Oral Care in Long-Term Care Settings

Ronald Ettinger and Leonardo Marchini

1 Introduction

The US population is aging, and the most recent data available suggest that in 2018 persons over 65 made up 16% of the total population [1, 2]. The older population has been projected to grow in number and percentage reaching 22% in 2050 [3]. As these people age, 34% of them will become frail and functionally dependent, that is, they will not be able to maintain their independence, and will require either home health services or long-term care services and other supports (LTSS) sometime during their life span [4]. In 2010, it was estimated that 10.9 million persons who lived in the community needed LTSS; half of them were over the age of 65. In addition, there were 1.8 million persons living in long-term care facilities (LTCF), the majority of which were older adults [5]. In 2019, it was noted that approximately 1.5 million persons were now living in nursing homes, and 65.6% were women, while 7.8% were over the age of 95 years, 33.8% were between 85 and 94 years, 26.4% were between 75 and 84 years, 16.5% were between 65 and 74 years, and 15.5% were under the age of 65 [6]. In general, nursing home residents need help with instrumental activities of daily living (IADLs) and at least one activity of daily living (ADLs). Consequently, many need help with daily oral hygiene and are more likely to have poorer oral health than persons of a similar age living independently [7–9].

The current cohort of older Americans is keeping their teeth for longer, as edentulism rates have declined to 17.6% for persons 65 years and older [10, 11].

R. Ettinger (✉)
Department of Prosthodontics, College of Dentistry, University of Iowa, Iowa City, IA, USA
e-mail: ronald-ettinger@uiowa.edu

L. Marchini
Department of Preventive and Community Dentistry, College of Dentistry, University of Iowa, Iowa City, IA, USA

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However, this rate varies by state, by income, and by education [11]. Currently, the majority of residents in long-term care facilities (LTCFs) are dentate [12], and it has been shown that poor oral health impacts a person's quality of life [13], by putting them at risk for pain and infection [14]. Also, it has been reported that lack of oral hygiene can precipitate aspiration pneumonia [15, 16]. Although this information has been known for some time, the provision of daily oral care and oral services for persons living in LTCFs is still poor [17], as communication between healthcare providers and dentists in LTCF is inadequate [18].

Most investigators who have attempted to introduce an adequate oral hygiene care program within LTCFs have failed once the supporting funding ceases. The main reasons for this failure are lack of an organizational culture within LTCFs to prioritize oral healthcare, which translates to the absence of enforcement of existing regulations/guidelines (OBRA 1987) [19]. Many LTCFs are understaffed and in addition the direct care workers (nurses' aides) are underpaid, overworked, and undereducated [17, 20]. Unfortunately, many of them have poor oral health themselves, so they are not motivated to care for the oral health of the residents. Therefore, the quality of any oral healthcare program in a LTCF will depend upon the importance the director of nursing and the administrator place on the oral health of the residents [19].

There have been many modes of delivery of dental care services in LTCFs. The method most acceptable for dentists has been transporting residents to a local dental practice, which will accept these patients. This method is inconvenient and costly for nursing homes, because they must designate a staff member to accompany the resident to the appointment. Therefore, nursing homes would prefer it if the residents' family members were willing to transport them [21]. To provide services in the nursing home, the simplest method has been emergency care only using a tackle box, which contains enough instruments and supplies for the extraction of teeth and the adjustment of dentures. The next level, which includes more comprehensive care, uses portable equipment that can perform preventive procedures and simple restorations. At the next level, the dental provider would use mobile equipment, which is set up in the nursing home for a period of time, and allows the dentist to do comprehensive care, including more complex procedures. Mobile vans have been equipped to visit nursing homes, but their use is limited by geography and the weather, because it requires taking the residents from the home to the van for care.

This chapter will expand on the details of the LTCFs population and their oral health problems. It will discuss dental care delivery systems, which have evolved, and define possible advantages and disadvantages of each of these systems and how these have been impacted by the COVID-19 pandemic.

2 Description of Long-Term Care Facilities and Their Population

Traditionally, nursing homes were used to provide services for frail and functionally dependent older adults, as well as younger adults with disabilities, who were unable to support themselves independently in their daily lives. With the advent of the Affordable Care Act (ACA), a new term for nursing homes was defined as

long-term care services and supports (LTSSs). This new term includes both institutionally and noninstitutionally based care, which includes adult day services, home health agencies, hospice, nursing homes, and assisted living facilities (ALF) and similar residential care communities [22].

Within the long-term care population, there are two major groups of residents. The first group are those who live in the facilities and receive long-term care, the second group are those who are admitted for post-acute care, usually following a stay in the hospital. The two groups have different clinical characteristics, as well as different sources of funding for their stay in the LTCFs [23]. The first group need permanent help with their activities of daily living, while the second group need help for a limited period of time to recover from their illnesses and should be able to return to their communities. The funding for the first group is either by out-of-pocket or by private nursing home insurance, or, if they become very poor, they may qualify for Medicaid, the US government healthcare insurance for the poor. The second group of older adults are usually funded by Medicare, the government healthcare insurance for Americans over 65 years of age, for up to 100 days, after a medically necessary hospital stay of at least 3 consecutive days. If the recovery time needs to be longer, then the cost will need to be financed either by out-of-pocket, by private insurance, or by Medicaid [24].

