

Clinical strategies for complete denture rehabilitation in a patient with Parkinson's disease

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Abstract

Successful oral rehabilitation in the patients with Parkinson's disease requires special care and attention. This clinical report describes the oral rehabilitation of a patient suffering from Parkinson's disease from past 15 years and was edentulous from past 3 years. The neutral zone technique has been used in this case as it is the most effective way of improving the stability of complete dentures especially in patients with diminished neuromuscular control. This technique involves fabricating the denture which is in harmony with the surrounding oral musculature.

Introduction

Parkinson's disease (PD) is a progressive neurologic disorder caused by the degeneration of dopamine-producing nerve cells in the brain, specifically in the substantia nigra and the locus coeruleus.⁽¹⁾ However, the etiology of this disorder has not yet been established. Disease onset before age 40 is rare; it is equally prevalent in men and women before age 60 but is more common in men thereafter.⁽²⁾ The 3 cardinal signs of PD are dyskinesia (involuntary movement), bradykinesia (slow movement), and akinesia (muscular rigidity).⁽³⁾ People with PD may experience several oral health problems, such as xerostomia or sialorrhea, dry-mouth and/or burning-mouth syndrome, poor oral hygiene, and denture problems. Furthermore, compromised voluntary and involuntary muscle control of the orofacial-pharyngeal muscles may lead to difficulty in mastication, dysphagia, and tremor of the mouth and chin.⁽⁴⁻⁸⁾

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.⁽⁹⁾

All of these problems represent major challenges for the clinician with respect to the oral rehabilitation of patients with PD.⁽⁴⁻⁸⁾ Oral rehabilitation of these patients requires a multidisciplinary approach⁽¹⁰⁾ and special care because, due to increased tremors, increased saliva, diminished adaptive skills and poor muscle control by the patient, prosthodontic procedures become difficult to perform and retention of dentures is compromised.⁽¹¹⁾

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. 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 prosthodontist 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.⁽¹²⁾

Case Report

A 62 year old female reported to the Department of Prosthodontics, Crown & Bridge, Oral Implantology, Seema Dental College, Rishikesh for the fabrication of Complete Denture.

The patient had a 15 year medical history of Parkinson's disease and Dyskinesias and was on medication. She was on medication of Pacitane which was for Parkinson's disease and involuntary muscle movements, Clonax for anxiety and epilepsy, Ecospirin which is a Non Steroidal Anti Inflammatory Drug (NSAIDS) for arthralgia and muscle pain, and Syndopa for Parkinson's disease.

On examination, the patient presented with the festinated gait and forward flexion of the body. She required an assistance to walk. There was a low level of muscular coordination. The speech of the patient was soft, hurried and monotonous. There was a lack of facial expression and reduced blinking of the eye. The mandibular movement showed trembling and limited movement of lips during conversation. The patient was not able to stay still as she had no control over the muscles of her body. The patient was advised to take medication before coming to the Department and a special emphasis was made to treat the patient in compassionate, caring environment to reduce anxiety. Early morning appointments were given to the patient.

As there was abnormal involuntary muscular activity Neutral Zone Technique was used to fabricate a Complete Denture. The neutral zone is defined as 'the

potential space between the lips and cheeks on one side and the tongue on the other; the area and or position where the forces between the tongue and cheeks or lips are equal.' The soft tissues that form the external and internal boundaries of the denture space exert forces which greatly influence the stability of the dentures. The central thesis of the neutral-zone approach to complete dentures was to locate that area in the edentulous mouth where the teeth should be positioned so that the forces exerted by muscles will tend to stabilize the denture rather than unseat it. The stability of complete dentures is influenced by the surrounding neuromuscular system in the oral cavity. Oral functions, such as speech, mastication, swallowing, smiling, and laughing, involve the synergistic actions of the tongue, lips, cheeks, and floor of the mouth that are very complex and highly individual.⁽¹³⁾

The aim of the neutral zone technique was to construct a denture in muscle balance through physiologically optimal denture contours and physiologically appropriate denture tooth arrangement.⁽¹⁴⁾ Thus the use of this technique in this case improved the stability of the denture.

Procedure

On the first day, both the Maxillary and Mandibular ridges of the patient were examined (Fig. 1-2).



Fig. 1: Edentulous Maxillary Arch



Fig. 2: Edentulous Mandibular Arch

Primary Impressions were made with impression compound in a conventional manner (Fig. 3).



