HYPERTENSION IN ADULTS

(a also known as “high blood pressure” or “high BP”)

Is the initiation of non-invasive dental hygiene procedures contra-indicated? No, unless systolic blood pressure (SBP) ≥ 180 mm Hg and/or diastolic blood pressure (DBP) ≥ 110 mm Hg OR there are warning symptoms/signs in the hypertensive patient/client at lower levels of BP; e.g., severe headache, blurred vision, shortness of breath, nosebleeds, nausea/vomiting, chest pain, or seizures. (See attached tables for further details.)

- Is medical consult advised? Yes, if SBP ≥ 130 mm Hg and/or DBP ≥ 85 mm Hg;
- Is medical clearance required? No
- Is antibiotic prophylaxis required? No
- Is postponing treatment advised? No, unless SBP ≥ 160 mm Hg and/or DBP ≥ 100 mm Hg. (See attached tables for further details.)

Is the initiation of invasive dental hygiene procedures contra-indicated? No, unless SBP ≥ 180 mm Hg and/or DBP ≥ 110 mm Hg OR there are warning symptoms/signs in the hypertensive patient/client at lower levels of BP; e.g., severe headache, blurred vision, shortness of breath, nosebleeds, nausea/vomiting, chest pain, or seizures. In patients/clients with risk factors such as myocardial infarction, angina pectoris, high coronary disease risk, recurrent stroke, diabetes mellitus, and renal disease, invasive procedures should not be performed if SBP ≥ 160 mm Hg and/or DBP ≥ 100 mm Hg. (See attached tables for further details.)

- Is medical consult advised? See above.
- Is medical clearance required? No
- Is antibiotic prophylaxis required? No
- Is postponing treatment advised? No, unless BP is at contra-indication levels (see above) or there are other concerns that invasive procedures may significantly elevate patient/client blood pressure (e.g., missed anti-hypertensive medications), which should prompt medical consultation prior to the performing of invasive procedures. Dental hygiene procedures should be deferred for any patient/client who has uncontrolled hypertension (BP of 180/110 mm Hg or higher in persons without a history of other cardiovascular risk factors; 160/100 mm Hg or higher with a history of other risk factors). Asymptomatic patients/clients with BP less than 180/110 mm Hg (or 160/100 in patients/clients with other cardiovascular risk factors) can receive any indicated dental hygiene treatment; however, persons with elevated blood pressures (particularly 135/85 AOBP or 140/90 non-AOBP and higher in most people) should be encouraged to see their physician for investigation and optimal management, as per attached tables.

Oral management implications

- Automated (electronic, oscillometric) blood pressure measurement is preferred over manual and auscultatory measurement.
- The primary concern in dental hygiene management of a patient/client with hypertension is that during the course of treatment a sudden, acute elevation of blood pressure might occur, potentially leading to a serious outcome, such as heart attack or stroke. Emotional stress and pain stimulate the sympathetic nervous system, which can result in elevated blood pressure. The two important questions to be answered before dental hygiene treatment are: 1/ what are the associated risks of treatment in this patient/client; and 2/ at what level of blood pressure is treatment unsafe for the patient.
- The procedural risk associated with an adverse cardiovascular outcome from both non-invasive and invasive dental hygiene procedures is very low. The risk imposed by uncontrolled blood pressure (defined as 180/110 or greater in most persons) constitutes a minor risk in terms of dental hygiene cardiovascular risk; however, blood pressure should be brought under control before elective procedures or surgery are performed.

1 Hypertension Canada defines “high normal” for non-automated blood pressure reading as 130-139 // 85-89 mm Hg. Note that Hypertension Canada’s blood pressure guidelines and terminology differ somewhat from those of the 2017 Hypertension Guidelines of the American College of Cardiology/American Heart Association, as well as the 2017 Diabetes and Hypertension Position Statement of the American Diabetes Association.
2 AOBP = automated office blood pressure (i.e., BP obtained via automated electronic upper arm device)
3 Non-AOBP = non-automated office blood pressure (e.g., BP obtained via non-automated blood pressure cuff with provider in the room)
**HYPERTENSION IN ADULTS**

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**Oral management implications (cont’d)**

- Orthostatic hypotension (i.e., low blood pressure when standing erect) can result from drugs (e.g., alpha-adrenergic blockers, angiotensin converting enzyme inhibitors, angiotensin II receptor blockers, and direct vasodilators) used to treat hypertension. Dental hygienists can minimize patient/client light-headedness or fainting by avoiding rapid chair position changes.

- Alpha-adrenergic blockers can result in nasal congestion, which should be taken into account where nasal breathing is relied upon.

