
   a. immediately call 911 or the local emergency number
   b. then get an Automated External Defibrillator (AED) if one is available, and start using it as soon as it is in hand
   c. if no Automated External Defibrillator (AED) is available, begin CPR

RECORD KEEPING

Subject to Ontario Regulation 9/08 Part III.1, Records, in particular S 12.1 (1) and (2) for a patient/client with a history of myocardial infarction or cardiac arrest, the dental hygienist should specifically record
1. a summary of the medical and medications history
2. any advice received from the physician/primary care provider relative to the patient/client’s condition
3. the decision made by the dental hygienist, with reasons
4. compliance with the precautions required
5. all Procedure(s) used
6. any advice given to the patient/client.

ADVISING THE PATIENT/CLIENT

Resources consulted
Cardiovascular conditions: Colgate Oral Care Centre

The dental hygienists should
1. urge the patient/client to alert any healthcare professional who proposes any intervention or test that he or she
   a. has a history of angina (angina pectoris)
b. is taking medication

2. explain to the patient/client that some cardiovascular diseases may
   a. affect oral health
   b. may require
      i. medical advice before the Procedures are implemented
      ii. changes to oral health care

3. advise the patient/client to bring angina-related medications, such as nitrates, to oral health appointments

4. should discuss, as appropriate
   a. the patient/clients use of medications, including
      i. use
         1. most recent
         2. for sub-lingual nitrates, combating dry mouth with moistening of area under tongue
      ii. effects
         1. nature
         2. duration
   b. the importance of the patient/client’s
      i. self-checking the mouth regularly for new signs or symptoms
      ii. reporting to the appropriate healthcare provider any changes in the mouth
   c. the need for regular oral health examinations and preventive oral healthcare
   d. oral self-care including information about
      i. choice of toothpaste
      ii. tooth-brushing techniques and related devices
      iii. dental flossing
      iv. mouth rinses
      v. management of a dry mouth
   e. the importance of an appropriate diet in the maintenance of oral health
   f. for persons at an advanced stage of debilitation
      i. regimens for oral hygiene as a component of supportive care and palliative care
      ii. the role of the family caregiver, with emphasis on maintaining an infection-free environment through hand-washing and, if appropriate, wearing gloves
      iii. scheduling and duration of appointments to minimize stress and fatigue
   g. comfort level while reclining, and stress and anxiety related to the Procedures
   h. medication side effects such as dry mouth, and recommend treatment
   i. mouth ulcers and other conditions of the mouth relating to disorders of the adrenal gland, comorbidities, complications or associated conditions, medications or diet
   j. pain management.

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<tr>
<th>BENEFITS/HARMS OF IMPLEMENTING THE RECOMMENDATIONS</th>
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<td>POTENTIAL BENEFITS</td>
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<tr>
<td>1. Promoting health through oral hygiene for persons with myocardial infarction or cardiac arrest who have a history of either of these.</td>
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2. Reducing the adverse effects, such as failure to recognize the medical emergency by
   a. recognizing the possibility of myocardial infarction or cardiac arrest
   b. acting appropriately and promptly
3. Reducing the risk that oral health needs are unmet.

**POTENTIAL HARMS**

1. Failing to take opportunities to promote health protection and prevention.
2. Performing the Procedures at an inappropriate time, such as
   a. when the patient/client should receive medical advice before the Procedures are implemented
   b. in the presence of complications for which prior medical advice is required
   c. in the presence of acute oral infection without prior medical advice.
3. Disturbing the normal dietary and medications routine of a person receiving care in connection with myocardial infarction or cardiac arrest.
4. Inappropriate management of pain or medication.

**CONTRAINDICATIONS**

**CONTRAINDICATIONS IN REGULATIONS**

Identified in the *Dental Hygiene Act, 1991 – O. Reg. 218/94 Part III*

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