June 2019

Seniors' Oral Care:

Providing Oral Hygiene Care to Residents of Ontario Long-term Care Homes

A Guide for Personal Support Workers

Ontario Dental Association

Approved by the Ontario Dental Association's
(ODA) Health Policy and Government Relations Advisory Committee
on February 1, 2019, the Committee would like to acknowledge
the contributions of both the ODA's Working Group on Access to Care
and Seniors Oral Health Resources Working Group.

Adapted with permission from Saskatchewan Oral Health Coalition and South
Australia Dental Services, Government of South Australia.

Original images used with permission of Government of South Australia.

Table of Contents

The Connection Between Oral Health and Overall Health

1. Introduction

The geriatric population is expected to double from 2.4 million in 2017, to 4.6 million by 2041.[1] Due to increased life expectancy, seniors are living longer and healthier lives, while retaining their natural teeth. Research suggest that seniors who maintain their natural teeth are at a greater risk of experiencing oral health issues (e.g. tooth decay, periodontal disease).[2,3] Residents in long-term care (LTC) facilities are most at risk of having their oral care overlooked.[2,3] Moreover, studies have shown that seniors residing in LTC facilities have poorer oral health status, and require some form of oral health care-intervention.[2,3]

It is important to understand that the decline in seniors' oral health is not only because of increasing age, but also due to long-term use of medication associated with systemic diseases (e.g. high blood pressure, diabetes, etc.).[4,5] The use of medication over a long-term period can contribute to dry mouth, functional disabilities, and cognitive impairment in seniors.[4,5] Additionally, poor oral health is a consequence of decreased or lack of daily oral care routine, limited access to oral health practitioners, pre-existing medical conditions, and financial limitations.[3] As a result, seniors are expected to experience at some point in their lives chronic pain, malnutrition, impaired learning, persistent infection, arthritis, and/or dementia.[6]

2. Ontario *Long-term Care Homes Act,* 2007

The Ontario *Long-term Care Homes Act,* 2007 (s.34) mandates that seniors residing in LTC facilities are provided with oral health care including:

- Morning and evening oral care, including cleaning of dentures,
- Physical assistance or cuing as needed to brush individual's own teeth, and
- Assistance, if required, to insert dentures prior to meals and at any other time as requested by the resident or identified in the treatment plan.[7]

Additionally, to maintain the integrity of teeth, residents must be provided with a treatment plan which includes regular oral assessments, dental status, and oral hygiene.[7,8]

The Canadian Dental Association (CDA) supports a mandatory standard that all LTC homes must provide seniors with oral health assessments by an appropriately trained and licensed health practitioner, a referral to a dentist for examination and treatment, a daily mouth care plan that is implemented by caregivers, and suitable support for the delivery of the treatment plan by the oral health-care team.[9]

3. Social Determinants of Health

3.1. Relationship Between Oral Health and General Health

Acknowledged as a basic human right, oral health has a significant role on general health, especially among the elderly population.[10,11] In countries with a fast aging population, oral disease is not only one of the most prevalent chronic conditions, but is quickly becoming a public health challenge.[12]

Documented in literature, the relationship between oral health and systemic health is exemplified in the association of oral pathogens and non-communicable diseases.[13] This relationship can be seen in the association between tooth loss and increased mortality; in addition to gum disease and the prevalence of coronary disease, aspiration pneumonia, and Type 2 diabetes.[13] Moreover, systemic diseases can severally impact poor oral health conditions, due to functional and cognitive impairment.[13]

The two-way relationship between oral health and systemic health not only impacts an individual's quality of life and health capabilities, but provides a reference for oral health care to be integrated with general health care.[11,14] Due to competing health conditions, seniors must adhere to self-management practices, which includes taking multiple prescription drugs that can have severe side-effects on tooth decay.[13] As a result, required care may become a significant financial burden, due to limited access to resources (e.g. education, jobs, income, food security, etc.), especially between different socioeconomic groups (e.g. social classes).[14]

3.2. Oral Health Inequalities

Oral disease may not only have adverse consequences on an individual's quality of life, but can also have a negative impact on society as a whole.[15] Studies indicate that when compared to individuals of a higher socio-economic status (SES), oral disease is most commonly found among individuals of a lower SES.[15,16]

Social determinants of health are societal and economic environmental factors such as circumstances that shape where a person is born, lives, works, and ages, which impact health and health inequality.[14,15] These factors influence a person's behavioural pattern, capability to make decisions and choices, and access to resources. Uneven distribution of determining factors can contribute to an increased oral disease burden, especially among individuals of a lower SES.[14] For example, prevalence of oral disease (e.g. dental caries, periodontal disease, oral cancer, and tooth loss) can be linked to various determinants of health such as income, social status, employment, education, socialization experience, and physical environment.[58]

Furthermore, oral health inequalities are often determined by biological, behavioural, psychosocial, environmental, and socio-economic risk factors.[15]

3.3. Financial Burden of Oral Care

Seniors experience the burden of managing multiple competing health conditions on a fixed income. With limited financial resources, access to optimal dental care is often reduced.[13] In fact, older adults with limited disposable income are more likely to have poor self-rated oral health, and experience oral health complications such as mouth pain, missing teeth, and issues with dentures.[18]

In Canada, the two most important determinants of access to dental care are income and dental insurance.[10] Research has shown that due to financial constraints, Canadians from lower-income families have negative oral health outcomes, increased incidents of untreated disease, lower rates of visiting a dentist, higher instances of avoiding dental visits, and greater likelihood of poor oral health self-management adherence to recommended care.[10]

Canadians are responsible for financing their own dental care. This is usually done in four ways:

1. Third-party insurance (employment-related dental coverage);
2. Private dental insurance (non-employment related coverage);
3. Out-of-pocket, and
4. Government-subsidized program.[10]

With income being a strong contributing factor to access to oral care, affordability becomes a barrier, as most treatment costs are placed on the patient.[14,19]

4. Poor Oral Health

Poor oral health can impact a person's overall health and well-being.[20] Studies show a robust association between oral disease and health conditions such as: diabetes, heart disease, and lung disease including aspiration pneumonia which occurs frequently in LTC residences.

Poor oral health can have psychosocial implications such as:

- Social withdrawal and avoidance of social situations;
- Problems with speech;
- Avoidance of smiling, and/or
- Embarrassment and shame.

Poor oral hygiene can lead to systemic conditions such as:

- Cardiovascular disease (CVD) and stroke;[21,22]
- Diabetes;[23]
- Osteoporosis;[24]
- Malnutrition;[25]
- Pneumonia;[20]
- Gum disease and bad breath.[3]

Poor oral hygiene (see Appendix A), can cause tooth decay and gum disease, which often lead to:

- Unintended weight loss and malnutrition because of chewing difficulties;
- Pain;
- Bad breath;
- Dry mouth;
- Speech difficulties;
- Inability to sleep well, and/or
- Social isolation and depression, and a generally lower quality of life.[26]

Mounting scientific evidence also suggests an association between poor oral health and serious, sometimes life-threatening medical conditions in older adults. For example, there is evidence of a connection between aspiration pneumonia (AP) (lung infection caused by foreign bodies or bacteria entering the lungs via the mouth) and poor oral health.[27,6] The leading cause of death among LTC residents is pneumonia.[28] This bacteria is commonly found in the dental plaque of elderly people.[28] Therefore it is vital that staff caring for elderly LTC residents learn the techniques to ensure residents maintain optimal oral health.

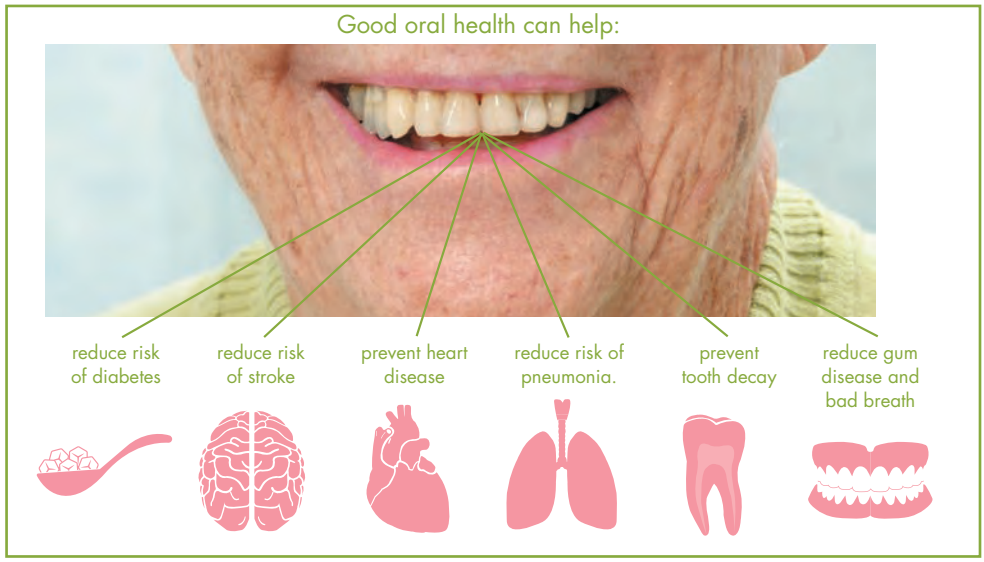


Figure 1: Good oral hygiene and other systemic conditions.[3,55]

Basic Care

1. Basics About Plaque and Tartar

Plaque is a sticky, colourless film of living and dead bacteria that frequently forms on the teeth and around the gum line.[29] Food, saliva and fluids combine to create plaque. If plaque is not removed with regular brushing and flossing, it can lead to dental caries (tooth decay) and periodontal disease.[30] When plaque is not removed by regular brushing and flossing, it can harden into a rock-hard crust known as **tartar**.[31] Tartar cannot be removed by brushing and flossing, and should be removed by an oral health professional at least once a year.[32] Tartar buildup can be prevented by getting rid of plaque when it first forms.[30]

2. Health Effects of Gingivitis

The longer plaque and tartar adhere to teeth, the more harmful it becomes.[33] The bacteria that causes inflammation of the gums is called **gingivitis**. Gingivitis is a form of periodontal disease, and is often reversible with professional treatment and home care (e.g. daily brushing and flossing).[34]

Symptoms of gingivitis may include: bleeding or swollen gums that appear red or dark-red in colour, and gums that pull away from the teeth forming spaces or *pockets*.[34] If left untreated, gingivitis may advance to periodontitis, where inflammation spreads deep into tissues, resulting into connective tissue and bone loss, and ultimately tooth loss.[22,35] Moreover, periodontal disease may increase the risk of developing many systemic aliments such as: cardiovascular disease (CVD), diabetes, osteoporosis, and pneumonia.[36,37,38]