Fig. 3: Primary Maxillary and Mandibular Impressions

Casts were poured and acrylic resin special trays were fabricated. Border Moulding with Green Stick Compound (Fig.4-5) were done and Secondary Impressions were made with Zinc Oxide Eugenol Impression Paste (Fig. 6-7).



Fig. 4: Maxillary Border Moulding



Fig. 5: Mandibular Border Moulding



Fig. 6: Secondary Maxillary Impression



Fig. 7: Secondary Mandibular Impression

In the next appointment conventional Jaw Relation was done. The vertical height of occlusion was set below than normal. The patient was requested to practice the movements at home prior to the appointment. Centric relation was recorded by hand guidance of the mandible as the patient was not able to hold the mandible jaw stable even for few seconds (Fig. 8).

Articulation and Mounting of the Jaw Relation was done. Simultaneously another record block was made of impression compound with acrylic stops placed posterior to maintain the vertical height. This block was made to record the neutral zone (Fig. 9).



Fig. 8: Jaw Relation



Fig. 9: Acrylic block for recording neutral zone

The compound block was softened in hot water and placed inside the patient's mouth, and the patient was requested to perform functional movements like licking lips, sucking, puckering, smiling, grinning, swallowing, and pronouncing some words. As the patient was not able to perform functional movements properly, she was made to drink warm water with the record block inside the mouth. The procedure was repeated by

softening compound due to poor muscular activity of the patient. Neutral zone was recorded (Fig. 10).

A putty index was made to guide the arrangement of teeth in the neutral zone. The denture teeth were arranged in a lingualized occlusion (Fig. 11)



Fig. 10: Recorded Neutral Zone



Fig. 11: Teeth Arrangement in lingualized occlusion

The esthetic trial and Jaw Relation verification was done in the Try-In. Dentures were cured and polished and delivered to the patient (Fig. 12).



Fig. 12: Post Operative

Discussion

Geriatric health care is a critical part of health care systems around the world due to the rapidly increasing elderly population. Prosthodontists play an important role in geriatric healthcare and can contribute significantly in restoring the quality of life in elderly patients.⁽¹⁵⁾

Several diseases of the aged population are neurological disorders. The Parkinson disease (PD) is a progressive neurological disorder that affects numerous motor and nonmotor functions. The motor symptoms of PD include resting tremors, involuntary movements, facial and limb rigidity, bradykinesia, and akathisia. The major nonmotor symptoms include drooling;

swallowing difficulties, xerostomia, bladder dysfunction, depression, anxiety, cognitive impairment, and orthostatic hypotension.⁽¹⁶⁻¹⁷⁾ These symptoms complicate the dental treatment plans, execution, and outcome. These disabilities must be taken into consideration during treatment for the favourable prognosis.

The compassionate, caring approach with PD patient is important to overcome the anxiety and better treatment compliance from the patient. Cognitive impairment, dementia, and difficulty in verbal communication should be handled sympathetically. Hence, it is advised for the dentist to introduce himself in every appointment. The stress is known to exacerbate the tremor and uncontrolled movement during treatment. The smiling, direct eye contact, and gentle touch are known to alleviate the anxiety.⁽¹⁷⁾ The involuntary muscle movement, xerostomia, and rigid musculature in PD patients compromise the denture retention and control. It is advantageous to use the quick setting impression material in severe form of PD. The low fusing impression compound was used for border moulding due to its incremental procedure. It provides a chance for subsequent correction and helping the patient to concentrate on one muscular movement at a time.⁽¹⁸⁾

The neutral zone teeth arrangement was observed to enhance the denture stability and retention. The researchers observe that the teeth at neutral zone do not interfere with involuntary muscular movement in PD patient.¹³ The lingualized occlusion scheme was utilized in the patient due to its combined advantage of better masticatory efficiency⁽¹⁹⁾ less distortion, and limited lateral movement of denture.⁽²⁰⁾ The researchers have also reported that lingualized occlusion is suitable for the patient with involuntary teeth grinding.⁽²¹⁾

Post treatment follow-up is critical for success full rehabilitation. It is helpful for continuous monitoring, evaluation, and correction of denture. The effective complete denture rehabilitation will help PD patient in alleviating both psychological and physical debilities to significant extent.⁽²²⁾

Conclusion

There are a significant number of Parkinson's disease patients in the society who require Complete Dentures for the functional, aesthetic and psychological rehabilitation. There should be a caring and sympathetic approach and the treatment plan should include a strategy to overcome the physical disabilities of the patient. Measures should be taken to reduce the anxiety of the patient. The neutral zone technique was used which improved the denture stability. This technique helped to construct a denture in harmony with muscle balance, as this patient lacked muscular control.

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