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Parkinson's disease: considerations for dental hygienists

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Abstract: The prevalence of Parkinson's disease (PD) is expected to double over the next 20 years owing to the increase in life expectancy. This progressive disease has several implications relating to oral health, and many are manageable with proper awareness and knowledge about the disease. This article reviews the epidemiology, pathophysiology, and characteristics of PD, as well as the treatments and oral health considerations to enable dental hygienists to undertake an informed approach to patient management strategies and provide optimal care.

Key words: dental devices; homecare; medically complex patients; oral hygiene; Parkinson's disease; special needs; xerostomia

Introduction

A common neurodegenerative disorder, Parkinson's disease (PD), is characterized by limitations in both motor and non-motor skills as well as in neuropsychiatric symptoms (1–3). The detrimental effects associated with this progressive disease can significantly impact all aspects of life, with oral health being a top contender (1, 2).

Oral health is often neglected as a result of the disease's progression; however, it remains a key component to the well-being of an individual diagnosed with PD (1). In this article, key oral health factors will be explored and recommendations to maintain optimal oral health while coping with PD will be reviewed. Current research regarding the potential therapeutic benefits of pulp stem cells to assist with diseases of the central nervous system will also be briefly explored. Given the role that oral health plays in PD, it is of paramount importance for dental hygienists to be cognizant of oral manifestations associated with PD along with appropriate strategies for working with these individuals in an efficient, compassionate and caring manner. Appropriate dental hygiene management requires an understanding of disease aetiology, clinical characteristics, oral health treatment considerations, and pharmacological interventions.

Epidemiology

Parkinson's disease is second to Alzheimer's disease as being the most common neurodegenerative disorder (4). The National Parkinson Foundation (5) estimates that the worldwide prevalence of PD is four to six million. A 2005 study analysed the prevalence rates of PD among the five most populated countries of Western Europe and the top 10 most populated countries of the world. Total prevalence estimates indicated between 4.1 and 4.6 million people over the age of 50 were diagnosed with PD, and the prevalence is projected to increase twofold (between 8.7 and 9.3 million) by 2030 (6).

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Studies have not conclusively reported a correlation between ethnicity and the incidence of PD; however, research shows the incidence is higher in men (4). Mean age of onset is around 57 years; very few diagnoses are reported prior to age 40 and after age 85, yet a drastic increase in the number of cases occurs after age 60. Most cases reported before age 50 are linked to genetics, whereas later onset is more often associated with environmental factors (4, 7). Table 1 lists the aetiological contributing factors of PD development.

Familial aggregation studies have reliably demonstrated that genetics can play a role in the development of PD (4, 7). Environmental factors exhibit both consistency and inconsistency, depending on the agent (4, 7). Smoking is one factor that appears to have a protective effect on the development of PD. This inverse relationship is controversial among researchers because the biology cannot be explained; however, more often than not, studies have shown that the longer an individual has smoked, the less likely they are to develop PD (4, 7).

Exposure to pesticides has shown a positive correlation to the development of PD. More research is necessary to determine which specific pesticides provide the greatest risk (4, 7). High consumption of dairy products has also shown a positive correlation with the development of PD. These studies are limited in number, but consistent in their findings (4, 7). Exposures to metals, such as lead and manganese, have shown a possible association, but more research is needed. Another factor that may or may not play a role in PD development is hormonal influence (4, 7). Given that PD is more common in men, a study was carried out analysing women and their oestrogen levels. Results suggested that the earlier oestrogen was reduced in a woman's body, the higher the woman's risk of developing PD. Although this particular study showed a relationship, other studies have limited evidence and are inconsistent (4, 7). Several other environmental factors may increase the likelihood of PD, but research is limited at this time, and findings are less consistent. These environmental factors are included in Table 1.

Table 1. Aetiological contributing factors of Parkinson's disease

Age	+
Genetics	+
Environmental:	
Smoking	-
Pesticides	+
Dairy product consumption	+
Metals	L
Hormonal influence	L
NSAID usage	L
Vascular diseases	L
Diabetes	L
Magnetic field exposure	L
Chemical exposures	L

+, positive correlation; -, negative correlation; L, likely positive correlation.

References: 4, 8.