The traditional pool of family caregivers has changed due to decreasing family size and increasing employment rates among women, which has resulted in an increasing need for paid long-term care services for frail and functionally dependent family members. In the past, family members with early to middle stage dementia who were at risk, and living by themselves, were cared for by their families. However, this situation has changed as there is nobody at home during the day to care for these persons [22]. Consequently, these older adults with frailty would have three options. If the family can afford it, then they can employ a caretaker to come to the home or, if it is available, the older adults can go to an adult day care center. The third option is a long-term care facility, which can vary from residential care communities to a traditional nursing home [22].

Data from the National Longitudinal Caregiver Study [25] reported that the caregivers' reasons for placing dependents in LTCFs were related to the need for more skilled care (65%), the deterioration of caregiver's health (49%), the dependents' dementia-related behaviors (46%), and the need for more assistance (23%). For persons living at home, cognitive impairment and incontinence are common reasons for families to place their relatives in LTCFs, because dealing with these conditions severely impacts the life satisfaction of the family and caregivers. The majority of these frail and functionally dependent older adults have maintained some natural teeth. These natural dentitions need continuing daily oral hygiene care, which they may or may not get adequately when residing in a LTCF [17].

3 Oral Health Problems Among Residents of LTCFS

There is very little current data on the dental status of LTCFs residents, as there has not been a national study since 1997 [26, 27]. However, there are some regional studies in which the dentate status among LTCFs residents has been reported and

varies from 53% in Kentucky [9] to nearly 80% in Florida [12] (see Table 1). The increased retention of teeth has resulted in a need for maintenance of these heavily restored dentitions (Figs. 1 and 2), which sometimes results in a need for complex restorations [10].

Many of the LTCFs residents are taking multiple medications to treat their numerous medical problems. It has been reported that over 400 medications have some potential for causing hyposalivation and xerostomia [30, 31]. The effects of these conditions on the heavily restored dentitions are increased plaque levels, resulting in new coronal caries, recurrent caries, root caries, and an exacerbation of periodontal disease (Fig. 3). These oral diseases can cause a decrease in oral health-related quality of life [31]. Poor eyesight, decreased hand-eye coordination, reduced

Table 1 Dentate status of residents in long-term care facilities in the USA

Author	Year	State	Percentage dentate
Murray et al. [12]	2006	Florida	79.6
Bush et al. [9]	2010	Kentucky	53.3
Chen et al. [28]	2013	Minnesota	69.9
Caplan et al. [29]	2017	Iowa	67.0
Marchini et al. [17]	2018	Iowa	77.8

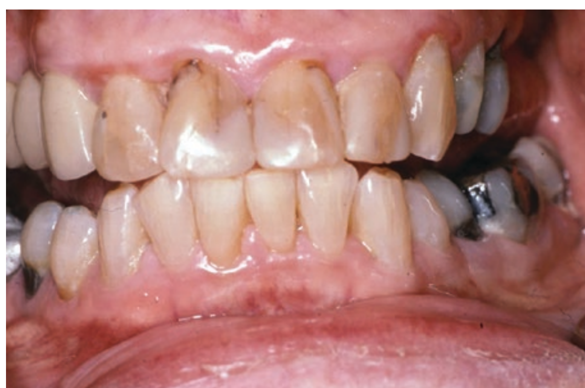

Fig. 1 Intraoral view of an 82-year-old female resident with a heavily restored dentition, who is still able to maintain oral hygiene at an acceptable level, although there is evidence of plaque accumulation and localized marginal gingivitis

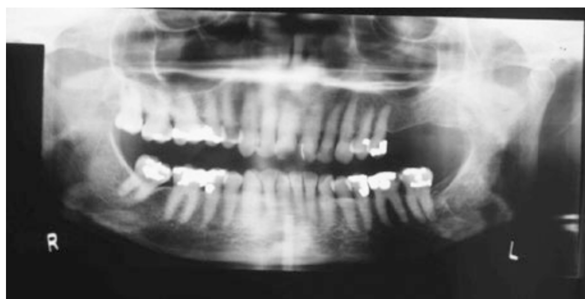

Fig. 2 Orthopantomograph of the same 82-year-old resident pictured in Fig. 1, showing her heavily restored dentition

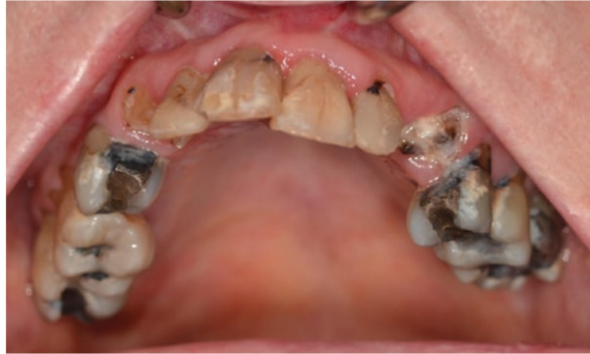

Fig. 3 Intraoral view of 68-year-old female resident, showing plaque accumulation resulting in coronal and root caries and periodontal disease, in an already heavily restored dentition with a history of taking multiple medications with xerostomic potential

manual dexterity, and cognitive impairment can cause increased plaque levels, which can lead to higher levels of oral disease unless appropriate daily oral hygiene routines are provided by LTCFs staff [32, 33]. For a more in-depth discussion on the topics of xerostomia, periodontal disease, and cognitive impairment, please refer to chapters "Xerostomia and Hyposalivation", "Management of Periodontal Disease in Older Adults", and "The 3 Ds: Dementia, Delirium and Depression in Oral Health".

