

## Prosthodontic considerations in Parkinson's disease

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### Abstract:

Parkinson's disease is a neurological disorder characterized by tremors, rigidity, bradykinesia and postural instability. The prevalence of this disease varies greatly throughout the world, though India has low prevalence but in Parsi community of Mumbai, its prevalence is 328.3 per 100,000. The incidence of disease increases with age. The physical disability of these patients compromises their daily activities including food intake and oral hygiene. Due to poor oral hygiene the extent of dental caries and edentulism increases therefore, the number of these patients attending dental clinic is increasing. This article reviews the clinical features, orofacial findings and the Prosthodontic management of such patients.

**Key Words:** Parkinson's disease, Saliva, Dentures, Implants.

### Introduction:

Parkinson's disease (PD) is a neurodegenerative disorder affecting the adults in middle and late life. It is characterized by tremors, slowness of movements (bradykinesia), muscle rigidity, postural instability, gait disturbances and ultimately affecting their day to day life as described by James Parkinson in 1817, Parkinson's disease is caused by depletion of neurotransmitters, dopamine and nor-epinephrine in the basal ganglion.

The etiology of this disease could be as a result of combination of accelerated aging, genetic predisposition, exposure to pesticides or neurotoxins, head injuries or an abnormal oxidative mechanisms (Ciarrocca et al, 2003). This condition develops usually after 40 years of age or later. It affects both the genders equally, with an incidence of 1 in 100 over the age of 60 (Packer et al, 2009). Parkinson's disease starts slowly and is unilateral to start with. Mild stiffness and resting tremors are the early signs of the disease. There is a typical 'pill-rolling' movement between thumb and fingers the tremors spread to the legs, face, tongue and mandible. These patients show inability to initiate voluntary and involuntary movements (akinesia) and exhibit flexed posture due to rigidity (Allen & Lueck, 2002).

Patient's gait is often slow, shuffling with a stooped posture and they tend to walk faster with shorter steps. Many of these patients develop autonomic dysfunctions like variations in blood pressure specially orthostatic hypotension cardiac dysrhythmias, excessive sweating and bladder & bowl dysfunction.

These patients may also develop sleep disturbances Certain behavioural disturbances like depression cognitive impairment and dementia may occur in these patients. Psychosis may develop due to dopaminergic medications (Friedlander et al, 2009). As this disease progresses the patient's ability to maintain his oral hygiene is hampered and chances of losing teeth are more. Hence these patients need more help from the dentist and the care givers.

### Orofacial findings:

Face of patients with Parkinson's disease has a typical "mask like" appearance due to reduction in the movements of the small facial muscles. The voice changes to soft, hurried, monotonous, mumbling and ultimately become whispering as a result of rigidity. The taste is altered because of medications and need more time to consume food, due to slow chewing movements, reduced tongue movements and difficulty in swallowing. Drooling of saliva from the corners of the mouth is followed by angular cheilosis, skin irritation and foul odour as a result of inability to swallow, close the mouth fully and anterior bowed head position. Bruxism, attrition and some cracked teeth are due to the orofacial musculature tremors and levodopa medications (Friedlander et al, 2009). Poor oral hygiene and xerostomia increases the chances of dental caries and periodontal diseases (Packer et al, 2009).

Burning mouth syndrome affects 24% of the Parkinson's patients. Burning sensation of the tongue, hard palate, floor of the mouth, lips, cheeks and edentulous alveolar ridge are noted, whether the patient is dentulous or edentulous, removable denture wearer or dentate subjects (Clifford et al, 1998).

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**Prosthodontic management:** Before starting the treatment, the dentist has to consult the patient's physician for any modification in the treatment plan. An informed consent by the patient or caregiver has to be obtained. These patients should be scheduled for short appointments of less than 45 minutes early in the morning as the symptoms are least bothersome 60 to 90 minutes after the administration of the drugs. Patient should empty his/her bladder to prevent urinary urgency and incontinence.

The dental chair should be raised slowly so that the patient is adjusted to the upright sitting position to prevent orthostatic hypotension. In some patients to prevent anxiety or frustration behaviour, the dentist has to identify himself each time, use simple words, short sentences and limit the use of face mask; smiling, direct eye contact and gentle touch may help. Patient's caregiver can sit next to the patient to reduce the anxiety. Relaxation and diversion methods can be implemented to reduce the stress (Corah et al, 1979). If the patient is uncooperative then intravenous sedation or general anesthesia can be given.

Patients of Parkinson's disease cannot keep their mouth open, there can be drooling of saliva and tongue and head movement may interfere with the treatment. To keep the mouth open, an extraoral ratchet-type prop or intraoral rubber bite block may help. To facilitate the patients swallowing, the dental chair can be inclined to around 45 degree and an aspirating tip can be placed under a rubber dam to aspirate the saliva.

Oral hygiene maintenance is compromised in these patients because of their impaired manual dexterity. Patients should be advised for tooth brushing, flossing methods and application of the topical fluoride if the patient cannot maintain his oral hygiene. If the patient cannot perform his oral hygiene then the instructions should be given to the caregivers (Friedlander et al, 2009).

**Removable prosthesis:** Patients of PD have difficulty in controlling and retaining the dentures due to tremors, rigidity of the orofacial musculatures and drooling of saliva. Therefore, the denture retention, stability and support are compromised. Impressions should be recorded with quick setting impression materials especially in severe form of PD. Patients being treated for complete denture, wax or compound should be used for recording jaw relations (as it registers

instantaneously) after proper training. Patience and practice helps in improving the coordination. Jaw exercises are helpful. Neutral zone technique, flange technique and selective grinding of the occlusion (to remove the interferences) to obtain the maximum stability and retention of the dentures are useful techniques. If the patient has xerostomia (as a result of side effect of the drugs) then the dentist can take the opinion from physician for the change of drugs. Moisture based denture adhesives or artificial salivary substitutes can be prescribed depending on the patient's manual disability and xerostomia (Turner et al, 2008). The dentures should be fabricated by using metal denture base or high impact denture base resin. Patient's oral hygiene and denture cleanliness is to be followed efficiently. Denture cleansers can be prescribed for cleaning the dentures.