Characteristics

Symptoms of PD develop gradually and are highly varied. Impairments of both motor and non-motor skills are common with the four cardinal signs of PD involving motor impairment. These include the following: resting tremor, bradykinesia, akinesia, and postural instability (3, 8). The most common and apparent sign of PD, however, is resting tremor, which is typically seen in the hands, but can also express in one's arms, legs, jaw, tongue, forehead, or eyelids (4, 9, 10). The initiation of resting tremors is often unilateral presenting in one or two fingers while at rest. With disease progression, tremors become bilateral and occur during movement, as well as during periods of rest (3, 8).

Another cardinal sign, muscular rigidity or stiffness in body movement, starts to form as the disease progresses. This manifestation is found upon examination of the extremities, neck and trunk (1, 3, 8, 9, 11). Bradykinesia is one of the most disabling characteristics of PD and is often accompanied by hypokinesia and akinesia. The ability to perform activities of daily living is negatively impacted by bradykinesia, and walking, talking, speaking, oral self-care, and swallowing can become compromised (1, 3, 8, 9, 11). As movement becomes more challenging, postural instability may set in resulting in a festinated gait and a forward flexion of the upper body. Both of these characteristics change the centre of gravity and tend to cause issues with balance and coordination, which may lead to falls and injuries (1, 3, 8, 9, 11).

As a result of akinesia, a lack of facial expression is common, resulting in the development of a mask-like face. Typically not seen until the disease has advanced, an open mouth with limited blinking of the eyes is also common (3, 8). Once this has set in, sialorrhea is inevitable because of dysphagia (3, 9, 11). Because of hypokinesia affecting the muscles of speech production, speech is characteristically slow, monotone and slurred (9, 11). Sweating can become excessive or non-existent owing to the autonomic dysfunction, medication peaks and dyskinesia, resulting in thermoregulation issues (3).

Other common forms of non-motor symptoms include the following: constipation, hypotension, fainting, cramps, muscle aches and pains, olfactory dysfunction, sexual dysfunction, urinary/bladder dysfunction, visual dysfunction and various sleep disorders such as insomnia, sleep apnoea and restless leg syndrome (3, 8, 9, 11). The last form of non-motor impairment consists of neuropsychiatric symptoms, which include anxiety and/or depression, confusion, psychosis, memory loss, apathy, cognitive dysfunction and hallucinations (3, 4, 8, 9, 11). Age factors into the presentation of symptoms; younger individuals tend to have more advanced symptoms with faster progression compared with those that are diagnosed at an older age (8). Nearly 25% of all PD sufferers also meet the guidelines for having dementia (9).

Pathophysiology of PD

Parkinson's disease is a complicated disease of the central nervous system that is associated with the loss of dopaminergic

neurons in the substantia nigra of the basal ganglia. This loss results in fewer dopamine-producing cells and significantly impacts movement (3). The definitive cause of PD has not been determined; therefore, neurologists are still investigating whether other possible physiologic contributing factors exist (8).

Dopamine serves the role of an inhibitory neurotransmitter, and acetylcholine, which is dopamine's counterpart, acts as the excitatory neurotransmitter. These two neurotransmitters complement each other, and as long as the levels remain balanced, normal functionality exists (3, 8). When dopamine diminishes, the acetylcholine, although unchanged, is overpowering in an unbalanced state and the symptoms of PD are initiated (3, 8). Most often, the disease does not present itself until 60–80% of the neurons that carry the neurotransmitter dopamine are lost or destroyed, resulting in the deterioration of motor skills. In more severe cases of PD, research has shown that 90–100% of the neurons that carry dopamine are lost (1, 8, 12).

Although dopamine is produced in various parts of the brain, the substantia nigra is most closely associated with PD because its dopaminergic neurons send messages to the corpus striatum, which is a part of the midbrain and the forebrain. The corpus striatum handles motor function and the forebrain controls emotions, both of which are significant contributors to the symptoms of PD (8).

Treatments

Although medical advances for the management of PD symptoms have been significant, currently there are no available treatments or therapies to stop the development and/or progression of PD (9). Pharmacological interventions are designed to stimulate parts of the brain where dopamine functions and maximize the amount of dopamine that reaches the brain. Levodopa is considered the gold standard medication and is most commonly used, as the brain converts this drug into

dopamine. While levodopa is often quite effective, in some individuals the drug has diminished effectiveness over time (1, 13). Levodopa can be prescribed alone or in combination with other PD medications, such as carbidopa and entacapone. Many oral implications result from PD medications and include the following: xerostomia, bruxism, dry throat, gingivitis, tongue oedema, abnormal taste, glossitis and orthostatic hypotension (1, 9, 10, 13). Examples of other common PD medications include amantadine, benzotropine and biperiden (9). A complete list of common PD medications and their oral implications is found in Table 2.

