

**PROSTHESIS GIVEN IN PARKINSONIAN PATIENT: A CHALLENGE**Sidra Aslam\*<sup>1</sup> and Mohd Aswad Khan<sup>2</sup><sup>1,2</sup>BDS Final Year Student Dr. Ziauddin Ahmad Dental College AMU Aligarh.**\*Corresponding Author: Dr. Sidra Aslam**

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**ABSTRACT**

As defined by James Parkinson -Parkinson's disease (PD) is a neurodegenerative disorder affecting in middle & late life adults which is characterized by tremors, slowness of movements, postural instability, gait disturbances, muscle rigidity, & ultimately poignant their day to day life. The etiology of this disease could be because of Genetics & Environment. Epidemiology is also taken into consideration. Paper enlightens about Systemic manifestation associated with disease as well as due to medication like Psychosis develops due to dopaminergic medications. Oral manifestations are studied to make treatment planning feasible & to avoid blunders during procedure. General management like History taking, Consideration before treatment, Chair positioning etc. are also focused. Prosthodontics management includes giving cd, overdenture, rpd, fpd, implants & Implant surgery & occlusal splint. Proper awareness & education both to patients & caretakers plays crucial role. Prosthetic Management of such patients is a sign of success of Dentistry.

**KEYWORDS:** Parkinson's disease (PD), Complete Denture (CD), Overdenture, Removable partial denture (RPD), Fixed partial denture (FPD), Implants.

**INTRODUCTION**

In 1817, James Parkinson described Parkinson's disease (PD) is a neurodegenerative disorder affecting in middle & late life adults & PD also, called as paralysis agitans / shaking palsy. It is characterised by tremors, slowness of movements (bradykinesia), postural instability, gait disturbances, muscle rigidity, & ultimately affecting their day to day life. PD is the commonest movement disorder & also the second commonest neurodegenerative disorder. Pathophysiology by parkinson disease foundation- main finding in brain of Parkinson disease is loss of dopaminergic neurons in brain Known as 'substantia nigra'. parkinson disease is caused by depletion of dopamine & nor-epinephrine or neurotransmitters in the basal ganglion. The decrease level of the neurotransmitter or dopamine affects the transmission of nerve impulses related to muscular activity.

**Epidemiology**

(1) It typically starts during middle & old age, As 55 -65 years is peak age. (2) As per new data given by WHO, number of new cases PD occurs is about between 16-19 per 100,000 persons. (3) As reported by National Institute of Neurological Disorder & Strokes (NINDS) the percentage for the age group above 60 years is 1-2% (4) When it seen before the age of 50 then it is called as young-onset PD. (5) In 2015, PD affected 6.2 million people & resulted in about 1,17,400 death globally. India, among the all the country have lowest incidence of

PD (70 out of a 100,000). (6) Men shows predilection over female with ratio of 1.5:1.

**Etiology**

Per the Parkinson's Disease Foundation, two major factors contributing for PD are

- a. Genetics
- b. Environment

**Systemic manifestation**

The systemic manifestations that are characterised for PD are

- 1) **Tremor** (trembling in, arms, hands, legs, face with jaws)

"Head tremor" involves face, Mandible, tongue etc. which creates problem during prosthodontics treatment. "Pill-rolling" movement between thumb and fingers is the typical feature of Parkinson's disease.

- 2) **Rigidity** (stiffness of upper & lower limbs with trunk)

- 3) **Bradykinesia** (slowness of movement) & Akinesia (reduction in muscle movement)

leads to infrequent blinking, as well as posture and gait abnormalities, such as rapid, short, shuffling steps

- 4) **Postural instability** (poor balance and coordination)
- 5) **Pain** [musculoskeletal, sensory (burning, numbness, tingling)

- 6) **Akathisia** (subjective feeling of restlessness)

- 7) **Bowel and bladder dysfunction** (e.g. constipation and bladder urgency/frequency)

- 8) **Tardive dyskinesia** (involuntary repetitive body movements includes sticking out the tongue, smacking of the lips.)

Other symptoms of PD are increased difficulty in writing, which results in micrographic (tiny script). Cognitive impairment of memory and concentration occurs to a variable degree. Mood disturbances (depression, anxiety, apathy) and insomnia, and fatigue are common. Dementia occurs in approximately 25% of patients/clients.

#### **10 Early Sign of Parkinson's Disease as Described by Parkinson's Disease Foundation**

- (1) Tremors
- (2) Small Hand writing
- (3) Loss of Smell
- (4) Trouble sleeping
- (5) Trouble moving or walking
- (6) Constipation
- (7) A Soft or Low Voice
- (8) Masked Face
- (9) Dizziness or Fainting
- (10) Stooping or Hunching over

#### **Appearance**

These are the following typical appearance features of PD.

Stopped posture, Flexed elbow & wrists, Trembling of extremities, Forward tilt of trunk, Stiffness or Reduced arm swinging while walking, Slightly flexed hips & knees, Shuffling, short stepped gait.