However, there is data to show that the daily oral hygiene support by staff in LTCFs is often poor or inadequate [17, 34]. The reasons for this dilemma are that the primary caregivers are nurses' aides, who often have poor oral health themselves and are inadequately trained to carry out oral hygiene procedures for residents, especially those who resist care. In addition, the nurses' aides are underpaid and overworked, and many LTCFs are understaffed, which results in inadequate oral healthcare for the residents. There have been several attempts to improve oral hygiene routines in LTCFs [17, 20]. The most successful has been the hiring of a dental hygienist either part-time or full-time to help with daily oral healthcare [35]; however, most LTCFs are not prepared to pay for these services, as dental care is not reimbursable through the health insurance of Medicare, unlike physical therapy, speech therapy, or occupational therapy [36, 37]. Another successful approach has been to designate one of the nurses' aides as the "oral health specialist" and, after some training, to have them spend at least 50% of their time caring for the oral health of the residents [38]. Unfortunately, when the grant money runs out for such a program, so does the support of the LTCF. Another problem is the high rate of turnover of LTCFs staff. If a training program exists within the LTCF, unless it is repeated on a continuous basis, the resignation of the current staff will dilute the commitment of the nurses' aides to an oral hygiene program; and when the new staff are hired, they have not benefited from the training program nor from the cooperative environment previously achieved [39].

Consequently, many reports have found poor oral health among LTCFs residents [17, 40, 41]. The consequences of an inadequate dentition can be inability to chew food adequately that can result in poor nutrition [42], as well as difficulties with communication [43], and declining systemic health, such as poor glycemic control

[44], increased risk for cardiovascular disease [45], and aspiration pneumonia [46]. The microbial colonization of hard surfaces, such as teeth and/or dentures, allows for formation of biofilms. These biofilms if left undisturbed due to a lack of oral hygiene change from gram-positive and mostly aerobic to gram-negative and anaerobic, which if inhaled can cause aspiration pneumonia, which is the leading cause of death in LTCFs [47]. There are several studies that have shown that daily oral hygiene for residents decreases the incidence of aspiration pneumonia in LTCFs [46]. For a more in-depth discussion on this topic, please refer to chapter "Swallowing, Dysphagia, and Aspiration Pneumonia".

The COVID-19 pandemic has negatively influenced access to care for LTCFs residents, because currently many facilities will not allow healthcare practitioners into their premises, unless they are salaried staff. LTCFs are reluctant to send their residents to other healthcare facilities, unless the resident requires emergency care or hospitalization, which rarely includes oral healthcare. The consequences for the residents' oral health are an exacerbation of their caries and periodontal disease, especially because oral hygiene routines have been disrupted due to COVID-19 social distancing protocols [48, 49]. The emergency approval of COVID-19 vaccines and its currently availability for healthcare providers and LTCFs residents will change the negative impact of isolation on the residents and should allow them to regain access to regular oral healthcare.

4 Types of Oral Health Services for LTC Patients

Historically, there have always been a few dedicated dentists who have been prepared to care for residents in LTCFs, by either having them transported to their dental offices or by visiting them at their residences [50]. The reluctance of the majority of dentists to care for these persons has been studied over time, and a series of barriers have been identified [50, 51]. The barriers include lack of training in geriatric dental medicine, the cost in terms of time and efficiency caring for these patients, the complexity of the residents medical and pharmacological regimens, as well as the complexity of dealing with deteriorating, heavily restored dentitions [51, 52]. Additionally, some dentists may also be negatively influenced by the prevalent ageist culture in modern societies, predisposing them against caring for this age group who requires more time and also challenges the culture of efficient practice management [53].

Some families of residents in LTCFs are also reluctant for their relatives to receive dental care because it is expensive, and unless they have private dental insurance or are covered by Medicaid, all costs are out-of-pocket. Medicare does not cover routine dental care, only some oral surgical procedures [37]. Another reason for families' reluctance for providing dental care for their relatives is because they believe that such care will disrupt the life of their relatives [50]. Some older adults with frailty may have had bad childhood experiences with dental care and consequently may fear or distrust dentists [10]. Many residents may have low dental

health literacy [54], which impacts their understanding of the importance of dental care and daily oral hygiene routines, such as tooth brushing and the use of fluoridated toothpaste, which means they may not brush their own teeth regularly or they may resist help with oral hygiene.

Finding a nearby dentist who is prepared to treat LTCF residents may also be a barrier, as the accessibility of dentists' office may be a problem, even if he/she is willing to care for the residents. Some such office barriers include not having ramps, wheelchair accessible elevators, doors wide enough to accommodate wheelchairs, and operatories that are wheelchair accessible [55]. The staff of such an office needs to be sensitive to patients with vision and hearing disabilities, as well as knowing how to safely transfer patients.