In removable partial dentures, the major connectors should not be of smaller design so as to prevent its aspiration and choking. Denture retainers should be designed for adequate retention. Precision attachments are not advocated as the patient lacks the necessary stable movement for insertion of the prosthesis. Flexible dentures (valplast), a recently available prosthetic material for removable partial dentures provide good retention and stability, but its effect on the tissue surface has to be studied.

Overdentures can provide better masticatory efficiency as compared to patient wearing conventional complete dentures. Abutments used for overdentures should be self cleansing. The metal copings should be cemented by using resin cement so as to reduce the microleakage. Magnets can be used for easy placement of these dentures.

**Fixed partial denture:** The margins of the preparations are to be kept supragingivally or equigingivally. Full coverage design is followed for maximum retention and resistance. Suction aids, and rubber dam are essential if there is drooling of saliva. An expanding vinyl polysiloxane gingival retraction material can be used for retraction of the gingival sulcus (Al Hamad et al, 2008). Over contouring may cause plaque accumulation, followed by gingival hyperplasia. If the patient has bruxism then resin fused to metal or gold bridge can be advocated. The contours and contacts of the pontic and retainers should be self cleansing. Resin cement should be used for cementation for fixed partial dentures as it reduces the microleakage.

**Implant Surgery:** Implant surgery and the required anesthesia appears to be the safe procedure. The quality of oral health and general health has improved by using dental implant supported prosthesis and is associated with marked increase in masticatory ability (Heckmann et al, 2000; Packer et al, 2009). Mandibular overdenture with magnetic attachment can be utilized as it is easy for insertion by the patient or by the caregiver (Chu et al, 2004).

Depending on the patient's physical disability, intravenous sedation or general anesthesia can be administered. Local anesthesia containing epinephrine must be cautiously administered if the patient is treated with levodopa and entacapone, as it may lead to an increase in blood pressure and heart rate. Epinephrine of less than 0.05 milligram appears to be safe as is found in three cartridges of 2% lidocaine with 1:100,000 epinephrine per 30 minutes period, with careful aspiration to avoid intravascular administration. Monitoring of the patients vital signs are mandatory. Dentist should be careful when prescribing erythromycin and ampicillin, as they are known to interfere with biliary excretion. Meperidine hydrochloride should not be given with Monoamine oxidase inhibitor (MAOI), selegiline and rasagiline as it leads to toxic interactions like hyperthermia, hypertension and tachycardia. Monoamine oxidase inhibitor potentiates the action of narcotic drugs. Therefore, if narcotic drugs are to be added then they should be given in half the dose.

### Conclusion:

Parkinsonism is a disease which affects the muscles of the face, tongue, palate and pharynx and limits the treatment planned to assist mastication, deglutition, speech and esthetics. The disease should be identified and the treatment should be started at an early age as the disease is progressively debilitating. Proper education and motivation is equally important for these patients and the caregiver regarding the prosthodontic treatment.

### Bibliography:

1. Al Hamad KQ, Azar WZ, Alwaeli HA, Said KN: A clinical study on the effects of cordless and conventional retraction techniques on the gingival and periodontal health. *Journal of clinical Periodontology*, 2008;35(12):1053-1058.
2. Allen C M C, Lueck C J: Neurological disease. In:

- Davidson's principles and practice of medicine. C. Haslett, ER Chilvers, NA Boon, NR Colledge, Eds.; 19<sup>th</sup> Edn.; Churchill Livingstone, New Delhi, 2002;pp:1174-1177.
3. Chu FCS, Deng FL, Siu ASC, Chow TW: Implant-tissue supported, magnet retained mandibular overdenture for an edentulous patient with Parkinson's disease: A clinical report. *The Journal of Prosthetic Dentistry*, 2004;91(3):219-222.
4. Ciarrocca KN, Greenberg MS, Garfunkel A: Neuromuscular diseases. In: Burket's Oral medicine: Diagnosis and treatment. MS Greenberg, MG luck, Eds.; 10th Edn.; Harcourt (India) Private Limited, New Delhi, 2003;pp:597-598.
5. Clifford TJ, Warsi MJ, Burnett CA, Lamey PJ: Burning mouth in parkinsons disease sufferers. *Gerodontology*, 1998;15(2):73-78.
6. Corah NL, Gale EN, Illig SJ: The Use of relaxation and distraction to reduce psychological stress during dental procedures. *Journal of the American Dental Association*, 1979;98(3):390-394.
7. Friedlander AH, Mahler M, Norman KM, Ettinger RL: Parkinson disease systemic and orofacial manifestations, medical and dental management. *Journal of the American Dental Association*, 2009;140(6):658-669.
8. Heckmann SM, Heckmann JG, Weber HP: Clinical outcomes of three parkinsons disease patients treated with mandibular implant overdentures. *Clinical Oral Implants Research*, 2000;11(6):566-571.
9. Packer M, Nikitin V, Coward T, Davis DM, Fiske J: The potential benefits of dental implants on the oral health quality of life of people with Parkinson's disease. *Gerodontology*, 2009;26(1):11-18
10. Turner M, Jahangiri L, Ship JA: Hyposalivation, xerostomia and the complete denture- A systematic review. *Journal of the American Dental Association*, 2008;139(2):146-150.