- Beta-blockers can result in dizziness, bronchospasm, and masking of hypoglycemia; the dental hygienist should be alert to these possible drug side effects.

- Dental hygienists should educate patients/clients when abnormal vital signs (including blood pressure) are present, and recommend medical referral when appropriate. They should encourage compliance with recommended physician hypertension management plan, including prescription medications.

- Dental hygienists should counsel patients/clients who smoke (particularly those who are hypertensive) to stop smoking and refer them to cessation supports in their local communities (e.g., public health unit, smokers’ help line, etc.). The Ontario Division of the Canadian Cancer Society, facilitated by Government of Ontario funding, offers a free, confidential Smokers’ Helpline for smokers via 1-877-513-5333; Smokers’ Helpline Online is available at [www.smokershelpline.ca](http://www.smokershelpline.ca).

**Oral manifestations**

- None specific to hypertension, but the contributory factor smoking has well-known oral manifestations. The development of facial palsy has been described in the occasional patient with very severe hypertension.

- Side-effects of anti-hypertensive medications 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);
  - dry mouth (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).

**Related signs and symptoms**

- Hypertension (HTN) is typically a persistent or repeatedly elevated AOBP ≥ 135/85 mm Hg OR non-AOBP ≥ 140/90 or ≥ 130/80 in patients/clients with diabetes. [Note: If dedicated office visit #1 to a qualified healthcare professional reveals mean AOBP or non-AOBP SBP ≥ 180 mm Hg and/or DBP ≥ 110 mm Hg, then hypertension is automatically diagnosed.]

- Hypertension affects more than one in five Canadian adults, and its incidence increases with aging. If people live long enough, more than 90% will develop hypertension.

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4 Hypertension Canada’s 2020 Guidelines also define home BP monitoring threshold for diagnosis as BP ≥ 135/85 mm Hg and ambulatory blood pressure monitoring (ABPM) threshold for diagnosis as a mean 24-hour BP ≥ 130/80 or a mean daytime BP ≥ 135/85. Hypertension Canada’s 2017 Guidelines (formerly the Guidelines of the Canadian Hypertension Education Program [CHEP]) removed age and frailty restrictions for the treatment of uncomplicated hypertension. In contrast to CHEP 2016 (which recommended target systolic BP in the very elderly [age ≥ 80 years] to be < 150 mm Hg), Hypertension Canada 2017 recommended office-setting systolic target of ≤ 120 mm Hg in high-risk patients/clients, which included persons age ≥ 75 years.
Disease/Medical Condition

HYPERTENSION IN ADULTS

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**Related signs and symptoms (cont’d)**

- The relationship between blood pressure (BP) and risk of cardiovascular disease (CVD) is independent of other risk factors; the higher the BP, the greater the likelihood of myocardial infarction (heart attack), heart failure, stroke, and kidney disease. Other examples of end organ damage include peripheral artery disease (e.g., intermittent claudication) and retinal damage (which may lead to loss of vision).

- About 90% of hypertension is primary (also known as “essential” or “idiopathic”; i.e., no readily identifiable cause). Up to 10% is secondary (e.g., caused by an identifiable underlying cause, such as renal insufficiency, renovascular disease, primary aldosteronism, aortic coarctation, Cushing’s syndrome, Conn’s syndrome, or pheochromocytoma). Drug-induced hypertension and white coat hypertension (i.e., elevated BP only in the presence of a health care worker) are other causes of elevated blood pressure.

- The following coexisting conditions may contribute to hypertension: alcohol intake (more than one standard drink per day); anxiety disorders; delirium; hyperinsulism with insulin resistance; obesity; pain (acute or chronic); pregnancy; sleep apnea; and smoking.

- There are many medications used to treat hypertension resistant to lifestyle changes. More than 40% of Canadians aged 60 years or over are on antihypertensive therapy. Dental hygienists are most likely to encounter patients/clients taking thiazide diuretics (e.g., hydrochlorothiazide,) or thiazide-like diuretics (diuretics often being referred to as “water pills” by patients/clients); beta-blockers (e.g., atenolol); angiotensin converting enzyme inhibitors (ACEIs, such as ramipril); angiotensin II receptor blockers (ARBs, such as losartan); and various long-acting calcium channel blockers (CCBs, such as felodipine, diltiazem, and verapamil). Less frequently used are direct renin inhibitors (e.g., aliskiren fumarate), alpha-adrenergic blockers (e.g., terazosin), and direct vasodilators (e.g., hydralazine).

