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 or at risk of sleep apnea.

Cite as
College of Dental Hygienists of Ontario, CDHO Advisory Sleep Apnea, 2010-02-02

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

Sleep apnea

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

To guide dental hygienists at the point of care relative to the use of the Procedures for persons who have or are at risk of sleep apnea, chiefly as follows.

1. Understanding the medical condition.
2. Sourcing medications information.
3. Taking the medical and medications history.
4. Identifying and contacting the most appropriate healthcare provider(s) for medical advice.

\(^1\) Persons includes young persons and children
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. Record keeping.

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 or guardians of children and young persons with sleep apnea.

MAJOR OUTCOMES CONSIDERED

For persons who have sleep apnea: 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

Nomenclature of sleep apnea

Adapted from
- Apnea Treatment Guide
- Canadian Lung Association Sleep Apnea
- Cleveland Clinic Sleep-Disordered Breathing
- MedlinePlus Apnea of Prematurity
- MedlinePlus Central Sleep Apnea
- MedlinePlus Obesity Hypoventilation Syndrome
- MedlinePlus Obstructive Sleep Apnea
- MedlinePlus Sleep Apnea
- NIH What is Sleep Apnea?
- Public Health Agency of Canada Sleep Apnea
- What is bruxism?

Terminology varies among centres: the following is common but not universal.

Sleep apnea, a common disorder of various types in which breathing pauses or becomes shallow, with potentially serious consequences, comprises
1. **obstructive sleep apnea**, in which the airway has collapsed or is blocked during sleep, resulting in shallow breathing or breathing pauses, apneas or apnea events or hypopneas

2. central sleep apnea, when breathing repeatedly stops during sleep because the brain temporarily ceases sending nerve impulses to the muscles of breathing

3. mixed sleep apnea, when **obstructive sleep apnea** and **central sleep apnea** occur together

4. **sleep-hypoventilation** syndrome, when breathing fails to maintain oxygen and carbon dioxide at normal blood levels

5. obesity hypoventilation syndrome, similar to **sleep-hypoventilation syndrome** but associated with obesity.

Related terminology includes

1. Apneas, apnea events, complete pauses in breathing that last at least 10 seconds during sleep.

2. Continuous positive airway pressure, CPAP, considered the best and most consistently effective treatment, which
   a. provides slightly pressurized air during the breathing cycle, with the pressure adjusted so that it is just sufficient to keep the airway open
   b. keeps the airway open during sleep
   c. prevents the episodes of blocked breathing in persons with **obstructive sleep apnea** and other respiratory problems.

3. Hypopneas, shallow breathing or partial reductions in breathing lasting at least 10 seconds during sleep.

4. Hypoventilation, breathing fails to maintain normal levels of oxygen and carbon dioxide in the blood.

5. Obstructive sleep apnea, episodes of blocked breathing during sleep that create **apneas or apnea events** or **hypopneas** which
   a. last 10–20 seconds or longer
   b. occur 20–30 times or more per hour
   c. occur dozens or even hundreds of times in a night
   d. disrupt sleep three or more nights in a week.

6. Obstructive sleep-disordered breathing, alternative terminology for **sleep apnea**.

7. Sleep bruxism, nocturnal tooth grinding, a repetitious movement disorder
   a. characterized by grinding or clenching of the teeth during sleep
   b. associated with
      i. increased tendency to snore
      ii. **apneas or apnea events** or **hypopneas**
      iii. development of **sleep apnea**.

8. Sleep-disordered breathing, comprises a wide range of **sleep disorders** of which **sleep apnea** is the most common.

9. Sleep disorders, in addition to sleep apnea, include
   a. insomnia, difficulty falling or staying asleep
   b. narcolepsy, excessive daytime sleepiness, uncontrollable sleep attacks, and sudden loss of muscle tone, usually lasting up to half an hour
   c. **restless legs syndrome**, neurological disorder involving uncontrollable urges to move when at rest.
10. Snoring, still widely regarded as merely a nuisance despite
   a. its recognition in the 1970s as an important clinical symptom of sleep apnea
   b. clear evidence that, in extreme instances, it may signal a life-threatening condition associated with significant chronic illness
   c. the diagnostic challenge that not all persons who snore have sleep apnea.

11. Upper airway resistance syndrome, involves limitation of inspired air flow during sleep and daytime fatigue and sleepiness in the absence of clinical findings of obstructive sleep apnea; its existence as a distinct condition is subject to debate.