#### **Pharmacological manifestation**

Anticholinergic, Dopaminergic medication like levodopa is the commonly used medicine used in PD patient, but have its own manifestation like

**Drug induced psychosis** (associated to dopaminergic drugs).

PD medications are cause for nausea, tardive & dyskinesia (involuntary repetitive movements of facial, buccal, oral, and cervical muscles).

**Bruxism, attrition and some cracked or fractures of teeth** (it may due head tremor or due to levodopa).

**Burning mouth syndrome** cause burning sensation of the, hard palate, tongue, floor of the mouth, lips, buccal mucosa and edentulous residual alveolar ridge are noted affect 25-30% of PD patient.

**Xerostomia** (higher risk of dental caries and periodontal diseases).

The taste is altered because of medications.

#### **Oral manifestation**

Person suffering from PD shows different oral conditions are 1) typical "mask like" appearance due to decrease facial muscles activity. 2) have lip pursing & Tongue thrusting habit. 3) The voice changes to soft, hurried, barely audible voice with pitch monotony due to laryngeal muscle rigidity. 4) Need more time to consume food, due to slow chewing movements, reduced tongue movements and dysphagia. 5) Sialorrhea & Drooling of saliva from the corners of the mouth which leads to angular cheilitis, skin irritation and foul odour. 6) Food and saliva may get collected at the back of the tongue, resulting in choking. This is due to inability to swallow and anterior bowed head position.

#### **General management during prosthodontics treatment**

##### **a) Consideration before Treatment**

Patient's physician consultation is requires for any modification in the treatment plan.

An informed consent has to be obtained by the patient or caregiver short appointments of less than 45 minutes early in the morning are scheduled for patient as the symptoms are least pronounced 60 to 90 minutes after taking drugs like levodopa.

Bladder should be empty it will prevent any urinary urgency during procedure.

As the disease progresses, and the time passes the response of patient to PD medication decrease and therefore the role of dental hygienist become more realistic and productive.

##### **b) Chair Position**

orthostatic hypotension can be prevent by slowly raising dental chair so that the patient is in upright sitting position.

Semi reclined position is advocated for the patient have poor salivary control, & position is such that it avoids airway obstruction, pooling of saliva, and aspiration.

An aspirating tip helps to aspirate the saliva which can be placed under rubber dam

##### **c) Doctor/ Dentist Features**

To prevent frustration or anxiety behavior, The dentist must identify himself to patient each time, use simple words, short sentences, limit the use of face mask (if possible) smiling, direct eye contact, gentle touch may help.

##### **d) Role of dental hygienist/ Role of Caregivers**

Parkinson's patient can't able to maintain their oral hygiene due to Parkinson's symptoms. So, oral hygiene will be maintained by caregivers/ hygienist.

Tooth brushing, flossing methods and application of the topical fluoride should be advised with proper medication on time.

#### e) Use of Physical Restraints

The main concern with PD patient is Maintenance of body stability, due to presence of Parkinson's symptoms like tremors and/or choreiform (rapid jerky) movements.

So, the patient need to be secured to dental chair with help of restraints or support devices, likes belts, soft ties, or pillows.

#### f) Salivary Substitutes

❖ Xerostomia is main side effect for patient used common PD drugs used during treatment

(1) Substitutes of Saliva are prescribed to PD patient like methylcellulose etc. (2) substitutes help in reducing dysphagia and also improve denture stability & retention. (3) Topical fluoride can be prescribed for the prevention of root caries.

#### g) Anxiety Control

Post-Operative pain and anxiety control.

Preoperative and postoperative vital signs and anxiety control.

To control the stress/ anxiety different can be implemented like Relaxation and diversion methods.

Sedation techniques may require to patient with the use of levodopa or its derivatives because it associated to choreiform movements, dyskinesia, and tremors.

Minimum waiting time for the procedure.

#### h) Local anaesthesia (LA)

LA Containing epinephrine should be administered cautiously in the patient, which are on levodopa and entacapone, as it may lead to an increase in blood pressure and heart rate.

LA only eliminate Parkinson's symptoms in area directly affected by it.

For patients taking Levodopa, halothane which sensitize the heart to the action of catecholamine should be avoided as they can precipitate Arrhythmias. If sedation is required Diphenhydramine is useful particularly because of its anticholinergic activity.

#### Prosthodontics management

- 1) Complete denture
- 2) Over denture –
  - a) Tooth supported
  - b) Implant supported
- 3) Implant and implant surgery
- 4) Removable partial denture
- 5) Fixed partial denture

- 6) Occlusal splints

#### Complete denture

##### a) Problems in PD patient

Patients of PD have difficulty in retaining & controlling the dentures due to- Tremors, Rigidity of the orofacial musculatures, Drooling of saliva.

Therefore, the denture, stability support and retention are compromised.

##### b) Features of Treatment for PD Patient

(1) impression material used for taking impression must have quick setting property especially in case of severe form of PD. (2) proper training should be given to patient for recording jaw relation. Patience and practice help in improving the coordination. (3) Monoplane teeth are generally selected to compensate for the oro-buccal Dyskinesia. (4) The dentures should be fabricated by using metal denture base or with reinforcements or high impact denture base resin.