Two surgical procedures are available to offset the symptoms, that is, an ablation procedure to disrupt the pathway of nerves and the implantation of a pacemaker-like device into part of the brain. The ablation procedures are not reversible, but they do tend to assist with minimizing tremors (9). Unfortunately, if a treatment was to become available, having the ablation procedure already carried out may inhibit the ability to have the newer treatment performed successfully. The pacemaker-like device sends electrical impulses to the part of the brain to help decrease the symptoms of PD. This procedure is more expensive, has more risk of infection, and the individual must be a candidate to undergo this procedure, but the implantation of this device has the advantage of being reversible (9).

The possibility of utilizing human foetal and pulp stem cells for treating PD in the future is under current investigation (9). Owing to ethical and legal issues, pulp stem cells are preferred because their accessibility in primary exfoliated teeth and extracted permanent teeth is great (9, 14–18). Researchers have found that pulp stem cells yield several neuroprotective and neurotrophic factors, high levels of colony formation and proliferative abilities, as well as self-renewal qualities, making them highly desirable as a PD therapy and/or treatment (14–20). Among the five current pulp stem cell types, dental pulp stem cells (DPSCs) and stem cells from human exfoliated

Table 2. Parkinson's disease medications and oral implications

Generic name	Xerostomia	Bruxism	Dry throat	Gingivitis	Tongue oedema	Abnormal taste	Glossitis	Orthostatic hypotension
Amantadine	X							X
Benzotropine	X							
Biperiden	X							
Bromocriptine								X
Cabergoline	X							X
Levodopa	X	X						X
Levodopa and Carbidopa	X	X				X	X	X
Levodopa and Entacapone	X	X				X	X	X
Pergolide	X							X
Pramipexole								X
Procyclidine	X							
Rasagiline	X							
Ropinirole	X			X	X		X	X
Selegiline		X				X		X
Trihexyphenidyl	X		X					

References: 1, 7, 10, 13.

deciduous teeth (SHED) demonstrate great potential to treat PD someday; however, more research is needed (16, 20, 21).

Oral health considerations

The promotion of health and the prevention of complications is a critical aspect of the treatment paradigm for patients with PD. Regular oral care is essential if the goal of optimal health and wellness is to be achieved. Patients are more prone to oral disease owing to the many physical and mental changes associated with the disease. Individuals with PD have more periodontal involvement, including gingival recession, tooth mobility and tooth loss, than individuals without PD. Also, PD populations have been found to have greater amounts of untreated dental caries and poorer oral hygiene than individuals without the disease (22–24). Table 3 lists common oral manifestations in patients with PD.

Given that prevention is a key component for maintaining oral health, once an individual is diagnosed with PD, a dental visit is necessary to create the best possible environment for the prevention and maintenance. A full review of the medical history and a comprehensive examination including radiographs should be performed (9, 10). Dental professionals may find it helpful to discuss the oral health status and needs with the patient's healthcare team, which may include a primary care physician, nurse, dietician and/or a speech and language therapist, and all family members and/or caretakers involved in assisting the patient. The coordination of care is an important component to help the patient in the most efficient and effective way possible (9, 13). Early treatment interventions are extremely important to prevent systemic complications from oral infection as well as complications when implementing dental hygiene care. Prompt interventions are also important because as the disease progresses, patients may not tolerate long amounts of chair time and as the disease progresses, patients have more difficulty with movement, making getting to the dental office difficult.

In an effort to be more empathetic to the patient, oral healthcare professionals must be cognizant of the psychological

Table 3. Common oral manifestations

Dental caries
Root caries
Periodontal disease
Attrition
Orofacial pain
TMJ discomfort
Cracked teeth
Erosion
Biting of tongue, lips or cheeks
Xerostomia
Mouth ulcers
Burning mouth
Denture retention issues
Dysphagia
Sialorrhea

References: 2, 7, 10, 13, 16.

toll this disease takes on many patients as well as its overall debilitating effects. The dental hygienist has a key role in assisting patients with maintaining their oral wellness, identifying oral manifestations, providing self-care education as well as modifying treatment to ensure safe, compassionate and effective dental hygiene care.

