

Prosthetic rehabilitation in a partially edentulous patient with lost vertical dimension: a clinical report

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Introduction:

Reconstruction of mutilated dentition with missing teeth and worn dentition using fixed or removable prostheses has been a challenge to a dentist's skill and capabilities. Fixed prosthodontics can offer exceptional satisfaction for both patient and dentist. It can transform an unhealthy, unattractive dentition with poor function into a comfortable, healthy occlusion capable of years of further service while greatly enhancing esthetics. Several studies have shown that the half time of comparatively extensive fixed partial dentures with conventional design is around 15 years.¹ For a single tooth replacement, for many years, conventional fixed bridgework was considered to be the best treatment option and survival of this type of restorations was estimated to be about 75% after 15 years.² And also, some patients who are given the choice between an implant-supported prosthesis

ABSTRACT

Rehabilitation becomes more challenging with the partial edentulism where bilateral segment is found missing. The collapse of posterior teeth also results in the loss of normal occlusal plane and the reduction of the vertical dimension. This case report describes the rehabilitation of a 65-year old female patient with multiple missing teeth and severe loss of tooth structure. The maxillary arch was restored with fixed partial dentures and the mandibular arch using porcelain fused to metal crowns and removable prosthodontics.

Keywords: Partial edentulism; vertical dimension of occlusion; fixed partial denture; removable partial denture.

and a fixed partial denture are not able to pursue implant care.

Various treatment-planning modalities can be made for restorations in patients who have lost either upper or lower posterior teeth, unilaterally or bilaterally, and have no distal abutments. In such partial edentulism, implant-assisted prosthodontics has become contemporary choice of the replacement of the natural teeth. When implant therapy is not used to replace missing natural teeth, conventional methods of fabrication of the removable partial denture continues to be an essential prosthetic consideration in many oral reconstructions. Patients seek treatment with cast removable partial dentures for the purpose of improving appearance and masticatory function. It has been suggested that compliance improves when the prosthesis meets the aesthetic requirements of the patient.³

This article presents an approach to rehabilitating a partially edentulous patient with worn dentition and lost vertical dimension using porcelain fused to metal restorations and a cast removable partial denture.

Case report:

A 65 year old female reported with a chief complaint of several missing teeth, excessive wearing down of teeth, reduced chewing efficiency and discomfort due to overclosure. The patient was in good general health, and the medical and dental history indicated no contraindications for dental treatment. Intraoral examination revealed partially edentulous maxillary and mandibular arches. Teeth missing were 12, 24 and 25. In the lower arch, 34,35,36,37,45,46,47 were missing. All the remaining teeth revealed attrition, especially 22 with nominal coronal tooth portion clinically, and abfraction were also noted in 14, 15. The anterior teeth had sharp enamel edges, dentinal craters, and attritional wear due to the loss of posterior support. Occlusal vertical dimension and vertical dimension at rest were assessed by phonetic evaluation,^{4,5} measurement of interocclusal space,⁶ and evaluation of facial appearance. Interocclusal space was judged to be approximately 4-5 mm that was greater than the normal value, 2-4 mm. On extra oral examination wrinkles and drooping commissures around the mouth were observed. On temporomandibular joint examination, no pain or tenderness was found.

On the basis of clinical and radiographic examination, a diagnosis of partially edentulous condition with worn out dentition and reduced vertical dimension of occlusion was made. Endodontic therapy was performed for teeth with severe attrition before further treatment was undertaken. Intraoral and extraoral condition was analyzed and various treatment options were discussed with the patient including crown lengthening procedures and implant placements. She showed fear of any form of surgical interventions and explained her financial limitations. Hence it was decided for porcelain fused to metal fixed partial dentures in the upper arch, individual porcelain fused to metal crowns in the lower anteriors and a cast removable partial denture for the lower posteriors. After taking patient's approval clinical procedures were initiated.

Diagnostic casts were obtained from primary impression using irreversible hydrocolloid. Face bow (Quick Mount) transfer was done, in centric relation on a semi adjustable articulator (Whip-Mix Articulator). The new vertical dimension of occlusion (VDO) was set by 2 mm increase

in the incisal guidance pin of the articulator. The splint was designed to offer bilateral contacts of all posterior teeth in centric relation and guides of the anterior teeth in excursive movement. The adaptation of patient to the increased VDO was evaluated during 1-month trial period. The method of increasing VDO with the splint was used to determine desirable VDO of the fixed interim prostheses. After taking centric relation record, diagnostic wax-up was performed. Autopolymerizing acrylic resin provisional prosthesis was fabricated that was produced from the diagnostic wax-up, and mandibular provisional removable partial denture was made to fit provisional crowns. Gross teeth preparation including post and core was carried out in the indicated teeth (Fig. 1).