3. Good Oral Health

The health status of the senior population can be complex due to increased comorbid and chronic conditions (e.g. hypertension, diabetes mellitus), and other challenges associated with aging, such as: functional, behavioural, and situational factors.[39,40]

Older adults with cognitive health complications may encounter difficulty managing medical illnesses, taking medications, and adhering to other self-care practices including dental hygiene.[39,41] These complications may also impact a person's lack of motor skills (e.g. manual dexterity), which may result from living with rheumatoid arthritis or a stroke.[42] Impaired manual dexterity can severely affect an individual's ability to perform oral hygiene.[42] Compared to competing health conditions, oral health is often neglected and not perceived as a priority. As a consequence, an older person's quality of life can be severely compromised, and existing health conditions may worsen.[26,43,44]

The benefits of good daily oral care and basic professional dental services for seniors living in LTC facilities, has been well recognized in literature.[45] A good oral care routine not only prevents tooth decay and gum disease, but also:

- Improves overall health and quality of life;[45,46,47,48]
- Increases the success of treatment;[45]
- Decreases dental plaque buildup;[48, 49]
- Reduces emergency care visits;[45]
- Minimizes the need for invasive/complex treatments;[45]
- Reduces the overall cost of care;[45,50]
- And minimizes the progression of oral disease.[45]

4. Basic Brushing for Natural Teeth

Compared to prior generations, Canadians are living longer and retaining much of their natural teeth.[2] Natural teeth should be cleaned twice a day, as it is the most cost-effective and efficient physical method in removing and controlling dental plaque.[41,51,13] Although sponge swabs are frequently used by caregivers, they are not effective in dental plaque removal.[52,53,54]

Residents should be encouraged to do as much of their own oral care as possible, but never assume that those capable of doing it always do so, as ability may change.

To assist elderly patients in maintaining a healthy mouth and to protect their oral health, below are six recommendations for preventive care:

1. Brush at least twice a day (morning and night);
2. Use fluoride toothpaste on teeth;
3. Use a soft toothbrush on gums, tongue, and teeth;
4. Use antibacterial product daily as required;
5. Keep mouth moist;
6. Reduce the frequency and amount of sugar (including fruit juices).[42]

Caring for Seniors With Natural Teeth

Care of Natural Teeth

Teeth are mainly made up of minerals including calcium. Bacteria in dental plaque convert sugars into acid, which can dissolve the minerals out of teeth. If the teeth are not cleaned, this can lead to decay (caries) in the teeth and lead to tooth infections and pain. Good oral hygiene is extremely important to help avoid tooth decay. Fluoride toothpaste helps strengthen teeth as well as reverse the effects of the acid produced by the bacteria in dental plaque.

Recommended Oral Health Care

Use fluoride toothpaste morning and night. (The Canadian Dental Association's logo denotes fluroide in toothpaste.)

Use a soft toothbrush to brush teeth, gums and tongue morning and night.

Encourage the resident to spit and not to rinse the mouth after brushing, so the fluoride can soak into the teeth.

Encourage the resident to drink water after meals, medications, other drinks and snacks to keep the mouth clean.

Rationale

Strengthen Teeth

Fluoride toothpaste strengthens teeth.

Encourage the resident to spit and not rinse the mouth after brushing so the fluoride can soak into the teeth.

Brushing

Brushing is the best way to remove dental plaque.

A soft toothbrush is gentle on oral tissues and is more comfortable for the resident.

Brushing before bed is important as bacteria can grow in number by as much as 30 times overnight.

Oral Hygiene Aids & Products

Use a fluoride toothpaste.

Use a soft toothbrush suitable for bending.

Infection Control

Wash hands before and after oral care.

Consistent and universal use of personal protective equipment includes:

- Gloves
- Mask
- Protective eyeware/face shields
- Protective clothing

Toothbrush Alternatives

Modified Soft Toothbrush

A soft toothbrush can be bent to give better access to the mouth.

A forward-bent toothbrush can be used to brush the inner upper and lower teeth.

A backward-bent toothbrush can be used to retract the cheek, while another brush is used to brush the resident's teeth.

Electric Toothbrush

An electric toothbrush may help residents with limited manual dexterity, due to stroke or arthritis for example, to manage brushing by themselves.

Vibration can be a problem for some residents.

Cost and maintenance can be a barrier.

This type of brush is recommended if the resident is currently using one.

Interproximal Brush

This type of brush is ideal for cleaning the larger spaces between teeth, underneath bridges, around crowns and between tooth roots where gum recession has occurred.

The brush can also be used to apply antibacterial gels between the teeth.

Interproximal brushing does not replace normal toothbrushing. The brushing of teeth, gums and tongue must still take place with a soft toothbrush.

Additional Oral Hygiene Aids

Tongue Scraper

This can be used as an alternative when a toothbrush is not able to clean the surface of the tongue sufficiently.

Hand Grip

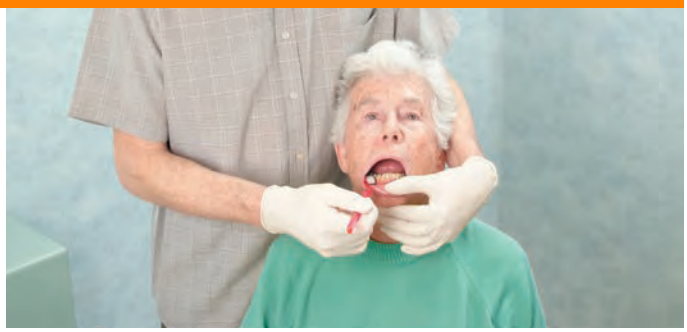
This is useful for residents with reduced grip strength.

Toothpaste Application

Use fluoride toothpaste morning and night.

Only a small pea-sized amount of toothpaste is required.

Positioning



When the resident requires assistance, try different positions to suit the situation.

Standing in Front Position

Sit the resident in a chair facing you.

If the resident is in bed, you will need to support the resident's head with pillows.

Support the resident's chin with your index finger and thumb, being careful not to place pressure on the resident's throat with your remaining fingers.

The thumb holding the chin can be used to roll down and hold the lower lip for better vision and access.

Good eye contact between you and the resident is maintained with this position.

Cuddle Position

Stand behind and to the side of the resident.

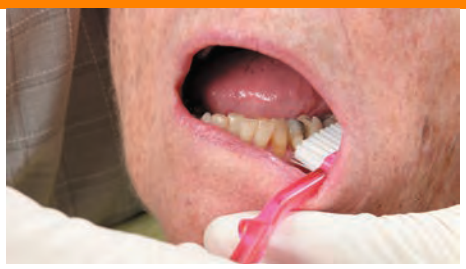
Rest the resident's head against the side of your body and arm.

Support the resident's chin with your index finger and thumb, being careful not to place pressure on the resident's throat with your remaining fingers.

The thumb holding the chin can be used to roll down and hold the lower lip for better vision and access.

Greater head control is achieved by using this position.

Toothbrushing Technique for Lower Teeth



Toothbrushing Technique for Upper Teeth

Toothbrushing

Place the toothbrush at a 45-degree angle to the gum line.

Gently brush front, back and chewing surfaces of the teeth and gums in a circular motion. Give particular attention to the gum line.

If some teeth are missing, make sure all surfaces of single teeth and cleaned.

Encourage the resident to spit and not rinse the mouth after brushing, so the fluoride soaks into the teeth.

Bleeding Gums

Report this as it may be a sign of a general health problem.

Bleeding is usually caused by the build-up of dental plaque.

Brushing is the best way to remove the dental plaque and heal the gums.

Continue to brush teeth (with particular attention to the gum line) with a soft toothbrush twice a day. The bleeding should resolve in a week.

Tongue Cleaning

Ask the resident to stick out their tongue.

Scrape the tongue carefully from back to front.

Do not go too far back as it will cause the resident to gag.

Alternative Toothbrushing Techniques

Electric Toothbrush

Turn the brush on and off while it is in the mouth, to limit toothpaste splatter.

Use the vibrating brush to reach all surfaces of the teeth and gums.

Interproximal Brush

Brush into the space between the teeth at the level of the gum and gently move back and forth to remove dental plaque and food.

An interproximal brush can also be used to apply antibacterial product between the teeth.

Toothbrush Care

After Brushing

Thoroughly rinse the toothbrush under running water.

Tap the toothbrush on the sink to remove excess water.

Store the toothbrush uncovered in a dry place.

Replace the toothbrush with a new one when:

- Bristles become worn.
- With the change of seasons (every three months).
- Following a resident's illness, such as a bad cold.

Replacing Toothbrush

When a resident is being treated for a fungal infection (such as thrush), replace the toothbrush when the treatment starts and again when the treatment finishes.

If a toothbrush grip is used, remove the grip and wash and dry the toothbrush handle and grip after each use.

Check Daily, Document and Report

- Lip blisters/sores/cracks
- Tongue for any coating/change in colour
- Sore mouth/gums/teeth
- Swelling of face or localized swelling
- Mouth ulcer
- Bleeding gums
- Sore teeth
- Broken or loose teeth
- Difficulty eating meals
- Excessive food left in mouth
- Bad breath
- Refusal of oral care

Modified Oral Hygiene Methods

Wipe Fluoride Toothpaste Onto Teeth

Instead of brushing teeth, try wiping a smear of toothpaste along the teeth with a toothbrush.

Alternatively, a chlorhexidine gel can be applied the same way.

This does not replace brushing but is a short-term alternative.

Mouth Props

Mouth props can be used for residents who clench or bite, or who have difficulty opening their mouth. Use mouth props only if you have been trained to do so.

Caution:

Never place your fingers between the teeth of a resident.

Modified Oral Hygiene Methods

Modified Soft Toothbrush

A backward-bent toothbrush can be used to retract the cheek, while another brush is used to brush the resident's teeth.

Use one hand to support the chin and roll down the lower lip while you insert a backward toothbrush and retract the cheek. Release your grip to hold the backward bent brush and use another toothbrush in your other hand to brush the resident's teeth.

To bend a soft toothbrush handle:

- Place the brush in a cup of hot water to soften the plastic.
- Apply downward pressure on the brush until it bends to a 45-degree angle.
- Take care as some types of toothbrush may snap.
- Clear plastic toothbrushes are the easiest to bend.

Use of a Spray Bottle

If it is difficult to brush or smear fluoride toothpaste or chlorhexidine gel into the teeth, a chlorhexidine mouthwash can be sprayed into the mouth.

This does not replace brushing but is a short-term alternative.

The mouthwash should be poured undiluted into a spray bottle. You must follow the LTC home's infection control guidelines for decanting the mouthwash, or have a pharmacist do this for you.

The spray bottle must be labelled with the resident's name and the contents.

Spray four squirts directly into the mouth. Take care not to spray the resident's face.

If appropriate, a backward-bent toothbrush can also be used to retract the cheek, so you can gain greater access as you spray the mouth.