Dental caries and periodontal disease are exacerbated by multiple factors of PD. Given that the predominant population of those with PD is over age 50, root caries are also a significant concern owing to the greater number of exposed root surfaces associated with ageing (2, 13). The PD factors that increase the likelihood of oral disease include non-motor and motor skill loss, xerostomia, dysphagia, nutrition, poor oral self-care and access to dental care (2, 9, 10, 13).

Motor impairment

Bradykinesia, tremors and dyskinesia create a challenge in both homecare regimens and patient management. Long-term oral impacts of tremors include attrition, orofacial pain, discomfort of the temporomandibular joint, cracked teeth, and biting of the tongue, cheeks and/or lips (2, 9, 10, 24). To minimize attrition and teeth breakage from falls, fabrication and patient use of a mouthguard may be most beneficial.

Xerostomia

Xerostomia is one of the most common oral manifestations in individuals with PD and an instigator of both caries and periodontal disease. It is estimated that xerostomia affects approximately 55% of patients with PD owing to their prescribed medications (1, 9, 10, 13). Given that saliva helps cleanse the mouth, neutralize acidic environments, and promote the remineralization of enamel, having a decrease in both the quality and quantity of saliva can severely impact oral health (2, 13). In addition, speech is sometimes impacted by lack of saliva, which may complicate speech problems already incurred by the patient with PD owing to hypokinesia. Some individuals with PD and xerostomia complain of mouth ulcerations, oral discomfort and problems with denture retention (2, 9, 11, 13).

To help alleviate xerostomia, dental hygienists may recommend several strategies including sipping water frequently, utilizing sugar-free hard candies, and frequently chewing sugar-free, xylitol-containing gum (2, 13). However, many patients with PD may find chewing gum difficult because of the oral musculature dysfunctions associated with PD; therefore, other alternatives should be utilized, such as salivary substitutes or pharmaceuticals. Use of salivary substitutes made of carboxymethylcellulose, that possess a viscosity similar to saliva, can be very helpful as well as use of salivary substitutes containing fluoride to reduce caries risk (2, 13).

Pharmacological interventions may also provide relief of xerostomia. Two cholinergic agonist drugs, pilocarpine (Salagen®; Patheon Inc., Ontario, Canada) and cevimeline HCl (Evxac®; Daiichi Sankyo Pharma Development, Edison, NJ, USA), can significantly improve salivary flow in patients

experiencing hypofunction and hence provide many beneficial affects to the patient with PD by escalating the secretion of saliva (25).

Burning mouth syndrome is another common complaint in persons with PD, and it is often associated with xerostomia. Burning mouth syndrome is five times more likely in populations with PD than those without PD. Although burning mouth syndrome is most likely associated with levodopa medication which promotes parafunctional chewing, it may also derive from deficiencies in vitamins or minerals and hormonal imbalances (10, 13). The most common sites for burning mouth syndrome include the tongue, hard palate, lips and the alveolar ridge of edentulous individuals (10, 13). Managing burning mouth syndrome is often difficult because the causes vary. Possible treatments include the following: treating deficiencies such as iron and vitamin B, antifungal therapy, clonazepam, alpha-lipoic acid and cognitive behavioural therapy (26, 27). An individual suffering from xerostomia or burning mouth syndrome may be less inclined to eat, which can contribute to weight loss and denture issues (10).

Ill-fitting dentures and poor denture retention may stem from xerostomia, weight loss or structural changes of the mouth, all of which are common among individuals with PD (2, 13). When dentures do not fit properly and regular movement occurs, ulcers begin to form and discomfort develops. Poorly fitted dentures can significantly impact one's ability to eat and socialize, which are already challenges for some patients with PD (2, 13). Discomfort in the mouth may also contribute to a lack of oral hygiene self-care. The best way to avoid problems with traditional dentures is to have an implant supported denture or overdenture, which will allow for increased function and retention for the aforementioned problems and the issues that may result from tremors (13, 28).

Dysphagia/Sialorrhea

Dysphagia may impact health in many ways including weight loss, stress and fear while eating, a withdrawal when eating around others, and challenges with taking medications (10, 13). When an individual struggles with swallowing and has difficulty eating, their systemic and oral health may deteriorate, especially if they are not able to take their PD medications. Also, if individuals with PD are not comfortable around others, neuropsychiatric symptoms such as anxiety and depression may worsen.

