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Correction of mandibular deviation in post-stroke patient using maxillary palatal ramp: case report

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ABSTRACT: Most of the stroke survivors are of elder citizens, and their edentulous condition is of concern to the speciality of prosthodontics. The early stages following stroke are important as they can maintain proper oral health and its functions. The oral manifestations of stroke include loss of sensation of oral tissues and unilateral paralysis of orofacial structures. Impaired muscular functions of oral structures may show compromised swallowing, speech, unfavourable motion and deviation of the tongue and mandible, reduced masticatory efficiency, as well as dietary habits which potentially lead to poor nutrition, weight loss, and subsequent problems such as the poor fit of dentures.
This report describes a method and correction of mandible deviation in a post-stroke edentulous patient using a maxillary palatal ramp.
KEYWORDS: Post-stroke, oral manifestation, edentulous, prosthodontic management, mandibular deviation, palatal ramp, oral health, rehabilitation.

I. INTRODUCTION

Cerebrovascular accident, or stroke, refers to an acute onset of neurologic deficits lasting more than 24 hours or culminating in death caused by a sudden impairment of cerebral circulation [1]. Stroke can have a profound effect on oral health and basic daily tasks such as drinking, eating, swallowing and communication. Impairment in mastication and swallowing (dysphagia) are significant problems for the stroke population, especially for those with moderate to severe stroke. Hemiplegia results in reduced bite force on the affected side. Additionally, patients receiving texture-modified diets for an extended period may have atrophied masticatory muscles and reduced bite force overall [2]. Both chewing impairment and dysphagia compromises nutritional intake and further weaken them.

Neuromuscular conditions and the mental attitude of the patients also modulate prosthodontic treatment procedures. A dentist can improve the oral rehabilitation of a patient with deteriorated facial and oral muscles after a stroke by incorporating orofacial myofunctional therapy. Edentulous patients with stroke should be encouraged to wear dentures during the rehabilitation phase as oral stereognosis is then less impaired[3].
Hemiparesis may also result in mandible deviation, which can make it difficult for edentulous patients to retrude their mandible into centric relation (CR), an issue that arises even in healthy individuals[4].

The midline displacement withposterior monolateral crossbite is caused by width discrepancy between the upper and lower dental arch resulting in a lateral shifting of the mandible. This laterodeviation is also called "laterale forced bite" or "articular cross bite"[5].

This article describes a straightforward and effective approach to restore the function by correcting mandibular deviation for an edentulous patient after a stroke. The treatment uses a conventional maxillary denture with a palatal ramp to guide them in centric relation.

II. CASE REPORT

A 69-year-old male patient with complete edentulism came to the Department of Prosthodontics and Implantology in Kannur Dental College, for maxillary and mandibular complete denture placement. His medical history revealed that he had hypertension, which is under medical control. In addition, he had experienced stroke 1 year 6 months back, for which he had received motor and sensory rehabilitation.

During the visit, he complained of an ill-fitting denture and insufficient chewing capability. Dental history revealed ill-fitting maxillary and mandibular complete denture from the past 1 year. General examination indicated undernourished nutritional status and an altered gait assumed to be post-stroke.

On extraoral examination competent lips, concave facial profile with facial asymmetry was observed. House Class II muscular tone with deviated mandibular movement towards his right

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side. The patient was asked to do hand and leg movements, raise the eyebrows and wide smiling, which showed compromised actions on the right side of the patient.

Figure 1. Facial asymmetry showing mandibular shift. Figure 2. Midline variation during tryin at first contact of palatal ramp and mandibular teeth.

The treatment plan was to fabricate a maxillary denture with a palatal ramp to guide the mandible into centric relation. Preliminary impressions were made by using stock trays and irreversible hydrocolloid. Definitive impressions were made by selective impression technique (zinc oxide eugenol wash impression after border moulding with low fusing compound) using auto polymerising resin custom trays. Passive movements were performed to achieve the peripheral tracing.