The time of day to appropriately schedule residents may depend on their medical problems. For instance, patients with chronic heart failure are best seen in the morning, because they are strongest after a night's rest. Residents with arthritis need time to have their joints unstiffen; therefore, late morning to early afternoon are more appropriate appointment times for these patients. Mid- to late morning is appropriate for residents with dementia, as they may become more confused and sundown as the day progresses. Several residents may be underweight and may need appropriate support, such as pillows, egg crate foam, etc., to sit comfortably in the dental chair. These patients cannot tolerate long procedures, and their appointments should not exceed 2 hours, which must include travel time, as well as the time in the dental office [21].

Many practitioners may not want to treat LTCF residents, because they may become frustrated as these patients are unable to maintain their daily oral hygiene, and consequently their oral health may decline no matter what treatment is provided by the dentist. Their oral health may be further impacted by xerostomia caused by the medications they are using, their visual impairment, as well as their lack of manual dexterity [56].

Many residents do not have relatives living nearby and require the LTCF to transport them to the dentist's office, which incurs expenses for the facility. These expenses include providing an appropriate vehicle or a driver and/or a nurses' aide to accompany the resident, which means the aide is not available for duties within the facility. An alternative to transporting the resident is to provide care within the LTCF. One advantage is that many residents with frailty do not cope well with being transported out of their environment. Also, residents who are incontinent or catheterized are more easily treated within the LTCF [21].

The simplest mode of dental care for LTCFs residents is the use of a "tackle box" (Fig. 4). The tackle box contains equipment and supplies that allow the dentist to adjust dentures and do simple extractions [21]. A simple but necessary procedure would be to show the nurses' aides how to put the residents' name on their dentures. The simplest method is to abrade the surface of the denture and write the resident's name on the denture with a marking pencil and then to cover the area with two layers of clear nail varnish. This technique will allow the name to remain for 12–18 months. The "tackle box" can be used to treat caries using atraumatic restorative treatment (ART) technique, which includes silver diamine fluoride (SDF)

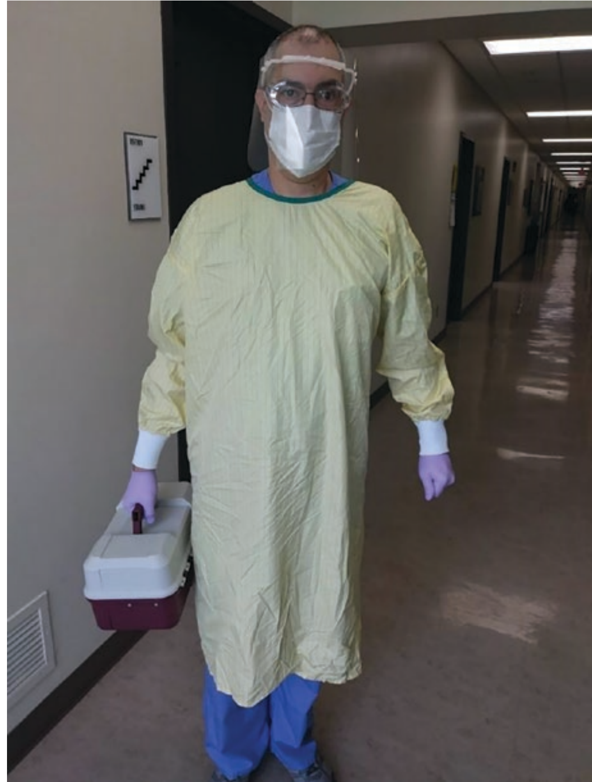

Fig. 4 Dentist visiting a long-term care facility, with the appropriate PPE, carrying a tackle box to provide a denture adjustment for a resident

applications and glass ionomer restorations [57]. These procedures require only hand instruments and do not generate aerosols, reducing the risk of COVID-19 infection [36]. For a more in-depth discussion on the topic of caries management, please refer to chapter "Management of Caries in Older Adults".

At the next level is commercial portable dental equipment, which allows the dentist to do the procedures described previously as well as direct restorations using rotary instruments, surgical extractions, and rest preparations for removable partial dentures (RPD). This equipment is not usually capable of sustained use but is efficient for intermittent procedures (Fig. 5). Some dental associations have bought this kind of equipment, which can be utilized at no cost by their members.

However, mobile equipment is now available, which is as effective as traditional dental office equipment (Fig. 6). This equipment allows the dentist to see multiple patients with comparable efficiency to a traditional dental office and provide comprehensive treatment. The advantage of this equipment is that it can be easily transported and timely installed in a facility, which allows providers to waste a minimum of their time prior to caring for residents, making it more cost-efficient for the dentist [57].

Especially equipped vans (Fig. 7) have been designed with dental chairs and other equipment. However, for a frail, functionally dependent or cognitively

Fig. 5 An Example of a portable dental unit (Aseptic Transport II, Aseptico, Inc Woodinville, WA 98072)

impaired persons, moving them from the LTCF to the mobile van can create serious risks or precipitate inappropriate behaviors. In hot weather, there is a risk of hyperthermia. In cold weather, there is a risk of falls, as well as hypothermia. Also, the van needs to be wheelchair accessible either with a ramp or a lift. Another disadvantage of the mobile van is related to their power source, which usually requires a 220-volt connection, and water lines that may freeze in the winter [57] If the van and the vehicle are directly connected, when the engine needs to be serviced, the equipment becomes unavailable, which further increases the cost of service.