Another common oral manifestation from dysphagia is acid reflux, which may cause perimylolysis tooth erosion, resulting in hypersensitivity. Advising the patient to swish with water instead of brushing for at least 30 min after an acid reflux episode may help reduce the amount of acidic harm to the enamel. The use of calcium phosphate technologies and fluoride can offset erosive damage by strengthening the enamel. Dysphagia may also lead to sialorrhea, which is related to poor lip closure and posture. Typically the saliva associated with sialorrhea is described as being thick and rope like (2, 13). The excessive salivation leads to frequent lip wiping, which commonly causes angular cheilosis (9, 10).

Nutrition

Nutrition is a challenge for most individuals with PD, leading to weight loss; therefore, frequent meals and snacks are suggested by physicians and dieticians (13). In many cases, the snacks are high in sugar, soft and sticky, making plaque removal more challenging. These factors will also significantly increase the risk of caries and periodontal disease. As previously mentioned, weight loss can lead to issues with dentures; therefore, nutrition plays a key role in denture retention (13, 24). One suggestion dental hygienists can offer is the consumption of nutritional drinks to help maintain proper nutrition and eliminate the frequent consumption of caries-causing snacks.

Oral self-care

Poor oral self-care is a significant contributing factor for dental disease among patients with PD. Compromised ability to perform oral self-care is related to impaired manual dexterity, as well as cognitive problems, apathy, depression and altered motor behaviour and fluctuations. Forgetfulness associated with dementia may also affect oral hygiene performance in many individuals with PD (13). As PD progresses, it is often up to a caretaker or family member to assume responsibility of oral hygiene because the patient with PD can no longer perform adequate oral self-care. Contributing factors leading to this dependence include tremors, bradykinesia and dyskinesia (2, 10).

Oral self-care instruction is of utmost importance, and each homecare regimen must be customized to the patient. If the individual can no longer independently care for themselves, whoever is responsible for their oral hygiene should demonstrate the technique utilized to allow the dental hygienist to make suggestions for improvement (9, 10).

Parkinson's disease individuals that are struggling with dexterity issues may find the use of powered toothbrushes and flossing devices very helpful. However, the noise from a powered device may frighten individuals with dementia; therefore, it may become a problem instead of providing a benefit. Also, the extra weight associated with a powered oral hygiene device may compromise the patient's ability to use it (9, 10, 13). As an alternative, manual toothbrush head designs such as the Surround® (Specialized Care Co., Inc., Hampton, NH, USA) toothbrush can be recommended if finances or weight preclude the purchase or use of powered devices. The Surround® toothbrush has bristles designed to surround the teeth to remove oral biofilm from the facial, lingual and occlusal surfaces simultaneously, reducing the number of brushing strokes required. For some patients, modifying the toothbrush by extending or enlarging the handle may prove helpful. These modifications can also be performed on flossing handles and proxybrushes (9, 10).

Although antimicrobial rinses can minimize oral infections, the oral musculature dysfunction experienced by many patients with PD may limit rinsing ability. In addition, rinsing may lead to aspiration. As a result, caution is advised when recommending mouth rinses (9, 13). For some patients, tooth-

brushes dipped in chlorhexidine or antimicrobial oral rinses used in an oral irrigation device may provide some antimicrobial benefits if rinsing is not possible. The use of fluoridated products and calcium phosphate technologies can reduce the risk of caries and help strengthen the enamel. Given that patients with PD are more likely to have recession owing to their age, the use of sodium fluoride may be best suited to reduce the risk of root caries.

Access to care

Another important contributing factor to oral disease is access to dental care. The top three inhibitors are finding a dental home, cost and anxiety (13). Given that individuals with PD have specific needs for care, finding someone to meet those needs may be challenging. The cost of care may impede following through with treatment.¹ Anxiety about treatment is impacted by both the motor and non-motor skills that PD affects. Tremors, bradykinesia, dyskinesia, dysphagia, sialorrhea, communication challenges, urinary incontinence and orthostatic hypotension are just some of the examples for why a PD sufferer may have anxiety towards receiving dental care (1, 2, 13). If finding a dental home or cost are issues, the local Department of Health office may be able to assist with locating an appropriate place to receive care. Once a dental home is found, relationship building can significantly reduce the anxiety around receiving dental care.

