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Reviewing the Prosthodontic Approach to Parkinson's Disease

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ABSTRACT

Parkinson's disease is a neurological condition characterized by symptoms including rigidity, tremors, postural instability, and bradykinesia. It affects approximately 6.3 million individuals worldwide, spanning various racial and cultural backgrounds. The impairment of motor skills and cognition impacts patients' diets, nutrition, and overall health, leading to compromised oral hygiene and an increased risk of dental issues such as caries, periodontitis, and eventually, edentulism. Compassionate care marked by attentiveness and empathy is essential in treating these patients, alongside educating their families about the disease. This article provides an overview of the causes, clinical manifestations, orofacial observations, and prosthodontic strategies for managing Parkinson's disease patients.

Keywords: Paralysis, Xerostomia, Over Denture, Implant

INTRODUCTION

Parkinson's disease, initially termed paralysis agitans and identified by Dr. James Parkinson in 1817, is a progressive neurodegenerative condition impacting muscle control, movement, balance, and various non-motor functions. Also known as Shaking palsy, it stands as the most prevalent movement disorder and the second most common neurodegenerative disorder. The reduction of neurotransmitters, including norepinephrine and dopamine in the basal ganglia, is implicated in the development of Parkinson's disease.[2,3]

METHODS AND MATERIAL

EPIDEMIOLOGY

Parkinson's disease typically manifests between the ages of 50 and 60, although it can also occur in middle-aged individuals. Its prevalence in the general population is 0.1%, but increases to 1% in those aged 65 and above. In Canada, approximately 100,000 individuals are afflicted with Parkinson's disease, while in the US, the National Institute of Neurological Disorders and Stroke (NINDS) reports around 1.5 million cases. Among those above 60, the prevalence ranges from 1 to 2%, escalating to 3 to 5% in those over 85. Annually, approximately 50,000 new cases are diagnosed in the US. Caucasians are more susceptible than individuals of Oriental Asian or black African descent, and men are affected twice as

frequently as women. While genetics and chemical exposure have been proposed as factors in some cases, their role remains limited according to some authors.

ETIOLOGY

The Parkinson's Disease Foundation identifies genetic and environmental factors as the primary contributors to Parkinson's disease. Ciarrocia et al. (2003) proposed a multifaceted causation, suggesting that the condition may stem from a combination of genetic predispositions, accelerated aging, head trauma, exposure to neurotoxic substances such as pesticides, or abnormalities in oxidative processes. Occupations such as welding, cleaning, or farming have also been associated with increased Parkinson's risk. Additionally, consuming water with elevated levels of heavy metals like mercury, iron, zinc, and manganese has been linked to a higher incidence of the disease.

CLINICAL FEATURES

Parkinson's disease typically begins gradually and initially affects one side of the body. The early symptoms include mild stiffness and tremors that occur when at rest, often manifesting as a characteristic "pill-rolling" movement of the thumb and fingers. Over time, these tremors can spread to involve the jaw, tongue, legs, and face. Allen and Leuck noted that patients with Parkinson's disease often adopt a flexed posture due to muscle rigidity, which can also lead to difficulties initiating both voluntary and involuntary movements, a condition known as akinesia. These patients often exhibit a distinct walking pattern characterized by slow, shuffling steps and a stooped posture, with shorter strides even when walking quickly. Autonomic dysfunctions are common in Parkinson's patients and can include fluctuations in blood pressure, bladder and bowel dysfunction, and excessive sweating.[8]

OROFACIAL FEATURES

These patients display a characteristic "mask-like" facial appearance due to diminished facial muscle movements. Additional symptoms include pursing of the lips, thrusting of the tongue, and a soft, barely audible voice due to rigidity. Eating becomes prolonged due to decreased tongue mobility, slow chewing, and difficulty swallowing (dysphagia). Medications can alter the patient's perception of taste. Saliva may dribble from the corners of the mouth, leading to angular cheilitis, foul odor, and skin irritation. Choking hazards arise from food and saliva accumulation at the back of the throat. Tremors in orofacial muscles and the use of Levodopa medication may induce teeth grinding (bruxism), tooth wear (attrition), and occasionally cracked teeth. Dry mouth (xerostomia) is another common symptom of Parkinson's disease resulting from medications such as anticholinergics, Levodopa, and dopaminergics. Approximately 25% of Parkinson's patients experience Burning Mouth Syndrome, characterized by a burning sensation affecting various oral tissues including the hard palate, tongue, cheeks, lips, and edentulous (toothless) areas, regardless of the patient's dental status (dentate, edentulous, or denture wearer).[9]