Some large LTCFs that have a high proportion of private pay residents are able to provide in-house dental facilities for their residents, which allow the oral healthcare practitioners to have similar surroundings to a dental office and that is designed to care for at-risk and wheelchair-bound patients. To make such an on-site dental

Fig. 6 An example of mobile equipment from DNTL (ProCart II) set up in a room in a nursing home with a portable chair and light, which is used by the University of Iowa's Geriatric Mobile Unit Program

Fig. 7 The van used by the Geriatric Mobile Unit Program parked outside of nursing home, in the Iowa winter, showing the problems that weather can pose to such a program

facility economically feasible, the LTCF should have at least 150 to 200 residents. To be flexible, these programs should also have some portable equipment to be able to treat residents in their rooms if they are bedridden [21]. In some cases, these operatories may be shared with podiatry and occasionally with hair dressing shops. These LTCFs may be able to employ a hygienist either full- or part-time to care for the residents, providing the state regulations allow indirect supervision by a dentist [57]. In Table 2, the advantages and disadvantages of different types of dental care delivery systems for LTCFs are summarized.

The most important service a consultant dentist needs to instigate in a LTCF is to develop a continuing and functioning oral hygiene program within the facility. Educating the director of nursing (DON) and the administrator to support such a program is not easy as previously discussed. This program should also include the help of the LTCF dietician to reduce the residents' intake of refined sugars and other carbohydrates, as well as discouraging the residents from snacking between meals or consuming sugary treats and carbonated beverages.

In-service programs for nurses' aides should begin by asking them what barriers they face when providing daily oral hygiene care for the residents. It helps to provide hands-on training with residents, especially showing the aides how to manage care-resistant behaviors, such as refusing oral care, kicking, hitting, biting, spitting, or inability to understand what is happening and/or to follow directions. The program should then describe basic communication techniques, as can be seen in Table 3.

Table 2 Advantages and disadvantages of different types of dental care delivery systems for LTCFs

Type of program	Advantages	Disadvantages
Transport to practice	Dentist has all equipment Cost-effective for dentists Cost-effective for LTCF if family transports the resident	Office needs architectural changes to accommodate wheelchairs Not cost-effective for LTCF if responsible for transportation Maybe stressful for residents
"Tackle box"	No additional equipment costs Ease of portability Cost-effective for LTCFs Less stressful for residents	Time-consuming for dentist Limited range of treatment options
Portable equipment	Ease of portability Ease of set-up Cost-effective for home Less stressful for residents	Time-consuming for dentist Limited range of treatment options Cost of equipment
Mobile equipment	Cost-effective for home Still portable Less stressful for residents	Time-consuming for dentist High cost of equipment Transportation and set up time
In-house facility	Cost-effective for dentist Less time consuming for dentist Less stressful for residents	High cost of equipment for LTCF

Table 3 Basic communication techniques to be used with care-resistant residents

Basic communication techniques
Be patient, respectful, and gentle when approaching the resident
Avoid removing the resident from his/her favorite activity
Address the resident by his/her name
Always smile
Keep eye contact, preferably at the resident's eye level
Approach the resident from the front; move slowly
Introduce yourself to the resident
Use plain language and short sentences
Provide only one instruction at a time
Briefly explain what you are doing and why you are doing it, and repeat it as necessary
Be sure to provide constant encouragement and abundant and immediate positive reinforcement for good behavior

If the resident does not voluntarily cooperate in toothbrushing, it may be helpful to simply touch the lips and teeth with a toothbrush, which may trigger a reflex related to toothbrushing. If there is further resistance, Jane Chalmers [58] has summarized in detail techniques that have been used to manage oral hygiene care for residents with dementia. One such technique for helping to clean a person's teeth who will not open his/her mouth is to take a toothbrush; bend it back at a 45° angle; slide the bent toothbrush into the angle of the mouth, holding it against the cheek, to break the perioral muscles spasm; and allow for the removal of plaque and debris. Some other techniques, which have been described to communicate with residents with challenging behaviors, are shown in Table 4.

When discussing with nurses' aides, the reasons why they were reluctant to brush residents' teeth was a fear of being bitten and punched. To protect themselves, nurses' aides can be shown how to approach the resident from the side, gain his/her attention, and then move behind him/her, cup the chin with one hand, and slowly bring the brush to the mouth with the other hand. This allows the nurses' aide to protect themselves from being kicked or punched as they can control the residents' hands. If the resident has a rocking chair in his/her room, it is very useful to place a foot on the rocker, tip it back, and bring the resident back toward the caregiver's abdomen, which gives easier access to the mouth, from a more protected position (Fig. 8).

If the resident is agitated, it is important for the caregiver to determine if the resident is at risk of self-injury or of hurting others, prior carrying out oral healthcare at this time. The caregiver may try distraction and/or rescuing techniques, but if the resident does not respond, then the procedure should be aborted for another more convenient time when the patient is less agitated.