The mandibular relationship was recorded by asking the patient to elevate the tongue to the most posterior part of the palate that he was able to reach and manually guided the patient to close in the retruded position to achieve centric relation.

Teeth arrangement was done, and a wax block was placed adjacent to the patient's left maxillary posterior teeth in the palatal region, beyond the occlusal plane. The wax block was softened, and the patient was guided to bite in centric relation. Care was taken to achieve a smooth gliding surface on the wax block and the trial denture was evaluated and processed by using the conventional wax elimination technique. The definitive dentures were assessed intraorally.

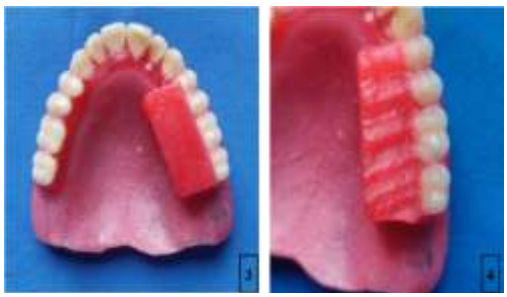

Figure 3. Trial denture with wax block. Figure 4. Smooth gliding surface on the wax block.

The patient was advised to use the prosthesis except when asleep, post-insertion instructions and mandibular exercises were educated to the patient. After 3 months of rehabilitation, the patient reported for a clinical evaluation, during which the occlusal equilibration and noticeable change in mandibular deviation was evident. Patient also reported improved efficiency during mastication, speech and swallowing food.

Figure 5. Final denture with maxillary palatal ramp.

Figure 6. Maxillary palatal ramp guiding into centric relation. Figure 7. Deviation correction and appropriate bite with palatal ramp.

III. DISCUSSION

There is only limited evidence-based research on Prosthodontic management. Clinical experience and case report indicate hemiplegia following stroke may present problems with denture wearing. Muscular control may diminish in post-stroke patients and can be maintained with the proper intervention of treatment modalities. Edentulous patients have a reduced ability to detect

the shape of objects placed in the mouth than in dentulous patients. Providing new denture can improve this ability according to study[3]. Vivid Prosthodontic treatment options are considered after stroke such as rebasing or relining, use of soft liners, replacement of new dentures, denture fixatives, neutral zone techniques etc.

Rebasing or relining: done chairside usually, but require replacement after 1year. Soft liners or tissue conditioners are useful to provide improvement in the fit surface of the denture. New dentures: should be extended as much as possible to obtain maximum retention support and stability. Neutral zone technique for recording the shape of the lower arch is recommended. Compared with monoplane occlusion, stable contact of the opposing teeth in CR was achieved. Few articles claim different techniques to resolve problems facing due to post-stroke. Management of post stroke complete edentulous patient using a suction effective method. Where a custom tray with wax rim and poles made for final impression and bite registration steps. This tray enables a suction effective impression method in a closed mouth[6]. Provision of prosthesis (palatal lift prosthesis with palatal augmentation prosthesis) for improving velopharyngeal incompetence (VPI), in the rehabilitation of a stroke patient with dysarthria[7]. Complete dentures for a patient after a stroke by means of orofacial myofunctional therapy. It's a method for tongue exercises and correction of mandible deviation in an edentulous patient after a stroke by using a pearl on a wire in the anteriomedian palatal part of the maxillary denture.[4]

This report is based on the treatment of a single patient and does not include any standardized group measurements. Guidance therapy is to be initiated at the earliest and aims to orient the correct path of closure. More in-depth education, tailored to both dental and healthcare personnel, would be advantageous in providing optimal patient care and ensuring the implementation of evidence-based practices.

IV. CONCLUSION

Establishing an appropriate stable and functional occlusal relationship is the primary focus of prosthetic rehabilitation. This article claims a varied approach of prosthodontic management to manage mandibular deviation in post-stroke patient and the results are on patient-based assessment. It suggests that restoration of compromised function and mandibular deviation could be controlled by palatal ramp. Linking various validated techniques and treatment options along with palatal ramp can also enhance the outcome.

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