Patient management strategies

Patient management strategies when treating individuals with PD are important to ensure a compassionate, caring and effective appointment. It is ideal for dental hygienists to schedule the patient with PD 60–90 min after their medications have been taken as medications tend to be most effective in that time period, and more optimal conditions for rendering treatment will exist (1, 9). A stress-free, short, mid-morning appointment is often ideal as the slower movement associated with a patient with PD makes earlier appointments challenging. Stress may exacerbate tremors and uncontrolled movements making treatment more complicated. Ensuring adequate pain management to minimize stress and scheduling appointments in shorter increments may make treatment easier and more comfortable for the patient, resulting in a higher rate of treatment compliance (1, 10, 13).

Communication can present a challenge for both the dental hygienist and patients with PD. The mask-like facial expression associated with PD negatively impacts non-verbal communication methods, and verbal communication methods are compromised because of speech problems, which make patients with PD difficult to hear and listen to. A slower response time should be anticipated in many patients with PD as they struggle with both speech and cognitive ability. Dental

hygienists may find having the caregiver in the treatment area to interpret the patient's speech helpful. If patients with PD sense frustration, they may be inclined to shut down and give up on their attempt to speak (13). Communication may be enhanced with the use of questions that are closed-ended, only requiring a yes or no response. Allowing adequate time for the patient to answer the questions is also important (13). If the individual cannot communicate and someone else is representing them, always keep the patient a part of the conversation. Given that some individuals may not be able to communicate, informed consent may need to be obtained from a legal guardian or from the court system (9).

Providing a safe environment and comfort during dental hygiene care is paramount to ensure a stress-free appointment, patient cooperation and the return for routine care. Given that PD often leads to issues with thermoregulation, the temperature of the room may need to be adjusted and/or a blanket may be necessary to provide optimal comfort (9). Hygienists may wish to assist with a bathroom stop prior to seating the patient, as another consideration is urinary incontinence (1, 10, 13).

Patient positioning is dependent upon the severity of PD. If the individual has dysphagia, a semi-reclined position should be utilized (45° angle) to help avoid excessive saliva pooling in the mouth, which would increase the risk of choking or aspiration (9). Having an assistant present to help with patient stabilization and holding a high-speed suction may be crucial in the administration of safe and comfortable care (9). Also, the use of powered scaling devices and air polishers is contraindicated owing to swallowing difficulties. When problems with opening and muscle rigidity are present, mouth props and bite blocks can be most helpful and create a more pleasant experience for the clinician and the patient. Local anaesthesia may be used to increase the patient's comfort level, but only with caution because the loss of sensation will exacerbate dysphagia (9).

Cradling of the patient's head during treatment can help alleviate involuntary movements and create a safer work environment during scaling for both the patient and dental hygienist (9, 10, 13). Some circumstances may warrant the use of patient stabilization devices if uncontrolled involuntary movements create a safety issue for either the patient and/or the clinician during the provision of care.

At the completion of the appointment, the dental chair should be raised slowly owing to the prevalence of orthostatic hypotension. Once the patient is sitting up, allow for adjustment time (10, 13). If the individual moves too quickly, the chance of falling is increased because of the general difficulty with movement and postural instability. Additionally, assistance may be needed while walking to and from the operatory, entering and exiting the building, as well as when utilizing the restroom (3). Patients with PD should not be left alone at any point throughout their dental visit owing to dementia and the potential for confusion. To help provide adequate preventive care, individuals with PD should be on a 3–4 month recare (1, 24). At each prophylaxis visit, fluoride varnish should be

¹Many PD sufferers are retired and have limited, fixed income.

applied to help minimize decay, and prescriptions for fluoridated toothpastes and/or chlorhexidine gels or sprays may be indicated (9, 10).

In some cases, PD may have progressed to the point in which dental services can only be performed while the patient is under general anaesthesia (1). This decision should be discussed with all healthcare providers, caretakers and family members to make sure all individuals understand that this is the best treatment option for the individual with PD.

Conclusion

Parkinson's disease is a progressive central nervous system disorder characterized by tremors, rigidity and impaired motor function. Oral involvement is significant and affects the oral health status of the patient. Dental hygienists must be cognizant of the oral signs and symptoms as well as treatment and oral self-care modifications that are necessary to ensure optimal dental hygiene care is rendered in a safe, comfortable and efficient manner.

Conflict of interest

The authors declare that they have no conflict of interests.

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