Caution:

Do not use chlorhexidine and fluoride toothpaste (containing sodium lauryl sulphate) within two hours of each other, as the product effectiveness is reduced.

Caring for Seniors With Dentures

1. Denture Identification

In LTC homes, it's not unusual for dentures to be wrapped in a napkin and left on a food tray, removed during a nap and left in the bed sheets, or to be accidentally taken by another resident. To minimize the possibility of lost dentures, labelling is critical.

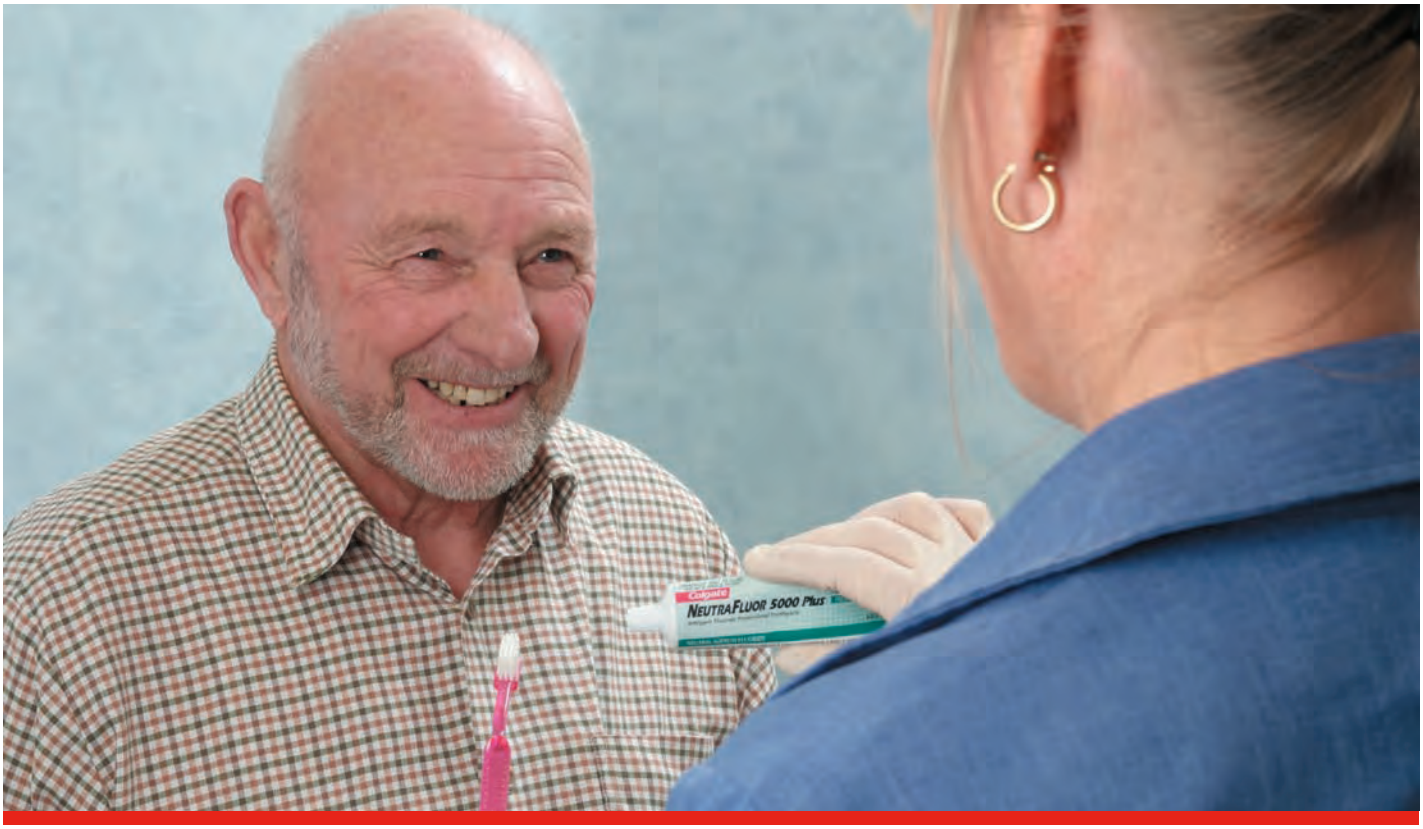
Dentures can be labelled at any time. If they were not labelled at the time they were made, a dentist can insert labels in an area of the denture that does not interfere with its appearance or function.

The storage box should also be clearly labelled with a marker or adhesive label.

2. Care for Dentures

Individuals who wear dentures are at an increased risk of developing infections such as denture stomatitis. To effectively clean dentures, brush with soap and water.[56] It is important to never use toothpaste for dentures as they are abrasive and may scratch the dentures over time, giving way to infections.[3] Dentures should also be taken out at night, before bed and stored in a sealed container of water. Weekly disinfection of dentures should be practised, using solutions such as chlorhexidine (both full and partial dentures) and sodium hypochlorite (full dentures) is recommended. It is important that dentures are not to be worn at night, as the gums need to rest.[56]

Plaque sticks to dentures in the same way it sticks to natural teeth. Soaking dentures in a cup with a cleansing tablet at night is not enough. Dentures and partial plates should be removed and rinsed after each meal and cleaned thoroughly with a denture brush before bedtime.[3]



Care of Dentures

Care of Dentures

Many problems can occur in residents with dentures. If dentures are not removed, allowing for the tissues to rest, infections such as thrush, or "denture sore mouth" can develop. Poorly fitting dentures can also lead to soreness or cracking at the corners of the mouth. Over time, dentures can wear out and the shape of the gums and jaws can change. Because of this, dentures may need to be relined or re-made to cater for these changes. Reduced saliva flow can also affect the ability to wear dentures comfortably.

Daily Oral Hygiene

Residents who wear dentures are at high risk of developing fungal infections (such as thrush).

Dentures must be taken out and brushed to remove dental plaque.

Gums and tongue should be brushed to remove dental plaque.

Gum tissue needs time to rest from wearing dentures.

Recommended Oral Health Care

Label dentures with the resident's name.

Brush dentures with a denture brush morning and night, using a mild soap.

Rinse dentures well under running water.

Brush gums and tongue with a soft toothbrush morning and night.

Take dentures out of the mouth overnight, clean and soak in cold water.

Disinfect dentures once a weeek.

Encourage the resident to drink water after meals, medications, other drinks and snacks to keep the mouth clean.

Oral Hygiene Aids and Products

Use a soft toothbrush suitable for bending to brush gums, tongue and partial dentures.

Use a denture brush for full dentures.

Use mild soap (liquid or foam) for cleaning dentures — handwashing soap as supplied by the LTC home should be suitable.

Provide a denture storage container (disposable or non-disposable).

Use a denture disinfection product (suitable for full or partial denture or both).

Soak dentures in white vinegar for calculus removal (not suitable for partial detures).

Use a denture adhesive (if required).

Provide a denture labelling kit (if required).

Infection Control

Wash hands before and after oral care.

Consistent and universal use of personal protective equipment includes:

- Gloves
- Mask
- Protective eyeware/face shields
- Protective clothing

Denture Care

Label Dentures

Dentures must be labelled with the resident's name.

Dentures are best named permanently by a dental professional, ideally when the denture is made.

To temporarily name dentures:

- Lightly sandpaper the pink acrylic on the outside (cheek side) of the denture.
- Write the resident's name in permanent marker. Never attempt to label them yourself with felt tip pens or markers.
- Using several coats of sealing liquid to cover the name.

The denture storage container should also be labelled with the resident's name.

Daily Denture Care

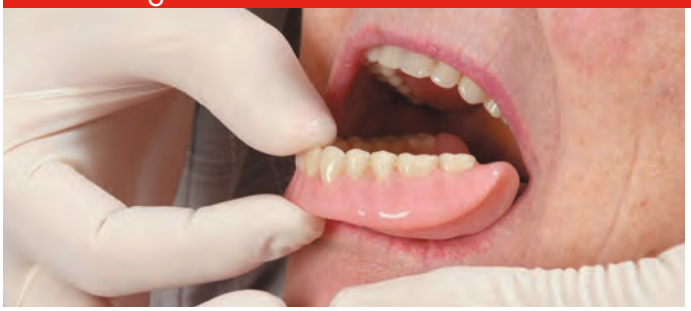
Either remove dentures after each meal and rinse mouth and dentures with water or encourage the resident to drink water after meals to help keep the mouth clean.

Brush dentures morning and night.

Encourage the resident to remove dentures overnight to rest the gums.

Denture storage containers should be washed and dried daily.

Removing Dentures



Before you start, ask the resident to take a sip of water to moisten the mouth.

Encourage the resident to remove his or her own dentures.

If the resident requires assistance, it is easier to take out the lower denture first by holding the lower front teeth with the thumb and index finger and lifting out.

To remove upper denture, break the seal by holding front teeth with the thumb and index finger and rocking the denture up and down until the back is dislodged.

Remove the denture at a sideways angle.

If you are unable to break the seal, use a backward-bent toothbrush to carefully push down on the side of the denture towards the back of the mouth until the denture is loosened and can be easily removed.

Removing Partial Dentures

Before you start, ask the resident to take a sip of water to moisten the mouth.

Encourage the resident to remove his or her own partial dentures.

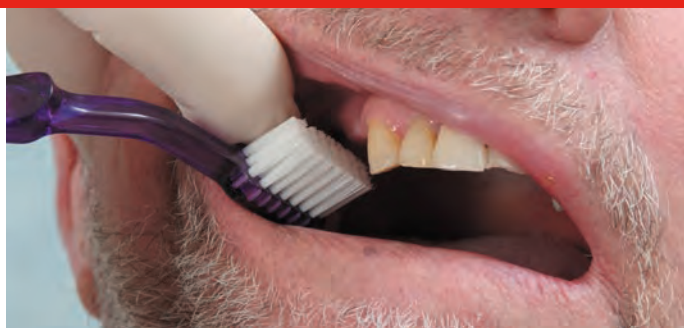
If the resident requires assistance, place your fingertips under the clasps that cling onto the natural teeth and push down carefully.

Gently grasp the plastic part of the denture and lift it out of the resident's mouth, taking care not to bend the wire clasps.

Brush Gums, Tongue and Teeth (Partial Dentures)

Use a soft toothbrush to brush the gums morning and night. This will remove dental plaque, any food particles and stimulate the gums.

Ask the resident to stick out the tongue and brush the tongue carefully from the back to the front.



Do not go too far back as it will cause the resident to gag.

For residents who wear a partial denture, give particular attention to the teeth that support the denture clasps.

Make sure all surfaces of single teeth are cleaned (including back, front and sides) with fluoride toothpaste.