Overview of sleep apnea

Adapted from
- NIH What is Sleep Apnea?
- Canadian Lung Association Sleep Apnea
- Apnea Treatment Guide
- Sleep Apnea, Symptoms, Treatment, Causes, and Cures
- Obstructive sleep apnea, Overview
- American Academy of Sleep Medicine Obstructive Sleep Apnea
- American Sleep Apnea Association
- Excessive daytime sleepiness
- Reduced Time in Bed and Obstructive Sleep-Disordered Breathing in Children Are Associated With Cognitive Impairment
- Treatment of obstructive sleep-disordered breathing with positive airway pressure systems
- Prevalence of obstructive sleep apnea–hypopnea in severe versus moderate asthma
- Public Health Agency of Canada Sleep Apnea
- Point of Care Question 3

Sleep apnea

1. In the form of obstructive sleep apnea is a serious and potentially life-threatening medical condition that, especially when accompanied by obesity, is dangerous to health because it may deprive the brain and body of oxygen, with potentially damaging effects on the heart and other organs.

2. Is often undiagnosed because of failure to recognize that its most common symptoms may signal a potentially serious medical disorder; these symptoms
   a. are snoring
   b. are falling asleep easily during the day or at inappropriate times
   c. may not be recognized for what they signal, or at all, by persons who experience them.

3. Occurs as obstructive sleep apnea that
   a. in moderate to severe form in Canada is estimated to affect some
      i. four percent of adult males
      ii. two percent of adult females
   b. may be associated with asthma in adults
   c. in otherwise healthy preschool-age US children
      i. possibly affects up to one to three percent
      ii. is caused chiefly by large adenoids and tonsils which, when the throat muscles relax during sleep, may block the airway
d. may be associated with cognitive impairment in children.

4. If untreated leads significant complications.

5. Results from narrowing of the airway, leading to airway collapse and blockage, which
   a. involves collapse of soft tissue in the back of the throat that arises from
      i. relaxed throat muscles
      ii. narrow airway
      iii. large tongue
      iv. fatty tissue in the throat
   b. by its extent determines the severity of the sleep apnea
      i. mild
      ii. moderate
      iii. severe, which may be life-threatening
   c. creates build-up of pressure within the airway
   d. causes vibration of the pharyngeal tissues resulting in snoring, the earliest sign
      of what may eventually become obstructive sleep apnea

6. Is associated with risk factors such as
   a. inherited conditions, especially
      i. narrowing of the airway
      ii. craniofacial factors predisposing to airway problems
   b. aging, in which
      i. the airways lose tone predisposing them to collapse
      ii. snoring progresses to sleep apnea which may in time develop into
         obstructive sleep apnea
   c. increasing weight and obesity, which
      i. further narrow an already narrow airway
      ii. in the abdominal area may affect breathing
   d. lifestyle behaviours, such as
      i. smoking
      ii. alcohol consumption
      iii. consumption of food close to bedtime.

7. Is assessed by the
   a. number of apneas that occur during each hour of sleep
   b. quality of sleep and air flow through the nose and mouth during sleep.

8. Is treated by some combination of
   a. oral appliances and other dental treatments
   b. weight loss
   c. positional therapy
   d. surgery
   e. continuous positive airway pressure devices, which though effective and often
      the preferred treatment, may create compliance problems because they
      i. are difficult to use
      ii. are uncomfortable
      iii. require and may not be accompanied by support with the necessary level
          of experience.
Comorbidity, complications and associated conditions

Comorbid conditions are those which co-exist with sleep apnea 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.

For untreated sleep apnea, the following are usually regarded as complications or associated conditions, but they may also occur as comorbidities.

1. Sleepiness, which
   a. requires attention because of its adverse consequences
   b. may be associated with factors other than untreated sleep disorders which also need to be identified and managed, such as
      i. sleep deprivation
      ii. jet lag and night work
      iii. alcohol consumption
      iv. medications
      v. depression
      vi. some illnesses.
2. Cardiovascular disease, such as
   a. hypertension
   b. heart attack.
3. Mental health conditions, such as
   a. feelings of depression
   b. memory problems
   c. difficulty with mental tasks.
4. Morning headaches
5. Impotence
6. Accidents
7. Early death

Oral health considerations

Adapted from:
- Aggravation of respiratory disturbances by the use of an occlusal splint in apneic patients: a pilot study
- American Academy of Sleep Medicine Obstructive Sleep Apnea
- American Sleep Apnea Association: Your Medical History
- Know your sleep apnea score with the STOP questionnaire
- Occlusal splints for treating sleep bruxism (tooth grinding)
- Online Sleep Apnea Screening Test (Requires personal identification)
- Point of Care Question 3
- Royal College of Dental Surgeons of Ontario: Treating Snoring and Obstructive Sleep Apnea Page 30
- STOP Questionnaire: A Tool to Screen Patients for Obstructive Sleep Apnea
- Treatment Options For Adults with Obstructive Sleep Apnea
- University of Maryland Medical Center Obstructive Sleep Apnea, Dental Devices
- University of Maryland Medical Center, Nasal CPAP
1. As part of their role in preventive healthcare, dental hygienists may identify in a patient/client what appear to be possible early warning signals of obstructive sleep apnea; in that event they should promptly arrange or advise referral of the patient/client to the family physician.