If the resident has a permanent nasogastric tube and is bedridden, many caregivers do not believe that the resident needs oral hygiene care. However, even though the resident is not eating, he/she is still generating biofilm, which if undisturbed increases the risk of aspiration pneumonia. Many of these residents cannot follow instructions and will not open their mouths to allow their teeth to be brushed. To overcome this problem, it is possible to insert a tongue depressor between the teeth

Table 4 Techniques to communicate with residents with challenging behaviors

Name of the technique	Description of the technique	Example
Rescuing	A second caregiver comes to deliver care, as the first caregiver leaves or steps back	The resident resists having the teeth brushed by one caregiver. A second caregiver takes over the resident's care.
Distraction	The resident can be distracted by singing a favorite song, by holding an item (such as a blanket or a doll), by watching a TV show or other video on YouTube	A resident is agitated during dental care. The resident is offered a doll or soft blanket as a distraction and this usually calms him/her down.
Bridging	The resident's sensory connection to the activity can be improved by having he/she hold the same object that is being used by the caregiver	Have the resident hold a toothbrush while the caregiver brushes his/her teeth with another toothbrush
Hand over hand	The resident is guided in an activity by the caregiver placing his/her hand over the resident's hand, in order to complete the task	Have the resident hold a toothbrush and then the caregiver places his/her hand over resident's hand and guides the toothbrushing
Chaining	A caregiver starts an oral healthcare activity and then lets the patient finish it	The caregiver places the resident's denture in his/her hand and encourages him/her to return the denture into his/her mouth

Fig. 8 A resident sitting in a rocking chair; the caregiver is tipping the chair backward to improve access to the mouth while brushing the residents' teeth

and then slide another one underneath it and keep adding them until the mouth is opened wide enough to insert a toothbrush. If that toothbrush is attached to suction, the mouth can be cleaned, the tongue brushed, and chlorhexidine sprayed to prevent dental diseases.

The development of a preventive program may help to reduce the effects of xerostomia and plaque accumulation in the residents' dentitions. The use of prescription high concentration fluoride toothpastes, such as toothpastes with 5000 ppm fluoride content, and no alcohol, or 0.12% chlorhexidine rinses have been shown to help reduce caries and periodontal disease [3]. Residents who are in a semicomatose state need to have their teeth, tongue, and gums wiped 2–3 times/day with moist gauze or glycerin and/or 10% solution of bicarbonate of soda to remove the coating which forms on these tissues [21]. The residents' lips should also be lubricated with lanolin to prevent drying and cracking. For care-resistant residents, the use of chlorhexidine in atomizers, which can be squirted into the buccal mucosa, has been shown to be efficacious [59].

5 Influence of the COVID-19 Pandemic on Oral Health Services for LTCFS Residents

In addition to the abovementioned barriers, residents of LTCFs are now facing new barriers related to the COVID-19 pandemic, which is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2). The major risk factors for poorer COVID-19 outcomes have been identified as older age and comorbidities [60], for instance, the case fatality rate for individuals aged 80+ has been reported to be about 22% [61].

LTCFs have become high-risk sites for COVID-19 infection and transmission. Many LTCFs have had outbreaks of COVID-19 around the USA, which may be caused by asymptomatic shedding of the virus, a lack of adequate personal protective equipment (PPE) for the staff, limited tracing of COVID-19 positive staff, and the limited testing of residents and staff [6, 62]. Unfortunately, many direct care workers in LTCFs have received inadequate training on how to protect themselves and others from COVID-19 infection. Also, many live in homes with multiple generations of family members, which reduces social distancing, and many must rely on public transportation to reach the LTCFs. These social issues heighten the staffs' risk of being infected by SARS-Cov-2, which has resulted in widespread virus outbreaks in LTCFs [49, 63]. As cognitively impaired residents now constitute a large proportion of residents in American LTCFs, many will not observe precautions related to COVID-19, such as wearing masks and maintaining social distancing, and so are at higher risk of getting infected and infecting others [6].

Another unintended consequence of the pandemic is that nurses' aides are avoiding providing daily oral hygiene help for residents, because they are afraid of getting infected by the residents' saliva, which increases plaque levels in residents and results in more untreated dental disease [36].

LTCFs have improvised new infection control protocols as a result of COVID-19, such as forbidding group activities and reducing or barring visitors, which includes dentists and other non-salaried providers [6]. During these months of LTCFs lockdowns, elective dental treatment has been postponed, and the consequences will be increased severity of dental disease among residents [3].

The use of tele-dentistry has emerged as a method to triage residents either to monitor their dental problems, to prescribe analgesics or antibiotics, and, if necessary, to refer residents to a hospital with a dental department for extractions. There have been reports that neglected dental infections may result in a hospital admission requiring the administration of IV antibiotics for facial swelling due to a dental abscess [3]. However, some cognitively impaired residents are not easily transferred to a hospital. The policy of some LTCFs is that if a resident leaves the facility, the LTCF will require that the resident quarantines outside the facility for 14 days before he/she can return. Many families have become very stressed because they are unable to visit their family members who are residing in a LTCF and to safely provide healthcare for the resident outside of the facility.