Figure 1 Intraoral view during teeth preparation

The provisional fixed restorations were cemented with temporary cement and the patient's adaptation was monitored. For three months, interim restorations were adjusted and used as a guide for the definitive oral rehabilitation. Improvement in mastication, speech, and facial esthetics confirmed the patient's tolerance to the new mandibular position with the restored vertical dimension of occlusion. The anterior guidance and posterior disclusion on excursive movement were established. Adjusted occlusion was transferred to anterior guide table.

Final preparation was performed, and definitive impressions were made with polyvinylsiloxane impression material. Bite registration was taken using provisional crown and occlusal registration material. Wax patterns were prepared for fixed partial dentures in maxillary arch and were cast in chrome cobalt alloy. Similarly, mandibular anterior teeth wax patterns were prepared, features like rest seats were incorporated in the patterns wherever required, and surveyed and were cast in chrome cobalt alloy. Cast copings were also surveyed to determine the most suitable path of insertion of

the definitive prosthesis. Porcelain fused to metal restorations were made using anterior guide table and cemented with resin modified glass ionomer cement. Because the patient's anterior guidance table was used in the production of definite restoration, the amount of occlusal adjustment on the lingual surface of maxillary anterior teeth was minimal. Final impression was made to record complete border extension of the residual ridge. The mandibular master cast was obtained from this impression and was then duplicated in reversible hydrocolloid duplicating material to obtain the refractory cast for the fabrication of cast metal framework. The definitive waxing for mandibular cast metal framework was performed. The framework was cast in chrome cobalt alloy. The impression on posterior alveolar ridge was taken once more with the individual tray which is attached to the removable partial denture (RPD) framework, and the altered cast was made. After the adaptation of removable partial denture framework and the trial of wax denture were done, the definitive mandibular RPD was fabricated and delivered with minor occlusal adjustment (Fig. 2 and 3). Oral hygiene instruction and regular check-up were administered.



Figure 2 Intraoral view - Post treatment



Figure 3 Post treatment view.

Discussion

Reconstruction of mutilated dentition with missing teeth and worn dentition using fixed or removable prostheses has been a challenge to a dentist's skill and capabilities. Such cases require assessment of the vertical dimension for the management and comprehensive treatment plan. When reorganizing the occlusion, it is essential to precede restorative procedures with a period of occlusal device therapy to ensure that a stable maxillo-mandibular relationship has been achieved.⁷ An occlusal device was given to the patient and was carefully monitored for 1 month to evaluate the adaptation to the removable occlusal overlay splints. This device creates a temporary occlusal condition that allows the temporomandibular joint to orthopedically adopt a more stable position.⁸ Also the patient's adaptation to the provisional restoration was monitored for 3 months. During this trial period discomfort, wear, and muscle fatigue were not observed.

The ideal centric contact scheme for partial prostheses is cusp-fossa relationship with freedom in centric. For the eccentric contact, as this is a partially edentulous case where most of the teeth require prosthetic work, hence group function on the working side was not assumed by the prosthesis. But instead mutually protected occlusion scheme was adapted. This pattern of occlusion would minimize the forces tending to remove prosthesis on the non working side, it would prevent the rotation around a vertical axis in the region of the distal abutment of a distal extension prosthesis and it would make the lateral displacement of denture base impossible.⁹ Therefore the splint was designed to offer bilateral contacts of all posterior teeth in centric relation and guides of the anterior teeth in excursive movement. The adaptation of patient to the increased vertical dimension of occlusion was evaluated during 1-month trial period. No muscle tenderness and temporomandibular joint discomfort were found.

Removable partial dentures are particularly indicated in Kennedy Class I cases¹⁰ when there is need for a simple and economic solution. Also in the cases where the distal end saddle is long, a removable prosthesis is the only realistic treatment option as, with the exception of implant-supported fixed bridgework, conventional or adhesive cantilevered restorations using the anterior abutment teeth may be inappropriate.¹¹ In a study, cast clasp-retained removable partial denture showed a survival rate of approximately 90% after 10 years of oral service. The predominant

complications during oral service were caries lesions, loss of abutment teeth, and fracture of clasps.¹² Distal extension base removable partial dentures are subjected to greater stress because their support is a combination of tooth and soft tissues. Forces must be controlled by maximum coverage of soft tissue, by proper placement of components in the most advantageous position and by functional impression procedures. However, the restored anterior teeth can be easily exposed to excessive occlusal loads if the patient does not wear the removable partial denture or resorption of residual ridge proceeds. Because the compliance of patients in wearing free-end saddle dentures has been shown to be poor, the education on wearing removable partial denture is necessary.¹³ Patients should be reviewed at regular intervals to identify any early signs of damage to intra-oral tissues. This allows the opportunity for appropriate modifications to be made before more serious problems arise.

Conclusion

The successful integration of fixed and removable prosthodontics results in accurately fitting, esthetic and functionally efficient prostheses. Periodic follow-ups and meticulous prostheses maintenance by the patient holds the key for the ultimate success of these types of rehabilitations.

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