2. **Recognition of obstructive sleep apnea**
   a. Self-assessment questionnaires for patients/clients may assist the dental hygienist in deciding whether or not to refer a patient/client for medical advice about the possibility of obstructive sleep apnea; the referral would
      i. advance the general health of the patient/client through early identification of warning symptoms of obstructive sleep apnea and prompt referral to the family physician
      ii. initiate the process whereby the patient/client is provided with a medical diagnosis which, if positive, would lead to
         1. medical treatment
         2. oral healthcare interventions, if appropriate, for the obstructive sleep apnea
      iii. not delay the Procedures because these are not normally contraindicated in obstructive sleep apnea.
   b. Of the available self-assessment questions, the simplest is the **STOP test**
      i. which comprises four questions
         1. **S**: Do you *snore* loudly?
         2. **T**: Do you often feel *tired*, fatigued or sleepy during daytime?
         3. **O**: Has anyone *observed* you stop breathing during sleep?
         4. **P**: Do you have or are you being treated for *high blood pressure*?
      ii. to which “Yes” answers to two or more of the four questions would
         1. indicate the need for medical referral unless the patient/client has recently been medically investigated for a sleep disorder
         2. would provide even stronger indication for medical referral when combined with other risk factors for obstructive sleep apnea, especially
            a. obesity
            b. age over 50
            c. large neck circumference
            d. male gender.

3. **Sleep bruxism**
   a. may be associated with sleep apnea because clenching of the teeth, which accompanies bruxism, appears to expand the airway and possibly relieve blockage
   b. has been the subject of recommendations for treatment with occlusal splints
      i. for which there is insufficient evidence in the literature to show that these can reduce sleep bruxism
      ii. which have been found to aggravate respiratory problems in some persons, which underscores the importance of **inquiry into sleep apnea and snoring** and medical advice for patients/clients using them.

4. **Dental treatments, chiefly**
   a. dental appliances, which
      i. are recommended for persons with mild-to-moderate obstructive sleep apnea for whom continuous positive airway pressure is
1. not tolerable
2. not appropriate
3. not helpful

ii. include
1. mandibular advancement devices, which
   a. are the most widely used dental device for sleep apnea
   b. resemble a sports mouth guard
   c. force the lower jaw forward and down slightly to keep the
      airway open
2. tongue retraining devices, splints to hold the tongue in place to
   keep the airway as open as possible

iii. offer the possibility of
1. significant reduction in apneas in mild-to-moderate apnea,
   particularly for persons who sleep on their backs or stomachs, but
   less so for those who sleep on their sides
2. improvement in airflow for persons with severe apnea
3. improvement in sleep
4. reduction in the frequency and loudness of snoring
5. better compliance than continuous positive airway pressure
6. when combined with double-arch night appliances, improved
   effectiveness in relieving sleep bruxism

iv. have disadvantages, such as
1. generally lower effectiveness than continuous positive airway
   pressure
2. worsening of apnea in some persons
3. cost
4. side effects, which may cause persons to discard them, including
   a. night pain
   b. dry lips
   c. tooth discomfort
5. with long-term use in some persons, permanent changes in the
   position of the teeth or jaw, which calls for
   a. regular checkups
   b. device adjustments as required
b. orthodontic treatment, rapid maxillary expansion, or transverse palatal
   expansion, a nonsurgical procedure, in which a screw device is temporarily
   attached to the upper teeth and tightened progressively to widen the two
   halves of the upper jaw in children in which the halves are still separate; this
   helps
   i. children with sleep apnea and a narrow upper jaw
   ii. reduce nasal pressure and improve breathing.
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

Adapted from
- Central Sleep Apnea: Treatment & Medication
- Obstructive and Central Sleep Apnea Medications Treatment
- Sleep Disorders: Drug Treatments
- Sleep Disorders: Treatment & Medication
- Sleep-Disordered Breathing and Modafinil

Warnings

Individual medications may be subject to important warnings, which
1. change from time to time
2. may affect the appropriateness, efficacy or safety of the Procedures
3. are accessible via the links to the particular medications listed below or through the specialized organizations listed above
4. through the links, should be viewed by dental hygienists in the course of their familiarizing themselves about a medication or combination of medications identified in the patient/client’s medical and medications history.