6 The Integration of Oral Healthcare in LTC Services

In the 1980s, as a result of a federal class action lawsuit, due to decades of scandals caused by inappropriate care and lack of regulations, the Congress mandated a study of nursing home regulations, which was led by the Institute of Medicine. This resulted in the Omnibus Budget Reconciliation Act of 1987 (OBRA-87) [64]. These regulations required LTCFs to have a dentist affiliated with the facility and that each resident has a dentist of record and an annual dental in service [1]. Unfortunately, nursing home assessors did not routinely inspect each resident to determine their oral health problems; consequently, the nursing homes ignored these regulations. In 1990, Medicare and Medicaid introduced new regulations, including new standards of care, which were resident-focused and outcome-oriented. This process resulted in a range of new federal enforcement measures, which required Medicare and Medicaid to certify nursing facilities to use a standardized, reproducible, comprehensive functional assessment tool for all residents and to develop individualized care plans. As a consequence, the Resident Assessment Instrument (RAI) was developed under the supervision of the Health Care Financing Administration (HCFA), which included the Minimum Data Set (MDS) [64]. However, several studies have indicated that the MDS dental assessments identified very few oral health problems and that even when problems were identified, it did not result in dental care, as the nurse assessors still do not inspect the resident's oral health [6, 65].

It is clear that dentistry has been missing in geriatric interprofessional teams [66], in part because dental education has been separated from medical and allied healthcare training programs. The impact of oral health on the older patient's well-being is not fully understood by non-dental healthcare professionals. A possible

solution would be to develop geriatric interprofessional education (IPE) courses [67]. The World Health Organization (WHO) defines IPE as "when two or more professions learn with, about and from each other to enable effective collaboration and improve health outcomes." The WHO then defines interprofessional collaborative practice as "when multiple health workers from different professional backgrounds provide comprehensive services by working with patients, their families, caregivers, and communities to deliver the highest quality of care across settings" [68]. Interprofessional care for frail and functionally dependent older adults is critical due to the complexity of their healthcare needs and the small number of specialists available to consult and treat them [69, 70].

An example of a government sponsored program to improve the oral health of residents in LTCFs is Australia's "Better Oral Health in Residential Care Model." The basis of this program was to change the perception of healthcare workers that oral health was the responsibility of dental professionals and to make healthcare workers understand that it was the responsibility of the healthcare team. This model advocates for sharing roles among nurses, primary care providers, nurses' aides, and dental professionals to implement four key oral health-related processes, which "include oral health assessment, oral healthcare planning, daily oral hygiene support, and dental assessment and treatment" [71].

However, due to the existing limitations in geriatric clinical education in dental schools, many dentists are not familiar or comfortable using portable and mobile equipment to treat residents in LTCFs [72]. Many studies [50, 51] have shown that some dentists are prepared to care for these patients in their private practices but that can create problems for the patients and the LTCFs with regard to added stresses for the patients and transportation problems for the facilities. Another barrier for the dentist is that they are inadequately reimbursed for the additional time required to travel to and from the LTCFs and the extra time it takes to care for these older adults with frailty due to their limited ability to cooperate during treatment.

Possible strategies to mitigate these problems to train and allow allied oral healthcare professionals, such as expanded function dental hygienist and dental therapists, to provide care for the residents under indirect supervision of a consulting dentist [3]. The use of tele-dentistry to diagnose some oral lesions would reduce traveling time for the residents and dentists, allowing for more efficient and cost-effective care for this population [73].

7 Some Solutions to Problems Caused by COVID-19

Tele-dentistry (Fig. 9) has become an important tool to remotely assess frail and functionally dependent older adults who might not be able to come to the office due to COVID-19 and related isolation or quarantine [74]. This technology can be used to remotely assess a LTCF resident who has acute dental needs and is isolated. Such a resident may need a prescription for analgesics, or for antibiotics if there is any

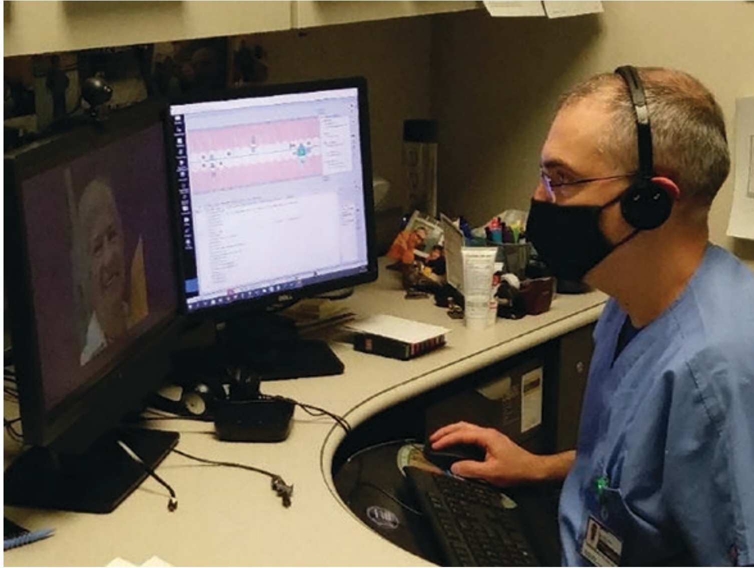

Fig. 9 A tele-dentistry consultation with a resident of a long-term care facility to determine her chief complaint, in order to decide if it is necessary for the dentist to visit the facility or if the resident needs to be referred to the dental practice. Please, note that she is a patient of record and that the dentist has access to her electronic dental records

sign of infection, such as facial swelling. If necessary, a referral may be required to transport the resident to a hospital emergency department that has a dental service.