Residents Who Have No Teeth and Do Not Wear Dentures

For residents who have no teeth and do not wear dentures, it is still important to brush the gums and tongue morning and night to maintain good oral health.

Use a soft toothbrush to brush the gums morning and night. This will remove dental plaque, any food particles and stimulate the gums.

Ask the resident to stick out the tongue and brush the tongue carefully from the back to the front.

Do not go too far back as it will cause resident to gag.

Cleaning Dentures

Cleaning Technique

Clean the dentures over a sink with a bowl filled with water or place a wash cloth in the base of the sink to protect the dentures from breakage if dropped.

Use a denture brush and a mild soap (liquid or foam) to clean food, dental plaque and any denture adhesive from all surfaces of the dentures. The handwashing soap supplied by the LTC home should be suitable for denture cleaning purposes.

Do not use normal toothpaste as it may be abrasive and over time will abrade and scratch the denture. A scratched denture can be a source of irritation and increase the risk of fungal infections.

Support the denture while cleaning as it can break very easily if dropped.

Holding a lower denture from end to end may apply force and cause the denture to break.

Cleaning Lower Denture

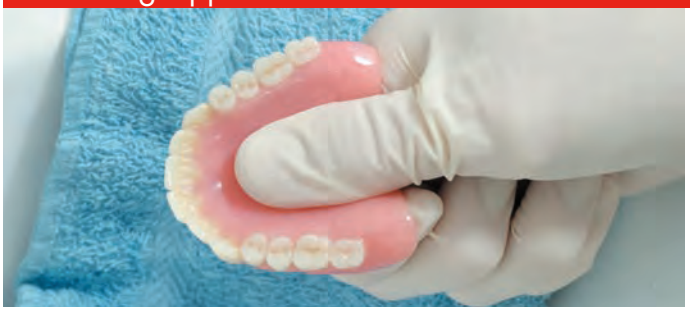
Cradle the lower denture between the thumb and the base of the index finger for a stable hold.

Brush all surfaces to remove dental plaque and any dentures adhesive.

If the denture has been relined with a soft cushion liner, use a soft toothbrush to clean it gently.

When the denture is relined, it cannot be soaked in disinfectant solution (consult with dentist or denturist for further instructions to clean/disinfect relined dentures).

Cleaning Upper Denture



Support the upper denture between the thumb and fingers for a stable hold.

Brush all surfaces to remove dental plaque and any denture adhesive.

If the denture has been relined with a soft cushion liner, use a soft toothbrush to clean it gently.

When the denture is relined, it cannot be soaked in disinfectant solution (consult with denturist or dentist for further instructions to clean/disinfect relined dentures.

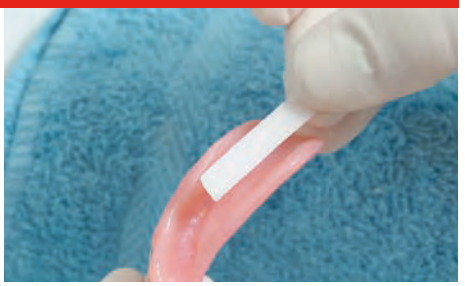
Cleaning Partial Denture

Use a soft toothbrush to clean metal clasps.

Gently brush around the metal clasps, taking care not to bend or move them as this will affect the denture fit.

Denture Adhesives





Residents with poorly fitting dentures, should be referred to the dentist.

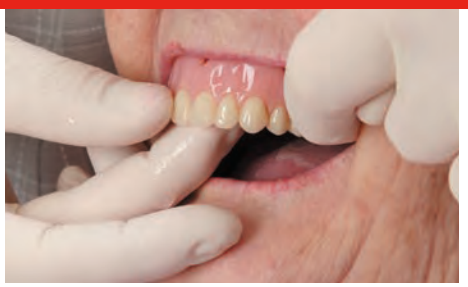
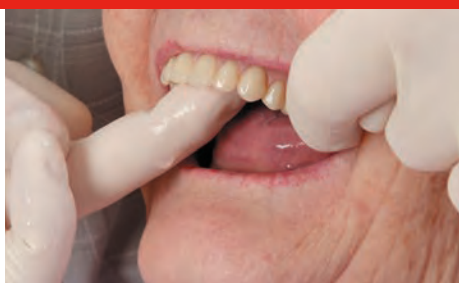
Denture adhesives can be used to hold dentures more firmly in place and prevent dentures from rubbing.

Dentures adhesives come as a paste, powder or sticky strips.

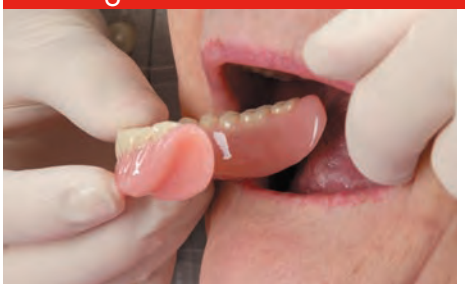
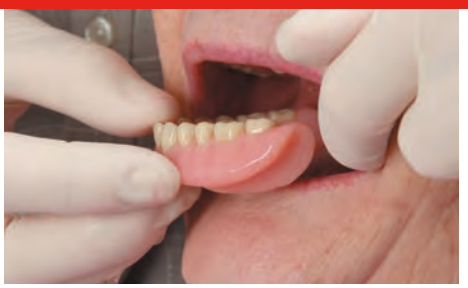
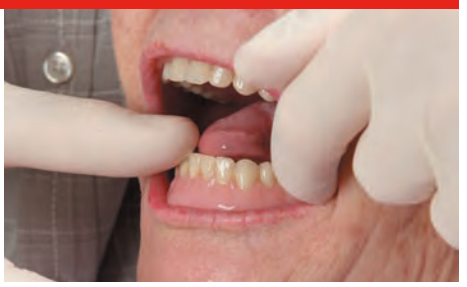
Follow the product instructions for directions on how to apply the denture adhesive.

Thoroughly remove all traces of the denture adhesive from both the denture and gums morning and night.

Putting Upper Dentures In

Putting Lower Denture In

Dentures must always be rinsed well under running water before being placed in the resident's mouth.

Encourage the resident to insert his or her own dentures.

If the resident requires assistance, insert the upper denture first followed by the lower denture.

Ask the resident to open his or her mouth. Hold the denture at a sideways angle as it enters the mouth and then rotate into position.

Putting Partial Denture In

Partial dentures must always be rinsed well under running water before placing them in the resident's mouth.

Encourage the resident to insert his or her own dentures.

Ask the resident to open the mouth, hold the denture at a sideways angle as it enters the mouth and then rotate and click into position.

Denture Disinfection

Disinfect dentures once a week and as directed if the resident is being treated for a fungal infection (such as thrush).

Always rinse dentures well under running water before placing in the resident's mouth.

Take care with the choice of denture disinfection products as some may cause the metal components of a partial denture to corrode. The following may be used.

Chlorhexidine solution with or without alcohol:

- This is suitable for both full plastic and partial dentures.
- Alcohol content is acceptable for this purpose as it is not in direct contact with the mouth.
- Chlorhexidine has a low allergy risk.
- Disinfect by using enough solution to cover the denture, soak for no more than 30 minutes, then rinse well.
- Follow the LTC home's infection control guidelines for decanting the solution.

Commercial denture cleansing table:

- The product used should clearly identify whether it is suitable for either full plastic or metal partial dentures or both.
- Follow the manufacturer's instruction for soaking time.

Caution

Excessive soaking in chlorhexidine may cause discolouration.

Allergy Alert

Persulfate, a denture cleanser ingredient, may cause an allergic reaction. This may happen quickly or after many years, even with correct use.

Symptoms include irritation, tissue damage, gum tenderness, breathing problems and low blood pressure. If symptoms occur remove dentures and refer to an oral health professional.

Removing Calculus and Stains

Calculus (tartar) is dental plaque that has been hardened by the minerals in saliva.

Thorough daily brushing should stop calculus from forming on the denture.

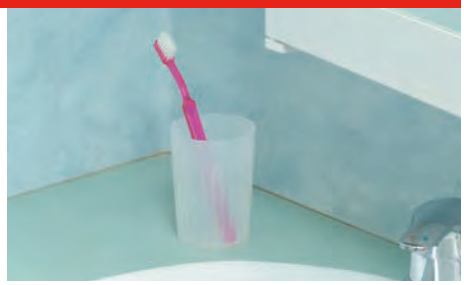
To remove calculus from a full acrylic denture, soak denture in full-strength white vinegar for eight hours to soften calculus and then scrub off using a denture brush.

Caution

Vinegar has corrosive properties and is not suitable for partial dentures.

For heavy calculus, staining and for stain removal on partial dentures, cleaning by an oral health professional is recommended.

Denture Brush and Toothbrush Care



After Brushing

Thoroughly rinse the toothbrush and denture brush under running water.

Tap the brushes on the sink to remove excess water.

Store the brushes uncovered in a dry place.

Replace the brushes when:

- Bristles become shaggy
- With the change of seasons (every three months)
- Following a resident's illness such as a "bad cold".

When a resident is being treated for a fungal infection (such as thrush), replace the toothbrush and denture brush when the treatment starts and again when the treatment finishes.

If a toothbrush grip is used, remove the grip and wash and dry the tooth-brush handle and grip after each use.

Check Daily, Document and Report

- Lip blisters/sores/cracks
- Tongue for any coating/change in colour
- Sore mouth/gums/teeth
- Swelling of face or localised swelling
- Mouth ulcer
- Bleeding gums
- If partial denture, sore or broken teeth
- Broken denture or partial denture
- Loose denture
- Denture not named
- Poorly fitting denture
- Stained denture
- Difficulty eating meals
- Excessive food left in mouth
- Bad breath
- Refusal of oral care

Advanced Care

1. Communicating With Residents Regarding Oral Care and Dealing With Behavioural Issues

Residents with dementia may require a great deal of help with oral hygiene care. However, helping with oral hygiene care can be difficult when dealing with behavioural problems.

The following are five techniques to utilize when caring caring for residents with dementia:

1. **Bridging** involves engaging the resident's senses to help him or her understand the task you are trying to do for them. Place a toothbrush in the resident's hands. Many people will automatically start to brush their own teeth after holding it for a few minutes. Avoid giving a toothbrush to an aggressive resident who is likely to throw it or use it inappropriately.[57,59]
2. **Distraction** involves placing an item such as a rolled-up washcloth or cushion in the resident's hands during oral hygiene care in order to distract his or her attention from the task. Familiar music, singing, gentle touch or talking may also distract and relax the resident.[57,59]
3. **Chaining** means the caregiver starts the oral hygiene process and the resident helps to finish it.[57,59]
4. **Hand-over-hand technique** can help to improve a resident's awareness of the task. The caregiver's hand is placed over the resident's to guide the resident.[57,59]
5. **Rescuing** can be used to help complete oral hygiene for residents with dementia. If attempts at oral hygiene are not going well and the resident is being highly unco-operative, a second caregiver can enter the situation and ask the first caregiver to leave so the second can help the resident (e.g. his/her friend). The second caregiver then completes the task.[57,59]

Sometimes it is helpful to try oral hygiene at another time of day when the resident is less aggressive or in a different environment that is more suitable. Successful strategies should be recorded in the resident's oral hygiene care plan (Appendix B).