The tables that follow are intended only as guides to help inform decision-making. The dental hygienist must also take into account the current clinical status of the patient/client in the office. Patients/clients with high blood pressure who have symptoms such as severe headache, blurred vision, shortness of breath, nosebleeds, nausea/vomiting, chest pain, or seizures, should be referred to a physician for immediate evaluation. Furthermore, the dental hygienist should compare current BP reading with previous readings. A person who typically has low or normal blood pressure who now has unexpectedly elevated blood pressure may be more worrisome in the short-term than a person who habitually has high blood pressure.

Where the tables advise that non-invasive procedures (e.g., oral hygiene instruction, fitting a mouth guard, and taking an impression) +/- invasive procedures (i.e., scaling teeth and root planing, including curetting surrounding tissue) may be undertaken, the dental hygienist should consider the individual circumstances of each patient/client. Specific procedures (be they non-invasive or invasive) should be avoided if the dental hygienist believes they could cause stress/anxiety resulting in a sudden, acute elevation in blood pressure. This individual consideration of stress/anxiety is particularly important for patients/clients with pre-existing high blood pressure. If in doubt, the dental hygienist should defer the procedure(s) pending medical evaluation.

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CDHO Advice Incorporating Hypertension Canada/CHEP Recommendations and Oral Health-Specific Sources

Table 1

****This table is to be used if a client presents WITHOUT A HISTORY of other risk factors such as history of myocardial infarction, angina pectoris, high coronary disease risk, recurrent stroke, diabetes mellitus, or renal disease.

*Note: AOBP = automated office blood pressure; non-AOBP = non-automated office blood pressure (BP readings in Table 1 refer to non-AOBP unless otherwise indicated.)*

<table>
<thead>
<tr>
<th>Visit and Clinical Status*</th>
<th>Office Systolic BP**</th>
<th>Office Diastolic BP**</th>
<th>Hypertension Canada*** Recommendations (where applicable)</th>
<th>CDHO Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertensive urgency or emergency</td>
<td>≥ 210 and/or ≥ 120</td>
<td></td>
<td>Hypertensive urgency or emergency, which requires immediate management</td>
<td>1. Re-check BP after 5 minutes 2. Perform neither Procedures nor any dental hygiene care 3. Call 911 as a medical emergency 4. Provide a referral note with the second BP reading</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client <strong>without a history</strong> of Other Risk Factors****</td>
<td>180-209 and/or 110-119</td>
<td></td>
<td>If non-AOBP systolic BP (SBP) is &gt; 140 mm Hg and/or DBP is &gt; 90 mm Hg (or AOBP SBP &gt; 135 and/or DBP &gt; 85), a specific visit should be scheduled for the assessment of hypertension</td>
<td>1. Re-check BP after 5 minutes 2. Perform neither Procedures nor any dental hygiene care 3. Provide a referral note with the second BP reading 4. Refer for prompt medical consultation</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client <strong>without a history</strong> of Other Risk Factors****. Specific referral for medical consultation is required for assessment of hypertension.</td>
<td>160-179 and/or 100-109</td>
<td></td>
<td>If non-AOBP SBP is &gt; 140 mm Hg and/or DBP is &gt; 90 mm Hg (or AOBP SBP &gt; 135 and/or DBP &gt; 85), a specific visit should be scheduled for the assessment of hypertension</td>
<td>1. Re-check BP after 5 minutes 2. Continue with dental hygiene care and Procedures as required 3. Give the patient/client a written note of all the BP readings 4. Refer the patient/client for a medical consultation</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client <strong>without a history</strong> of Other Risk Factors****. Specific referral for medical consultation is required for assessment of hypertension.</td>
<td>140-159 and/or 90-99</td>
<td></td>
<td>If non-AOBP SBP is &gt; 140 mm Hg and/or DBP is &gt; 90 mm Hg (or AOBP SBP &gt; 135 and/or DBP &gt; 85), a specific visit should be scheduled for the assessment of hypertension</td>
<td>1. Re-check BP after 5 minutes 2. Continue with dental hygiene care and Procedures as required 3. Give the patient/client a written note of all the BP readings 4. Refer the patient/client for a medical consultation</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading: BP is high normal</td>
<td>130-139 and/or 85-89</td>
<td></td>
<td>If non-AOBP BP is high normal (SBP 130-139 mm Hg and/or DBP 85-89 mm Hg), annual follow-up is recommended</td>
<td>1. Re-check BP after 5 minutes 2. Continue with dental hygiene care and Procedures as required 3. Give the patient/client a written note of all the BP readings 4. Advise the patient/client consult with a primary-care provider about the readings recorded on the note</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client <strong>without a history</strong> of significance for hypertension</td>
<td>&lt; 130 &lt; 85</td>
<td></td>
<td>No recommendations</td>
<td>Proceed with dental hygiene care and Procedures as required</td>
</tr>
</tbody>
</table>

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HYPERTENSION IN ADULTS
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Table 2
****This table is to be used if a client presents WITH A HISTORY of risk factors such as history of myocardial infarction, angina pectoris, high coronary disease risk, recurrent stroke, diabetes mellitus, or renal disease.