Using this technology legally requires the dentist to appropriately identify the patient, e.g., by confirming their name and date of birth, which requires the dentist to have the patient's clinical records available. It may also require a staff member or the patient's legal advocate to be present in order to inform the patient/legal advocate about the limitations associated with tele-dentistry. At the end of the remote appointment using tele-dentistry, the dentist must keep detailed notes of the appointment. Dentists should avoid using tele-dentistry to consult with patients who are not patients of record, unless the patient has been referred to them.

Frail and functionally dependent older adult patients residing in LTCFs and their care providers should also be educated about the mitigation strategies that are being used in dental practices to improve infection control and aimed at minimizing COVID-19 transmission. These strategies include initial contact by telephone or tele-dentistry apps to identify the patient and their chief complaint, including asking about the existence of any COVID-19 symptoms. If the dentist refers the resident to his/her dental practice, the resident's temperature will be taken, and the accompanying person will be asked to maintain social distancing and to wear a mask. The dental provider will be wearing appropriate PPE, which will include a face mask and a shield, as well as a waterproof gown. Infection risks will be minimized by reducing aerosol generating procedures, such as the use of SDF and ART to manage caries, and hand scaling for periodontal maintenance. If aerosols need to be

generated, then the addition of extraoral high suction units can be employed to reduce the risk of aerosol-induced contamination.

Residents with dementia will have difficulties with tele-triage and the new protocols related to COVID-19. For instance, residents with dementia, who make up 48% of the LTCFs population [62], will react negatively to the use of face masks and shields by the clerical staff and dental providers (Fig. 10). This reaction can make providing dental treatment for these patients very disruptive. Many residents with hearing and vision problems will be unable to hear or lip read their dental provider if he/she is wearing a N95 respirator, a face mask, and a full-face shield [4].

Consequently, more older adults with dementia may need to be treated under general anesthesia (GA). The circumstances will depend on the patients' level of cognitive impairment, their disruptive behavior, and the type of dental care they need. Access to operating rooms for dental treatment under GA has been restricted in the past and has become extremely difficult due to COVID-19. A system for prioritization will need to be developed under these new conditions [75].

When dentists are allowed to reenter LTCFs to deliver elective dental care, they will need to use enhanced infection control precautions, such as inquiring if the

Fig. 10 Dentist wearing the appropriate PPE, which has evolved as a result of the COVID-19 pandemic

residents have had immunization for COVID-19 prior to the consultation. Additional measures should include improved decontamination of equipment and surfaces with 80% alcohol wipes. If aerosols need to be generated, the room being used should have the door closed, and the clinician will need to bring an extraoral high suction unit. Fogging protocols of the room should follow aerosol generating procedures, although this procedure has become controversial [3].

To support the required PPE and added equipment and supplies, reimbursement rates will need to be increased. Therefore, as a group the American Dental Association and other professional organizations will need to lobby third-party companies and government agencies to increase their reimbursement rates, if dental professionals are to safely care for these frail and functionally dependent older adults [3].

8 Conclusions

To be in compliance with OBRA-87, every LTCF should have a consultant dentist who has a contractual agreement with the facility to examine and treat all of the residents who consent to receive dental care. The consultant dentist should develop an oral health program for the institution together with the administrator, the director of nursing, and the medical director. Such a program should include:

1. Each resident should have a dentist of record included in their medical files.
2. An oral screening on or about the time of admission should be done by a dentist.
3. A yearly examination as required by the resident assessment instrument – minimum data set (RAI-MDS 2.0), either by a dentist or dental hygienist.
4. A yearly in-service for the nursing staff on an oral health topic, either by a dentist or dental hygienist.
5. All oral prosthesis should be marked with the resident's name or number.
6. There should be a customized written program of oral hygiene care for each resident, which includes:
   (a) The cleaning of teeth and/or dentures that should be performed daily, preferably by the resident, but if they are not competent, then by a staff member.
   (b) Modified or adapted toothbrushes for the resident's specific needs, if necessary.
   (c) An ultrasonic device for cleaning dentures.
   (d) The encouragement of residents to remove their dentures while sleeping, unless they are necessary to support a continuous positive airway pressure (CPAP) device.
7. If the resident requires treatment, then the treatment plan should follow the concepts of rational treatment planning, with the following priorities:
   (a) The highest priority is the relief of pain and the treatment of acute infection.

(b) Depending upon the life expectancy of the resident, dental treatment may be limited to emergency and maintenance procedures.
(c) Restoration of esthetics may be a valuable contribution to the emotional welfare of the family and the resident, even at the terminal phase of life.
(d) Restoration of function should be a priority taking into account what treatment is in the best interest of the residents after evaluating all their modifying factors.
(e) All other treatment is elective depending on the needs and expectations of the residents and their families.

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