2. Oral Cancer

Oral cancer is ranked as the 13th most common cancer in Canada.[60] Approximately 4,700 Canadians were diagnosed with oral cancer in 2017.[61] In fact, more deaths occur from oral cancer than from melanoma or cervical cancer.[3] Oral cancer is a malignant tumor that begins in the cells of the oral cavity, and may metastasize (spread) to other parts of the body.[62] Adults, 60 years and older, are at the greatest risk for oral cancer. Since oral cancer is an age-dependent disease, the number of seniors diagnosed is expected to rise within the next decade.[63]

3. Medications and Xerostomia

Xerostomia (otherwise known as dry mouth), is a common condition among seniors and is often associated with dysfunctional salivary glands.[64,65] Xerostomia can be extremely uncomfortable and have a negative impact on oral health.[64] Salivary dysfunction is not only characterized by old age, but can be linked to medication and numerous medical conditions (e.g. chemotherapy, radiotherapy, Parkinson's disease, and diabetes).[66,67]

In fact, xerostomia has been associated with more than 500 medications.[8] Individuals over 65 years of age are at an increased risk for developing xerostomia.[69] Vital to oral health, saliva is a natural cleanser, aids in tooth remineralization, contains antibodies, and helps reduce gingival ulcerations.[3,70] Since saliva flushes food particles and bacteria from the mouth, depleted levels of saliva can cause bacteria to accumulate, therefore increasing the risk of developing cavities and gum disease.[66] When the salivary function is disrupted, there is an increased risk for individuals to experience health complications such as: soreness, dryness of the mucosa and lips, dental caries, candidiasis (yeast/fungal infection), reduced sensation, difficulty eating, change in taste, impaired ability to speak, choking, difficulty wearing dentures, and bad breath.[70] Additionally, elderly persons become predisposed to complex health conditions such as aspiration pneumonia, as reduced saliva flow increase oral bacteria.[71,72] Xerostomia may also cause tooth loss and

reduce an individual's ability to chew and speak, leading to malnutrition which may result in reduced immunity against infection (Appendix C).[27]

Some drugs that may cause dry mouth include:

- Cytotoxic drugs;
- Central-acting psychoactive agents (e.g. antidepressants);
- Opioids;
- Drugs acting on sympathetic system;
- Diuretics.[66,73]

4. Saliva Substitutes

Residents suffering from dry mouth should be encouraged to sip water frequently. Sucking on ice chips and sugar-free candy or chewing gum may also help. Avoid lemon-flavoured hard candy as it makes the saliva acidic, increasing the possibility of tooth decay.[74]

Over-the-counter saliva substitutes can also be used to replace lost moisture and make a resident's mouth much more comfortable. These products usually come as a gel or a spray and are used to replace missing saliva.[74]

5. Nutrition

Studies show there is an association between oral health status and malnutrition in seniors living in LTC homes.[25] Among seniors, malnutrition tends to be a complex and multifactorial issue. Reduced intake of food and a lack of adequate food have both been identified as contributing factors that can lead to malnutrition and poor quality of life.[76, 77] Consequently, a loss of appetite may result from medication, physical, and mental health issues, or certain treatments such as chemotherapy and radiotherapy.[25,78]

Taking care of the mouth enhances the ability to bite, chew, and swallow a variety of nutritious foods. In turn, a healthy, balanced diet contributes greatly to both oral health and general health. An adequate intake of nutritious food helps the body resist infection and inflammation, including periodontal disease. Excellent daily oral hygiene and a nutritious diet go hand in hand and both are needed to maintain good health.

6. Denture Stomatitis

Denture Stomatitis (DS) is a common mucosal (mucous membrane lining) inflammation that occurs beneath dentures.[79] DS is characterized by redness of the mucosa in the oral cavity, and is most prevalent among older populations.[79] The primary cause of denture stomatitis has been attributed to a multitude of factors such as: mucosal trauma from poorly fitting dentures, poor oral and denture hygiene, not removing dentures at night, and a yeast infection *Candida ablicans*.

Continuous use of dentures, in addition to poor oral and denture hygiene can lead to development of biofilm (plaque) on the surface of the prosthesis.[79,80] Physical disabilities, medication (e.g. antibiotics and corticosteroids), and other health complications (e.g. diabetes, immunosuppression) can worsen DS, which may inhibit a person's ability to maintain good oral hygiene.[81] Furthermore, vitamin A and folate deficiency have also been associated with oral candidiasis and denture stomatitis (Appendix C).[3,81]

7. Oral Thrush/Candidiasis

Candida (yeast) is typically found in small amounts in healthy adults. However, an overgrowth of candida in the oral cavity can lead to candidiasis, a fungal infection.[82] Individuals age 65 and over are at an increased risk for this infection. Moreover, decreased saliva production can contribute to an increase in oral candidiasis.[83] The spread of candidiasis has been attributed with poor oral hygiene, dry mouth, chemotherapy/radiotherapy, medication that irritate or damage the oral mucosa, antibiotics, and iron deficiency (anemia).[83]

Symptoms of oral thrush/candidiasis include:

- Painful, burning sensation in the mouth;
- White patches, and/or
- Redness inside the mouth and throat.[84]

How to prevent oral thrush:

- Brush teeth twice a day with toothpaste that contains fluoride and floss regularly.
- Remove dentures every night, and clean dentures with paste or soap and water before soaking dentures in a solution of water and denture-cleaning tablets.
- Brush gums, tongue, and inside mouth with soft brush twice a day.
- Have dentures adjusted to fit properly.[84]

8. Dysphagia and Oral Care

Dysphagia is a medical term used to define change in swallowing patterns.[85] Part of the degenerative process of aging involves changes to the neurological, respiratory, and digestive system, which impacts swallowing.[85] In fact, approximately 50 per cent of individuals in nursing homes have a swallowing disorder.[86] Dysphagia may result from complications affecting the nervous system (e.g. stroke, head injury, or dementia), cancer, and gastro-esophageal reflux disease (GORD).[87]

Individuals with dysphagia frequently suffer with loss of sensation, paralysis and/or weakness in the affected side of mouth and limbs.[86] This often impacts a person's ability to sense where food is in the mouth, which may result into coughing or choking when airway passages is blocked by food.[87] As a consequence, among elderly patients, dysphagia contributes to an array of negative health problems such as malnutrition and pneumonia.[88,89]

Signs of dysphagia include:

- Coughing or choking when eating or drinking;
- Bringing food back up (occasionally through the nose);
- Feeling of food is stuck in throat or chest, and
- Persistent drooling of saliva.[87]

To minimize the risk of bacteria and fluid gathering in the mouth, oral care in people with dysphagia should be performed at least twice a day, in addition to before and after meals if needed.[90] Food debris should be removed from teeth and mouth after meals, as it may cause choking.[90] Individuals should be encouraged to brush their own teeth. For patients who encounter difficulty in holding a toothbrush, there are several alternatives such as using a toothbrush handgrip.[90] Lastly, use a pea-size amount of low-foaming toothpaste without water.[90]

9. Diabetes and Oral Care

9.1. What is diabetes?

Diabetes mellitus is a chronic complex metabolic disease that disrupts the body's ability to produce or properly use insulin.[91] The body obtains glucose through food that is consumed and uses glucose as a main source of energy. Insulin, a hormone produced by the pancreas, enables glucose to enter cells.[92] One of the hallmarks of diabetes, is elevated blood glucose levels (or blood sugar), where glucose is unable to enter cells due to the body's inability to use or produce sufficient insulin.[93] The three types of diabetes are: Type 1 (insulin-dependent), Type 2 (non-insulin-dependent), and gestational diabetes mellitus.[93]

Excess glucose in the blood stream may cause various problems such as pain and infection in the oral cavity, as a result oral health is influenced by systemic health conditions.[94] Areas affected in the oral cavity may include:

- Teeth;
- Gums;
- Jaw;
- Tissues on the roof and bottom of the mouth, on the tongue, and inside the cheeks.[95]

People with poorly controlled diabetes, are more susceptible to oral infections and inflammation. Along with poor oral hygiene, health conditions may decline due to decreased insulin sensitivity, and progression of periodontal disease.[96]

9.2 Associated Oral Health Problems and Diabetes

When diabetes is not controlled, glucose levels in saliva increases, fueling bacterial growth which increases dental plaque. Dental plaque can result from consuming foods rich in sugar and starch. Plaque may also lead to tooth decay, cavities, gum disease, and bad breath.[95]

Individuals living with diabetes may experience more severe gum disease due to prolonged healing. In turn, gum disease may become a barrier in controlling blood glucose levels.[95]

In addition to the well-documented risk of gingivitis and periodontitis, people living with diabetes have elevated rates of dental caries and salivary dysfunction.[97] In fact, the most common oral health problems from diabetes are:

- Tooth loss;
- Dental decay;
- Lichen planus;
- Thrush (candidiasis);
- Dry mouth (xerostomia);
- Neurosensory disorder (burning mouth syndrome);
- Taste impairment.[98]

9.3 Relationship Between Periodontal Disease and Diabetes

The prevalence of periodontal disease has been found to be more common among individuals living with diabetes.[98,99,100] Although the mechanism between diabetes and periodontal disease has not been fully understood, the association between diabetes and periodontal disease has been described as a two-way relationship. For example, as diabetes increase the prevalence, severity, and progression of periodontal disease; periodontal disease may increase diabetes complications and counter diabetes self-management efforts.[100,101,102]

Periodontal disease can depreciate gum and bone functionality, resulting into tooth loss, reduced chewing abilities and quality of life.[103] Diabetes can increase the progression of periodontal disease, leading to exposed root surfaces and increasing the risk of developing root caries.[94] Emerging evidence indicates that periodontal disease can increase the risk of other diabetes-related health complications such as: cardio-renal mortality, and kidney disease.[94] Furthermore, bacterial infections like those associated with periodontal disease may reduce the body's ability to use glucose, by decreasing the effectiveness of insulin receptors on target tissue cells.[100]

Though periodontitis is not life-threatening, it has been associated with increased rates of morbidity.[100] It is vital that individuals living with diabetes are engaged in maintaining good oral hygiene behaviours, and as part of routine diabetes care, risk assessments and dental referrals are provided.[104]

Appendix A

Lips

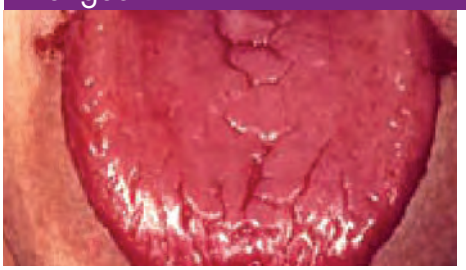
Sore Corners of Mouth (Angular Cheilitis)

Bacterial or fungal infection which occurs at the corners of the mouth.