<table>
<thead>
<tr>
<th>Visit and clinical status*</th>
<th>Office Systolic BP**</th>
<th>Office Diastolic BP**</th>
<th>Hypertension Canada*** Recommendations (where applicable)</th>
<th>CDHO Advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertensive urgency or Emergency</td>
<td>≥ 210 and/or ≥ 120</td>
<td></td>
<td>Hypertensive urgency or emergency, which requires immediate management. According to Hypertension Canada, asymptomatic diastolic BP (DBP) ≥ 130 mm Hg constitutes hypertensive urgency/emergency</td>
<td>1. Re-check BP after 5 minutes 2. Perform neither Procedures nor any dental hygiene care 3. Call 911 as a medical emergency 4. Provide a referral note with the second BP reading</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client with a history of Other Risk Factors****</td>
<td>180-209 and/or 110-119</td>
<td></td>
<td>If non-AOBP systolic BP (SBP) is &gt; 140 mm Hg and/or DBP is &gt; 90 mm Hg (or AOBP SBP &gt; 135 and/or DBP &gt; 85), a specific visit should be scheduled for the assessment of hypertension</td>
<td>1. Re-check BP after 5 minutes 2. Perform neither Procedures nor any dental hygiene care 3. Provide a referral note with the second BP reading 4. Refer for emergency medical treatment</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client with a history of Other Risk Factors**** and who therefore requires specific medical referral</td>
<td>160-179 and/or 100-109</td>
<td></td>
<td>If non-AOBP SBP is &gt; 140 mm Hg and/or DBP is &gt; 90 mm Hg (or AOBP SBP &gt; 135 and/or DBP &gt; 85), a specific visit should be scheduled for the assessment of hypertension</td>
<td>1. Re-check BP after 5 minutes 2. Perform only non-invasive dental hygiene care; avoid invasive procedures 3. Give the patient/client a written note of all the BP readings 4. Refer the patient/client for a medical consultation</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client with a history of Other Risk Factors**** and who therefore requires specific medical referral</td>
<td>130-159 and/or 80-99</td>
<td></td>
<td>Persons with diabetes mellitus should be treated to attain systolic blood pressures of less than 130 mm Hg and diastolic blood pressures of less than 80 mm Hg</td>
<td>1. Re-check BP after 5 minutes 2. Continue with dental hygiene care and Procedures as required 3. Give the patient/client a written note of all the BP readings 4. Refer the patient/client for a medical consultation</td>
</tr>
<tr>
<td>Single-visit dental hygienist’s reading for a patient/client with a history of Other Risk Factors**** or who is receiving anti-hypertensive medication</td>
<td>&lt; 130 and/or &lt; 80</td>
<td></td>
<td>Below blood pressure target levels and treatment thresholds for persons with diabetes mellitus</td>
<td>Proceed with dental hygiene care and Procedures as required</td>
</tr>
</tbody>
</table>

* Assumes that the measurement is repeated at least once over a period of five minutes or more, with the patient/client at rest.

** mm Hg (≥ means ‘equal to or more than’; < means ‘less than’; ≤ means ‘equal to or less than’)

*** CHEP 2016 Guidelines stated that target systolic BP in the very elderly (age ≥ 80 years) is < 150 mm Hg, rather than < 140 mm Hg in other non-diabetic adults. However, superseding this, Hypertension Canada’s 2017 Guidelines (formerly CHEP Guidelines) stated that target systolic BP is ≤ 120 mm Hg for high-risk patients/clients, which includes persons age ≥ 75 years.

**** Other Risk Factors: history of myocardial infarction, angina pectoris, high coronary disease risk, recurrent stroke, diabetes mellitus, renal disease.
Disease/Medical Condition

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References and sources of more detailed information

- Hypertension Canada http://guidelines.hypertension.ca
- Hypertension Canada’s 2018 Guidelines for Diagnosis, Risk Assessment, Prevention, and Treatment of Hypertension in Adults and Children https://www.onlinecjc.ca/article/S0828-282X(18)30183-1/fulltext
- US Centers for Disease Control and Prevention http://www.cdc.gov/bloodpressure/

* 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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