Medication
1. is not generally used for treating sleep apnea because specific medications and natural remedies are lacking
2. may be necessary for the treatment of complications, associated conditions, and comorbidities of sleep apnea
3. may be required to combat the daytime sleepiness that accompanies sleep apnea, but not as a replacement for other treatment methods
4. may be required for relief of nasal congestion or other transient conditions
5. of a sedative nature may aggravate sleep apnea
6. if used should always be accompanied by a sleep-improvement regime
7. does not currently provide proven, effective treatments for central sleep apnea.

Specific medications include
1. for daytime sleepiness, one particular type, used in the treatment of narcolepsy, that is
   a. also approved for combating excessive daytime sleepiness
   b. used in conjunction with continuous positive airway pressure or other
treatment for the sleep apnea
      modafinil (Alertec®)
2. restless legs syndrome
   levodopa and carbidopa (Parcopa®, Sinemet®)
   ropinirole (Requip®)
   pramipexole (Mirapex®)
3. insomnia
   estazolam (Eurodin, ProSom)
   flurazepam (Dalmane®)
   temazepam (Restoril®)
   trazodone
   triazolam (Halcion®)
4. short-term insomnia
   zaleplon (Sonata®)
   zolpidem (Ambien®)
5. chronic insomnia
   eszopiclone (Lunesta®)
6. difficulty falling asleep
   ramelteon (Rozerem®) resembles the mode of action of melatonin, a natural
   substance in the brain that is needed for sleep

Side effects of medications

See the links to the specific medications listed above.

THE MEDICAL AND MEDICATIONS HISTORY

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 appropriate primary care provider(s).
3. Inquire about
   a. symptoms indicative of unrecognized sleep apnea
   b. the patient/client’s understanding and acceptance of the need for oral
      healthcare
c. medications considerations, including over-the-counter medications, herbals and supplements

d. problems with previous dental/dental hygiene care

e. problems with infections generally and specifically associated with dental/dental hygiene care

f. how the patient/client’s state of health is at this moment

g. 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

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 **Recommendations** published by the Centers for Disease Control and Prevention (a frequently updated resource).
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**

In an otherwise healthy patient/client whose sleep apnea has been recognized and investigated, there is no contraindication to the Procedures. A medical consultation or referral may be appropriate if the patient/client has

1. Symptoms or signs that may signal unrecognized sleep apnea.
2. One or more complications, associated conditions or comorbidities of sleep apnea.
3. Recently changed medications, under medical advice or otherwise.
4. Recently experienced changes in his/her medical condition.
**DEALING WITH ANY ADVERSE EVENTS ARISING DURING THE PROCEDURES**

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.

First-aid provisions and responses as required for current certification in first aid.

**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 sleep apnea, 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**

The patient/client is urged to alert any healthcare professional who proposes any intervention or test that he or she has a history of sleep apnea.

As appropriate, discuss

1. The importance of medical advice for sleep apnea.
2. The importance of a good diet in the maintenance of oral health.
3. The need for regular oral health examinations and preventive oral healthcare.
4. Home oral hygiene including information about choice of toothpaste, tooth-brushing devices, dental flossing, mouth rinses and saliva control.
5. Medication side effects such as dry mouth, and recommend treatment.
6. Scheduling and duration of appointments for patients/clients with chronic or debilitating conditions.
7. Comfort level while reclining, and stress and anxiety related to the Procedures.
8. Mouth ulcers and other conditions of the mouth relating to sleep apnea, comorbidities, medications or diet.

**BENEFITS/HARMS OF IMPLEMENTING THE RECOMMENDATIONS**

**POTENTIAL BENEFITS**

1. Promotion of health through oral hygiene by identification in adults and children of what appear to be warning signals of obstructive sleep apnea and promptly arranging or recommending referral of the patient/client to the family physician.
2. Reduction of the risks associated with sleep apnea by
   a. giving appropriate advice and encouragement
   b. using appropriate techniques of communication
c. providing advice on scheduling and duration of appointments.

3. Reduction of risk of oral health needs being unmet.

### POTENTIAL HARMs

1. Causing harm through inappropriate advice to patients/clients or the parents or guardians affected by sleep apnea, recognized or not.

2. Performing the Procedures at an inappropriate time, such as
   a. in the presence of complications, associated conditions or comorbidities for which prior medical advice is required
   b. in the presence of acute oral infection without prior medical advice.

3. Disturbing the normal dietary and medications routine of a person with sleep apnea.

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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