PROSTHODONTIC MANAGEMENT

Physician consultation is necessary before any adjustments to the treatment plan are made prior to commencing dental procedures. Patient or caregiver consent must be obtained in

writing. Scheduling early morning appointments is recommended as symptoms are typically least troublesome 60 to 90 minutes post-medication. Appointments should be kept under 45 minutes in duration. Patients should empty their bladder to prevent incontinence and urinary urgency, and they should be seated upright to prevent orthostatic hypotension.

Patients may exhibit anxiety or frustration, which can be managed through relaxation and diversion techniques. Dentists may need to reintroduce themselves each time, use concise language, simplify vocabulary, and avoid wearing face masks for better communication. Direct eye contact, smiling, and gentle touch can foster rapport. Caregivers should be permitted to accompany the patient to alleviate anxiety.

Due to difficulties in maintaining mouth opening, patients may experience drooling and interference from tongue and head movements during treatment. Intraoral rubber bite blocks or extraoral ratchet props can aid in keeping the mouth open comfortably. A 45-degree reclined chair position is preferred to facilitate swallowing, with regular aspiration of saliva using an aspirating tip under the rubber dam.

Patients with impaired manual dexterity face challenges in oral hygiene maintenance. Advice regarding tooth brushing, flossing techniques, and fluoride application should be provided to both the patient and their caregiver to ensure proper oral health care.8

Removable Prosthodontics

Due to excessive saliva drooling, tremors, and rigidity of the muscles in the mouth and face, patients often struggle to control and keep their dental prostheses in place. This leads to compromised retention, stability, and support of the prosthesis, particularly in severe cases. It's advisable to use quick-setting impression materials to accurately capture the impression in such scenarios. Additionally, training the patient to use wax and compound for recording jaw relations is essential. Techniques such as the flange technique and neutral zone techniques, along with employing a monoplane occlusion, are recommended to ensure maximum intercuspation and avoid interferences, thereby enhancing stability and retention of the denture.

Turner et al suggest the use of artificial salivary substitutes and moisture-based denture bases for patients experiencing severe dry mouth. Metal denture bases or high-impact denture base resins are preferred in such cases. Prescribing denture cleansers and ensuring proper oral and denture hygiene through regular inspection are crucial for maintaining overall oral health.[15]

Fixed Prosthodontics

Supra-gingival or equi-gingival margins are preferred for preparations. Full coverage restorations should be provided for optimal retention and resistance. The use of rubber dam and suction aids is mandatory, especially in cases of saliva drooling. Al Hamad et al. (2008) recommended gingival sulcus retraction using an expanding Vinyl polysiloxane. Over-contouring of the prosthesis should be avoided to prevent plaque accumulation and subsequent gingival hyperplasia. Patients with bruxism should receive resin-fused-to-metal or gold bridges. Both the retainers and pontic of the prosthesis should be designed for self-

cleansing. Resin cements should be used for cementing fixed partial dentures to reduce microleakage.

Implant Surgeries

Implant-supported prostheses have significantly enhanced both the overall and oral health of patients, along with improving their chewing ability. Additionally, employing magnetic attachments in mandibular overdentures proves highly beneficial to patients due to the ease of insertion and removal.[19]

CONCLUSION

As previously mentioned, Parkinsonism is a progressive condition that affects the muscles of the face, pharynx, tongue, and palate. Treating individuals with this condition can be challenging due to the behavioral and psychological aspects associated with the disease. However, success in prosthesis treatment can be achieved through a meticulous approach and careful handling of the patient during treatment. Providing patient education and motivation regarding post-insertion instructions is crucial for ensuring long-term treatment success.

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