Check for:

- Soreness and cracks at corners of the mouth.

Tongue



Sore Tongue (Glossitis)

This is commonly caused by a fungal infection.

It may be a sign of a general health problem.

Check for:

- A reddened, smooth area of tongue;
- A tongue which is generally sore and swollen.

Thrush (Candidiasis)

This is a fungal infection of oral tissues.

Check for:

- Patches of white film that leave a raw area when wiped away;
- Red inflamed areas on the tongue.

Gums and Tissues

Gum Disease (Gingivitis)

This is caused by the bacteria in dental plaque accumulating on the gum line at the base of the tooth.

It gets worse and more common with age.

Check for:

- Swollen red gums that bleed easily when touched or brushed;
- Bad breath.

Severe Gum Disease (Periodontitis)

This causes gums and bone that support the teeth to break down.

This condition can impact seriously on general health and wellbeing.

Check for:

- Receding gums;
- Exposed roots of teeth;
- Loose teeth;
- Tooth sensitivity;
- Bad breath.

Oral Cancer

Oral cancer is a major cause of death. People who smoke and drink alcohol heavily are at higher risk.

Check for:

- Ulcers that do not heal within 14 days;
- A white or red patch or change in the texture of oral tissues;
- Swelling;
- Unexplained changes in speech;
- Difficulty in swallowing.

Appendix B

Oral Hygiene Products and Aids

Use a soft toothbrush suitable for bending.

Use a brightly coloured toothbrush.

Use mouth props (but only if trained in their use).

Use modified oral health-care application technique; (for example, spray bottle).

Use a chlorhexidine mouthwash (alcohol-free and non-teeth staining) as prescribed by the GP or dentist.

Effective Communication

Speak Clearly

Speak clearly and at the resident's pace.

Speak at a normal volume.

Always explain what you are doing.

Use words the resident can understand.

Ask questions that require a yes or no response.

Give one instruction or piece of information at a time.

Use reassuring words and positive feedback.

Use words that impart an emotion; for example, "lovely" smile or "sore" mouth.

Observe the resident closely when you are talking with him or her. A lack of response, signs of frustration, anger, disinterest or inappropriate responses can all suggest the communication being used is too complex.

Effective Communication Strategies

Caring Attitude

Firstly, focus on building a good relationship with the resident before you start oral care.

Use a calm, friendly and non-demanding manner.

Smile and give a warm greeting using the resident's given name. Using the given name is more likely to engage the resident.

Allow plenty of time for the resident to respond.

If you cannot remain calm, try again at another time or get assistance.

The Right Environment

Choose the location where the resident is most comfortable. This may be the bedroom where there are familiar things or the bathroom because this is the usual place for oral care.

Maintain regular routines.

Ensure there is good lighting as residents with dementia need higher levels of lighting.

Use a brightly coloured toothbrush so it can be seen easily by the resident.

If possible, turn off competing background noise such as the television or radio.

Body Language

Approach the resident from the diagonal front and at eye level. By standing directly in front, you can look big and are more likely to be grabbed or hit.

Touch a neutral place such as the hand or lower arm to get resident's attention.

Position yourself at eye level and maintain eye contact if culturally appropriate.

Be aware that the personal spaces of residents can vary.

Be consistent in your approach and maintain a positive expression and caring language.

Improve Access to the Mouth

Overcoming Fear of Being Touched

The resident may respond fearfully to intimate contact when the relationship with you has not been established.

Firstly, concentrate on building up a relationship with the resident. Once you have engaged the resident, gently and smoothly stroke the resident's face. The aim is to relax the resident and create a sense of confort and safety.

This process may need to be staged over time until the resident becomes trusting and ready to eccept oral care.

Bridging

Bridging aims to engage the resident's senses, especially sight and touch, and to help the resident understand the task you are trying to do for him or her.

Undertake this method only if the resident is engaged with you.

Describe the toothbrush and show it to the resident.

Mimic brushing your own teeth so the resident sees physical prompts, and smile at the same time.

Place a brightly coloured toothbrush in the resident's preferred hand (usually the right hand).

The resident is likely to mirror your behaviour and begin to brush his or her teeth.

Chaining

If the resident does not initiate brushing his or her teeth through bridging, gently bring the resident's hand and toothbrush to his or her mouth, describing the activity and then letting the resident take over and continue.

Improve Access to the Mouth

Hand-Over-Hand

If chaining does not work, then place your hand over the resident's hand and start brushing the resident's teeth so you are doing it together.

Distraction

If the hand-over-hand method is not successful, place a toothbrush or a familiar item (such as a towel, cushion or activity board) in the resident's hand while you use the other toothbrush to brush the resident's teeth.

Familiar music may also be useful to distract and relax the resident during oral care.

Rescuing

If your relationship with the resident is not working and attempts at oral care are not going well, then tell the resident that you will leave it for now. Ask for help and have someone else take over the oral care.

Appendix C

Gum and Tissues

Ulcers and Sore Spots

These are caused by chronic inflammation, a poorly fitting denture or trauma.

Ulcers may be a sign of a general health problem.

Check for:

- Sensitive areas of raw tissue caused by rubbing of the denture (particularly under or at the edges of the denture);
- Broken denture;
- Broken teeth;
- Difficulty eating meals;
- Responsive behaviour.

Sore Mouth (Stomatitis)

Usually, this is caused by a fungal infection.

It is commonly found where oral tissue is covered by a denture.

It may be a sign of a general health problem.

Check for:

- Red swollen mouth — usually in an area which is covered by a denture.

Dry Mouth (Xerostomia)

This can be a very uncomfortable condition caused by medications, radiation and chemotherapy or by medical conditions such as Sjögren's syndrome and Alzheimer's disease.

Check for:

- Difficulty with eating and/or speaking;
- Dry oral tissues;
- Small amount of saliva in the mouth;
- Saliva which is thick, stringy or rope-like.

Natural Teeth

Tooth Decay (Caries)

Tooth decay is a diet and oral-hygiene related infectious disease which affects the teeth and causes pain.

Check for:

- Holes in teeth;
- Brown or discoloured teeth;
- Broken teeth;
- Bad breath;
- Oral pain and tooth sensitivity;
- Difficulty eating meals;
- Responsive behaviour.

Root Decay (Root Caries)

Gums recede and the surface of the tooth root is exposed.

Decay can develop very quickly because the tooth root is not as hard as tooth enamel.

Check for:

- Tooth sensitivity;
- Brown discolouration near the gum line;
- Bad breath;
- Difficulty eating meals;
- Responsive behaviour.

Retained Roots

The crown of the tooth has broken or decayed away.

Check for:

- Broken teeth;
- Exposed tooth roots;
- Oral pain;
- Swelling;
- Bad breath;
- Trauma to surrounding tissues from sharp tooth edges;
- Difficulty eating meals;
- Responsive behaviour.

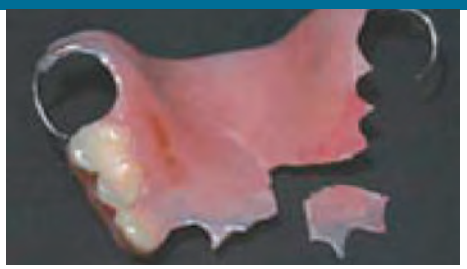
Dentures

Requiring Attention

The denture is in need of repair or attention.

Check for:

- Resident's name on the denture;
- Chipped or missing teeth on the denture;
- Chipped or broken acrylic (pink) areas on the denture;
- Bent or broken metal wires or clips on a partial denture.



Poorly Fitting

A denture can cause irritation and trauma to gums and oral tissues.

Check for:

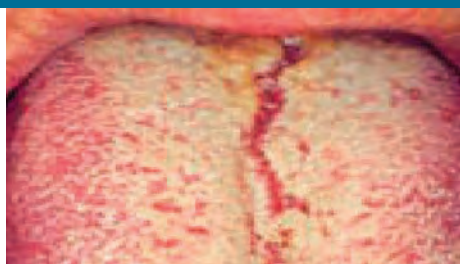
- Denture belonging to resident;
- Dentures being a matching set, particularly if the resident has several sets of dentures;
- Denture movement when the resident is speaking or eating;
- Resident's refusal to wear the denture;
- Overgrowth of oral tissues under the denture;
- Ulcers and sore spots caused by wearing the denture.

Oral Cleanliness

Poor Oral Hygiene

Poor oral hygiene allows the bacteria in dental plaque to produce acids and other substances that damage the teeth, gums and surrounding bone.

Dental plaque begins as an invisible film that sticks to all surfaces of the teeth, including the spaces between the teeth and gums. It forms continously and must be removed by regular brushing. If dental plaque is not removed, it hardens into calculus (tartar).



Check for:

- Buildup of dental plaque on teeth, particularly at the gum line;
- Calculus on teeth, particularly at the gum line;
- Calculus on denture;
- Unclean denture;
- Bleeding gums;
- Bad breath;
- Coated tongue;
- Food left in the mouth.