##### c) Technique of Treatment

- For maximum retention & stability
  1. Neutral zone technique,
  2. Flange technique
  3. Selective grinding of the occlusion (to remove the interferences)

##### d) Prescription for Patient

Moisture based denture adhesives. Like fixon.

Artificial salivary substitutes can be given on the patient's manual disability and xerostomia e.g. methylcellulose mouth wash or other moisture absorbing material.

Denture cleansers can be prescribed for cleaning the denture.

#### SO ACCORDING TO BOUCHER & ZARB

Clinical presentation as excess or diminished movement may be hyperkinetic (bruxism, dystonia, dyskinesias) or hypokinetic like in Parkinson's disease with the reduce ability of patient control muscular movement of the jaws thereby seriously impact the prognosis for complete denture therapy.

So, we have other option for complete denture like overdenture it may be in form of tooth supported, if patient have some teeth or it may implant supported.

#### Overdenture

It has been classified as

##### a) Tooth supported

Non-Coping

Coping

Attachment

**b) Implant supported****a) Advantage of Overdenture over conventional denture**

(1) In comparison to conventional complete dentures in PD patient it provides better masticatory efficiency. (2) Have better retention and support, (3) Over denture with magnetic attachment can be used as, it is easy for insertion by the patient and by the caregiver have better retention

**b) Requirement for Over Denture**

Abutments used should be self-cleansing in case of overdentures.

The metal copings should be cemented by using resin cement to reduce the microleakage

**c) Implant Based Over Denture**

Provide added retention.

**d) Contraindications Of Tooth Supported Over Dentures**

Caries susceptible (due to xerostomia).

Demand for meticulous oral hygiene (which is big problem in PD patient, so oral hygiene should be maintain by caregivers).

**Implants & implant surgery****a) Implant supported over denture**

Implant based denture the denture body can be connected to the implants (generally 2) using a variety of connectors, such as

- i. Bar connections,
- ii. Single spherical attachments (otherwise known as ball anchors),
- iii. Magnets,
- iv. Rigid or cylindrical telescopic copings
- v. Non-rigid telescopic copings (resilient copings).

**b) Implants**

Implant may also support the other prosthesis like crown, bridge, facial prosthesis etc.

The quality of oral health and general health has improved by using dental implant supported prosthesis shows a marked increase in masticatory ability.

Implant surgery and the required anesthesia appears to be the safe procedure as chance of tremors & the complication of associated with tremors is minimized.

**c) Contraindication of implant**

Systemic disease like diabetes, clotting disorders etc. the implants are contraindicated.

**Removable Partial Dentures****a) Features of RPD**

- (1) The design of major connectors should not be small,
- (2) Denture retainers should be designed for adequate

retention, (3) There is lack in coordination for insertion of the prosthesis so, Precision attachments are not used in the patient.

**b) New Materials For RPD**

Some flexible prosthetic materials are available for the purpose of RPD which provide better stability & retention but its effect on the tissue surface must be studied like valplast, lucitone.

**c) Contraindication of RPD**

Small RPD of 1 or 2 teeth should not be given to prevent its aspiration and choking during tremors.

**Fixed Partial Denture****a) Features of Treatment**

(1) The marginal preparations should be kept equigingival or supragingival (2) Full coverage design is followed for maximum retention and resistance, (3) The contours and contacts of the pontic and retainers should be self-cleansing (Over contouring may cause plaque accumulation, followed by gingival hyperplasia), (4) Telescopic crowns can also be given as they reduce lateral stress on abutment teeth by allowing stress release or stress conversion crown in case of bruxism Porcelain fused to metal (PFM) or gold bridge can be advocated

**b) Cementation of Crown**

Resin cement should be used for cementation for fixed partial dentures as it reduces the microleakage & chance of detachment

**Occlusal splint**

Occlusal Splint defined as a removable artificial occlusal surface used for diagnosis or therapy affecting the relationship of the mandible to the maxillae.

Different types of splint have been used to prevent bruxism, attrition, stress of TMJ muscle and fractures of tooth which may either because of tremor associated with head region or due to medication.

Occlusal splints used are

- **MUSCLE RELAXATION APPLIANCE**
- **SOFT OR RESILIENT APPLIANCE**

**CONCLUSION**

Parkinsonism is a dreadful disease. Its management for a Prosthodontist is a challenge.

Knowing the manifestations systemic as well as oral along with pharmacological management plays a crucial role from treatment point of view. Prosthodontics management has so many options like CD, RPD, FPD and Implants in cases of providing artificial prosthesis. Occlusal splint can be used for decrease bruxism, prevention of tooth fracture and relaxing of elevated muscles due to tremors. In case of complete edentulous patients Implant supported prosthesis is the best treatment from our studies point of view except in the

case they are contraindicated. In case of partial edentulous patients FPDs were the feasible option. If Implants are possible then they should be recommended. All the efforts reach the success if proper post insertion instructions are followed and oral hygiene is maintained.

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