References

1. Ontario Ministry of Finance. (2018). Ontario Population Projections Update, 2017-2041. Retrieved from: https://www.fin.gov.on.ca/en/economy/demographics/projections/.
2. Matthews, D. C., Clovis, J. B., Brillant, M. G., Filiaggi, M. J., McNally, M. E., Kotzer, R. D., & Lawrence, H. P. (2012). Oral health status of long-term care residents-a vulnerable population. *Journal of Canadian Dental Association*, 78(3), c3.
3. Jafari, M., & Shanmugam, V. (2016). *Saskatchewan Seniors' Oral Health and Long-term Care Strategy. Better Oral Health in Long-term Care: Best Practice Standards for Saskatchewan*. Retrieved from: https://www.saskatoonhealthregion.ca/locations_services/Services/Oral-Health/Documents/Final%20LTC%20Report-%20Maryam%20Jafari-Sept%2022%202016.pdf.
4. Chen, X., Clark, J. J., & Naorungroj, S. (2012). Length of tooth survival in older adults with complex medical, functional and dental backgrounds. *The Journal of the American Dental Association*, 143(6), 566-578.
5. Davies, R. M. (2004). The rational use of oral care products in the elderly. *Clinical Oral Investigations*, 8(1), 2-5.
6. Canadian Academy of Health Sciences. (2014). *Improving Access to Oral Health Care for Vulnerable People Living in Canada*. Retrieved from: http://cahs-acss.ca/wp-content/uploads/2015/07/Access_to_Oral_Care_FINAL_REPORT_EN.pdf.
7. Ontario Ministry of Health and Long-term Care. (2011). A Guide to the Long-term Care Homes Act, 2007 and Regulation 79/10. Retrieved from: http://health.gov.on.ca/en/public/programs/ltc/docs/ltcha_guide_phase1.pdf.
8. McKeown, L., Woodbeck, H., & Lloyd, M. (2014). A journey to improve oral care with best practices in long-term care. *Canadian Journal of Dental Hygiene*, 48(2), 57-62.
9. Canadian Dental Association. (2016). *Oral Health Care Standards for Residents in Long-term Care in Canada*. Retrieved from: https://www.cda-adc.ca/en/about/position_statements/ltc/.
10. Canadian Dental Association. (2017). The State of Oral Health in Canada. Retrieved from: https://www.cda-adc.ca/stateoforalhealth/.
11. Porter, J., Ntouva, A., Read, A., Murdoch, M., Ola, D., & Tsakos, G. (2015). The impact of oral health on the quality of life of nursing home residents. *Health and Quality of Life Outcomes*, 13(1), 1.
12. Ramsay, S. E., Papachristou, E., Watt, R. G., Lennon, L. T., Papacosta, A. O., Whincup, P. H., & Wannamethee, S. G. (2018). Socioeconomic disadvantage across the life-course and oral health in older age: findings from a longitudinal study of older British men. *Journal of Public Health*, 40(4), e423-e430.
13. Calvo, J., Chávez, E. M., & Jones, J. (2016). Financial roadblocks to oral health for older adults. *Generations*, 40(3), 85-89.
14. FDI World Dental Federation. (2015). Oral Health Atlas 2015. Retrieved from: https://www.fdiworlddental.org/resources/oral-health-atlas/oral-health-atlas-2015.
15. Watt, R.G., Listl, S., Peres, M., & Heilmann, A. (2015). International Centre for Oral Health Inequalities Research and Policy: Social inequalities in oral health: from evidence to Action. Retrieved from: http://media.news.health.ufl.edu/misc/cod-oralhealth/docs/posts_frontpage/SocialInequalities.pdf.
16. Gülcan, F., Ekbäck, G., Ordell, S., Lie, S. A., & Åstrøm, A. N. (2015). Inequality in oral health related to early and later life social conditions: a study of elderly in Norway and Sweden. *BMC Oral Health*, 15(1), 20.
17. Tellez, M., Zini, A., & Estupiñan-Day, S. (2014). Social determinants and oral health: an update. *Current Oral Health Reports*, 1(3), 148-152.
18. Huang, D. L., & Park, M. (2015). Socioeconomic and racial/ethnic oral health disparities among US older adults: oral health quality of life and dentition. *Journal of Public Health Dentistry*, 75(2), 85-92.

19. Health Canada. (2010). Report on the findings of the oral health component of the Canadian Health Measures Survey 2007-2009. Retrieved from: http://publications.gc.ca/site/eng/369649/publication.html.

20. Gil-Montoya, J.A., de Mello, A.L.F., Barrios, R., Gonzalez-Moles, M.A., & Bravo, M. (2015). Oral health in the elderly patient and its impact on general well-being: a nonsystematic review. *Clinical Interventions in Aging*, 10:461-467.

21. Joshy, G., Arora, M., Korda, R. J., Chalmers, J., & Banks, E. (2016). Is poor oral health a risk marker for incident cardiovascular disease hospitalisation and all-cause mortality? Findings from 172 630 participants from the prospective 45 and Up Study. *BMJ Open*, 6(8), e012386.

22. Söder, B., Meurman, J. H., & Söder, P. Ö. (2015). Gingival Inflammation associates with stroke–a role for oral health personnel in prevention: a database study. *PLoS One*, 10(9), e0137142.

23. National Institute of Diabetes and Digestive and Kidney Disease. (2014). Diabetes, Gum Disease, & Other Dental Problems. Retrieved from: https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/gum-disease-dental-problems.

24. National Institutes of Health: Osteoporosis and Related Bone Diseases National Resource Centre. (2016). *Oral Health and Bone Disease*. Retrieved from: https://www.bones.nih.gov/health-info/bone/bone-health/oral-health/oral-health-and-bone-disease.

25. Van Lancker, A., Verhaeghe, S., Van Hecke, A., Vanderwee, K., Goossens, J., & Beeckman, D. (2012). The association between malnutrition and oral health status in elderly in long-term care facilities: a systematic review. *International Journal of Nursing Studies*, 49(12), 1568-1581.

26. Royal College of Surgeons Faculty of Dental Surgery. (2017). Improving older people's oral health. Retrieved from: https://www.rcseng.ac.uk/-/media/files/rcs/fds/media-gov/fds-improving-older-peoples-oral-health-2017.pdf.

27. Yao, C. S., & MacEntee, M. I. (2013). Inequity in oral health-care for elderly Canadians: Part 1. Oral health status. *Journal Canadian Dental Association*, 79, d114.

28. Sjögren, P., Wårdh, I., Zimmerman, M., Almståhl, A., & Wikström, M. (2016). Oral care and mortality in older adults with pneumonia in hospitals or nursing homes: Systematic review and meta-analysis. *Journal of the American Geriatrics Society*, 64(10), 2109-2115.

29. National Institute of Dental and Craniofacial Research. (2017). *Older Adults and Oral Health*. Retrieved from: https://www.nidcr.nih.gov/sites/default/files/2018-01/older-adults-oral-health.pdf.

30. Moynihan, P., & Petersen, P. E. (2004). Diet, nutrition and the prevention of dental diseases. *Public Health Nutrition*, 7(1a), 201-226.

31. National Institute of Dental and Craniofacial Research. (2018). *Gum Disease*. Retrieved from: https://www.nidcr.nih.gov/health-info/gum-disease/more-info.

32. Canadian Dental Association. (2018). *Gum Disease*. Retrieved from: https://www.cda-adc.ca/en/oral_health/talk/complications/diseases/gum_diseases.asp.

33. National Institute of Health. (2013). *Periodontal (Gum) Disease: Causes, Symptoms, and Treatments*. Retrieved from: https://www.nidcr.nih.gov/sites/default/files/2017-09/periodontal-disease_0.pdf.

34. American Academy of Periodontology. (2018). *Type of Gum Disease*. Retrieved from: https://www.perio.org/consumer/types-gum-disease.html.

35. Poudel, P., Griffiths, R., Wong, V. W., Arora, A., Flack, J. R., Khoo, C. L., & George, A. (2018). Oral health knowledge, attitudes and care practices of people with diabetes: a systematic review. *BMC Public Health*, 18(1), 577.

36. Kim, J., & Amar, S. (2006). Periodontal disease and systemic conditions: a bidirectional relationship. *Odontology*, 94(1), 10-21.

37. Langmore, S. E., Terpenning, M. S., Schork, A., Chen, Y., Murray, J. T., Lopatin, D., & Loesche, W. J. (1998). Predictors of aspiration pneumonia: how important is dysphagia? *Dysphagia*, 13(2), 69-81.

38. El-Solh, A. A. (2011). Association between pneumonia and oral care in nursing home residents. *Lung*, 189(3), 173.

39. Yellowitz, J. A., & Schneiderman, M. T. (2014). Elders' Oral Health Crisis. *Journal of Evidence Based Dental Practice*, 14, 191-200.

40. Razak, P. A., Richard, K. J., Thankachan, R. P., Hafiz, K. A., Kumar, K. N., & Sameer, K. M. (2014). Geriatric oral health: a review article. *Journal of International Oral Health: JIOH*, 6(6), 110.

41. American Dental Association. (2017). Oral Health Topics. Retrieved from: https://www.ada.org/en/member-center/oral-health-topics/toothbrushes.

42. Jablonski, R. Y., & Barber, M. W. (2015). Restorative dentistry for the older patient cohort. *British Dental Journal*, 218(6), 337.

43. Coker, E., Ploeg, J., Kaasalainen, S., & Carter, N. (2017). Observations of oral hygiene care interventions provided by nurses to hospitalized older people. *Geriatric Nursing*, 38(1), 17-21.

44. Scannapieco, F. A., & Shay, K. (2014). Oral health disparities in older adults: oral bacteria, inflammation, and aspiration pneumonia. *Dental Clinics*, 58(4), 771-782.

45. British Columbia Dental Association. (2011). Oral Health Care Delivery in Residential Care Facilities. Retrieved from: http://docplayer.net/6313298-Oral-health-care-delivery-in-residential-care-facilities.html.

46. Yao, C. S., & MacEntee, M. I. (2013). Inequity in oral health care for elderly Canadians: Part 1. Oral health status. *Journal of the Canadian Dental Association*, 79, d114.

47. El-Solh, A. A. (2011). Association between pneumonia and oral care in nursing home residents. *Lung*, 189(3), 173.

48. Dyck, D., Bertone, M., Knutson, K., & Campbell, A. (2012). Improving oral care practice in long-term care. *Canadian Nurse*, 108(9), 20-24.

49. Arora, V., Tangade, P., Ravishankar, T. L., Tirth, A., Pal, S., & Tandon, V. (2014). Efficacy of dental floss and chlorhexidine mouth rinse as an adjunct to toothbrushing in removing plaque and gingival inflammation–A three way cross over trial. *Journal of Clinical and Diagnostic Research: JCDR*, 8(10), ZC01.

50. Wyatt, C. C., & MacEntee, M. I. (1997). Dental caries in chronically disabled elders. *Special Care in Dentistry*, 17(6), 196-202.

51. Canadian Dental Association. (2018). How Not to See your Dentist (more than necessary). Retrieved from: https://www.cda-adc.ca/en/oral_health/talk/dentist.asp.

52. Pace, C. C., & McCullough, G. H. (2010). The association between oral microorgansims and aspiration pneumonia in the institutionalized elderly: review and recommendations. *Dysphagia*, 25(4), 307-322.

53. Darby, I. (2015). Periodontal considerations in older individuals. *Australian Dental Journal*, 60, 14-19.

54. Needleman, I. G., Hirsch, N. P., Leemans, M., Moles, D. R., Wilson, M., Ready, D. R., Ismail, S., Ciric, L., Shaw, M.J., Smith, M., Garner, A., & Wilson, S. (2011). Randomized controlled trial of toothbrushing to reduce ventilator-associated pneumonia pathogens and dental plaque in a critical care unit. *Journal of Clinical Periodontology*, 38(3), 246-252.

55. Government of South Australia. (2008). *Better Oral Health in Residential Care*. Retrieved from: http://www.sahealth.sa.gov.au/wps/wcm/connect/842b750047d746d29e189ffc651ee2b2/BOHRC_Staff_Portfolio_Module_1%5B1%5D.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-842b750047d746d29e189ffc651ee2b2-lDQKKVi.

56. Fricker, A., & Lewis, A. (2009). *Better Oral Health in Residential Care Final Report*. Retrieved from: https://www.sahealth.sa.gov.au/wps/wcm/connect/32902a8043506b6a91bef32835153af6/SADS-BOHP-Fin-Report-Nov-09.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-32902a8043506b6a91bef32835153af6-lwm1l8Q.

57. NHS Health Scotland. (2013). *Caring for Smiles Guide for Care Homes: Better Oral Care for Dependent Older People*. Retrieved from: http://www.knowledge.scot.nhs.uk/media/7460397/caringforsmilescarehomes2013.pdf

58. Government of Canada. (2018). Social determinants of health and health inequalities. Retrieved from: https://www.canada.ca/en/public-health/services/health-promotion/population-health/what-determines-health.html

59. Dalhousie University. (2013). *Brushing Up on Mouth Care: Facilitator Guide*. Retrieved from: https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/ahprc/facilitator-guide.pdf

60. Government of Canada. (2017). Canadian Cancer Statistics 2017 Special topic: Pancreatic cancer. Retrieved from: http://www.cancer.ca/~/media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2017-EN.pdf.

61. Canadian Cancer Society. (2018). Oral Cancer. Retrieved from: http://www.cancer.ca/en/cancer-information/cancer-type/oral/statistics/?region=on.

62. National Institute of Dental and Craniofacial Research. (2018). Oral Cancer. Retrieved from: https://www.nidcr.nih.gov/health-info/oral-cancer/more-info.

63. Government of Canada. (2015). Canadian Cancer Statistics 2015 Special topic: Predictions of the future burden of cancer in Canada. Retrieved from: http://www.cancer.ca/~/media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2015-EN.pdf?la=en.

64. Ouanounou, A. (2016). Xerostomia in the geriatric patient: causes, oral manifestations, and treatment. *Compendium of Continuing Education in Dentistry*, 37(5), 306-11.

65. National Institute of Dental and Craniofacial Research. (2017). Dry Mouth. Retrieved from: https://www.nidcr.nih.gov/health-info/dry-mouth.

66. Gupta, A., Epstein, J. B., & Sroussi, H. (2006). Hyposalivation in elderly patients. *Journal of the Canadian Dental Association*, 72(9).

67. Gil-Montoya, J. A., Silvestre, F. J., Barrios, R., & Silvestre-Rangil, J. (2016). Treatment of xerostomia and hyposalivation in the elderly: A systematic review. *Medicina Oral, Patologia Oral y cirugia bucal*, 21(3), e355-66. doi:10.4317/medoral.20969.

68. Shetty, S. R., Bhowmick, S., Castelino, R., & Babu, S. (2012). Drug induced xerostomia in elderly individuals: An institutional study. *Contemporary Clinical Dentistry*, 3(2), 173.

69. Wiener, R. C., Wu, B., Crout, R., Wiener, M., Plassman, B., Kao, E., & McNeil, D. (2010). Hyposalivation and xerostomia in dentate older adults. *The Journal of the American Dental Association*, 141(3), 279-284.

70. American Dental Association. (2018). Oral Health Topics: Xerostomia (Dry Mouth). Retrieved from: https://www.ada.org/en/member-center/oral-health-topics/xerostomia.

71. Azarpazhooh, A., & Leake, J. L. (2006). Systematic review of the association between respiratory diseases and oral health. *Journal of Periodontology*, *77*(9), 1465-1482.

72. Beck, J. D., & Offenbacher, S. (2001). The association between periodontal diseases and cardiovascular diseases: a state-of-the-science review. *Annals of Periodontology*, 6(1), 9-15.

73. Anil, S., Vellappally, S., Hashem, M., Preethanath, R. S., Patil, S., & Samaranayake, L. P. (2016). Xerostomia in geriatric patients: a burgeoning global concern. *Journal of Investigative and Clinical Dentistry*, *7*(1), 5-12.

74. The American Academy of Oral Medicine. (2015). Dry Mouth. Retrieved: https://www.aaom.com/dry-mouth.

75. Griffin, S. O., Jones, J. A., Brunson, D., Griffin, P. M., & Bailey, W. D. (2012). Burden of oral disease among older adults and implications for public health priorities. *American Journal of Public Health*, 102(3), 411-8.

76. Saarela, R. K., Soini, H., Hiltunen, K., Muurinen, S., Suominen, M., & Pitkala, K. (2014). Dentition status, malnutrition and mortality among older service housing residents. *The Journal of Nutrition, Health & Aging*, 18(1), 34-38.

77. Kazemi, S., Savabi, G., Khazaei, S., Savabi, O., Esmaillzadeh, A., Keshteli, A. H., & Adibi, P. (2011). Association between food intake and oral health in elderly: SEPAHAN systematic review no. 8. *Dental Research Journal*, 8 (Suppl 1), S15-20.

78. Chen, C. C. H., Bai, Y. Y., Huang, G. H., & Tang, S. T. (2007). Revisiting the concept of malnutrition in older people. *Journal of Clinical Nursing*, 16(11), 2015-2026.

79. Gendreau, L., & Loewy, Z. G. (2011). Epidemiology and etiology of denture stomatitis. *Journal of Prosthodontics: Implant, Esthetic and Reconstructive Dentistry*, 20(4), 251-260.

80. Yarborough, A., Cooper, L., Duqum, I., Mendonça, G., McGraw, K., & Stoner, L. (2016). Evidence regarding the treatment of denture stomatitis. *Journal of Prosthodontics*, 25(4), 288-301.

81. Walsh, T., Riley, P., & Veitz-Keenan, A. (2015). Interventions for managing denture stomatitis. *Cochrane Database of Systematic Reviews*, (10).

82. Singh, A., Verma, R., Murari, A., & Agrawal, A. (2014). Oral candidiasis: An overview. *Journal of Oral and Maxillofacial Pathology: JOMFP*, 18(Suppl 1), S81.

83. Flevari, A., Theodorakopoulou, M., Velegraki, A., Armaganidis, A., & Dimopoulos, G. (2013). Treatment of invasive candidiasis in the elderly: a review. *Clinical Interventions in Aging*, 8, 1199.

84. National Health Services. (2018). *Oral Thrush in Adults*. Retrieved from: https://www.nhsinform.scot/illnesses-and-conditions/infections-and-poisoning/oral-thrush-in-adults.

85. Rech, R. S., Hugo, F. N., Baumgarten, A., dos Santos, K. W., de Goulart, B. N. G., & Hilgert, J. B. (2018). Development of a simplified dysphagia assessment by dentists in older persons. *Community Dentistry and Oral Epidemiology*, 46(3), 218-224.

86. Huang, S. T., Chiou, C. C., & Liu, H. Y. (2017). Risk factors of aspiration pneumonia related to improper oral hygiene behavior in community dysphagia persons with nasogastric tube feeding. *Journal of Dental Sciences*, 12(4), 375-381.

87. NHSinform. (2018). Dysphagia (swallowing problems). Retrieved from: https://www.nhsinform.scot/illnesses-and-conditions/stomach-liver-and-gastrointestinal-tract/dysphagia-swallowing-problems.

88. Sura, L., Madhavan, A., Carnaby, G., & Crary, M. A. (2012). Dysphagia in the elderly: management and nutritional considerations. *Clinical Interventions in Aging*, *7*, 287.

89. Ortega, O., Parra, C., Zarcero, S., Nart, J., Sakwinska, O., & Clave, P. (2014). Oral health in older patients with oropharyngeal dysphagia. *Age and Ageing*, 43(1), 132-137.

90. NHS. (2018). Oral care for people with Dysphagia and those who are Nil by Mouth. Retrieved from: https://www.locala.org.uk/fileadmin/Locala_Refresh/Documents/Dental_Services/Patient_Information_Leaflets/Oral_care_for_people_for_people_with_dysphagia.pdf.

91. Goldenberg, R., & Punthakee, Z. (2013). Definition, classification and diagnosis of diabetes, prediabetes and metabolic syndrome. *Canadian Journal of Diabetes*, 37, S8-S11.

92. National Institute of Diabetes and Digestive and Kidney Diseases. (2016). What is Diabetes? Retrieved from: https://www.niddk.nih.gov/health-information/diabetes/overview/what-is-diabetes.

93. Diabetes Canada. (2019). Types of Diabetes. Retrieved from: https://www.diabetes.ca/about-diabetes/types-of-diabetes.

94. Kudiyirickal, M. G., & Pappachan, J. M. (2015). Diabetes mellitus and oral health. *Endocrine*, 49(1), 27-34.

95. National Institute of Diabetes and Digestive and Kidney Disease. (2014). Diabetes, Gum Disease, & Other Dental Problems. Retrieved from: https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/gum-disease-dental-problems.

96. International Diabetes Federation. (2009). Guideline: Oral health for people with diabetes. Retrieved from: https://www.idf.org/our-activities/advocacy-awareness/resources-and-tools/83:oral-health-for-people-with-diabetes.html.

97. Houlden, R.L. (2018). 2018 Clinical Practice Guidelines: Introduction. *Canadian Journal of Diabetes*, 42, s1-s5.

98. International Diabetes Federation (IDF). (2017). IDF Diabetes Atlas 8th Edition. Retrieved from: https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/134-idf-diabetes-atlas-8th-edition.html.

99. Negrato, C. A., Tarzia, O., JOVANOVIČ, L., & Chinellato, L. E. M. (2013). Periodontal disease and diabetes mellitus. *Journal of Applied Oral Science*, 21(1), 1.

100. Alagl, A. S. (2017). Periodontal abscess as a possible oral clinical sign in the diagnosis of undiagnosed diabetes mellitus of elderly in a dental clinic set up — A 7-year cross-sectional study. *Journal of Investigative and Clinical Dentistry*, 8(3), e12217.

101. Casanova, L., Hughes, F. J., & Preshaw, P. M. (2014). Diabetes and periodontal disease: a two-way relationship. *British Dental Journal*, 217(8), 433.

102. Llambés, F., Arias-Herrera, S., & Caffesse, R. (2015). Relationship between diabetes and periodontal infection. *World Journal of Diabetes*, 6(7), 927.

103. National Institute of Dental and Craniofacial Research. (2017). Diabetes: Dental Tips. Retrieved from: https://www.nidcr.nih.gov/sites/default/files/2017-11/diabetes-dental-tips.pdf.

104. Poudel, P., Griffiths, R., Wong, V. W., Arora, A., Flack, J. R., Khoo, C. L., & George, A. (2018). Oral health knowledge, attitudes and care practices of people with diabetes: a systematic review. *BMC Public Health*, 18(1), 577.

4 New Street, Toronto, ON M5R 1P6
Tel: 416-922-3900 or 1-800-387-1393
Fax: 416-922-9005 • www.youroralhealth.ca