

Case report

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Management of generalized attrition with an overlay removable partial denture for restoration of the OVD—a new treatment option

Abstract :

overlay removable partial denture can be used as an interim prosthesis for the patients who have lost their occlusal vertical dimension due to moderate to severe attrition resulting in functional and esthetic problems. This prosthesis is believed to allow neuromuscular adjustments to a newly adjusted VDO and also to observe the function and esthetics. ORPDs provide reversible and relatively inexpensive treatment for the patients who have limitations. In this case report, a patient was treated with overlay removable partial denture for restoring the lost vertical dimension. This article reviews indication, advantage, disadvantages of ORPDs. Though there are esthetic and functional limitations with potential risk of material fracture, all patients with severely worn dentition with decreased VDO and missing teeth should be offered this treatment option. Regular recall and maintenance visit are essential for long term success of ORPDs.

Key Words : Overlay removable partial denture, occlusal vertical dimension, tooth wear, tooth surface los

Introduction:

Overdenture is a prosthesis that derives support from one or more abutment teeth by completely enclosing them beneath its impression surface. Overlay removable partial dentures, a subset of overdenture, are often referred to as a RPD that has part of their components covering the occlusal surfaces of the abutment teeth to restore them to a functional occlusion.¹ Unlike conventional overdenture, where only a few mm of coronal tooth structures are left supragingivally, there is at least one-third or half of the tooth structure remaining in ORPD situation. In situation where loss of OVD has occurred because of non compensated TSL (tooth surface loss), the overlay RPD may be a definitive treatment option. This treatment consists of a prosthesis that covers and is partially supported by natural teeth, tooth roots, or dental implant and is an effective method of treating a patient with severely worn dentition. This treatment option has been suggested to be reversible and cost effective for patients.

There are three main indications of ORPDS.¹ As an interim prosthesis, an ORPD is most often prescribed for a patient with reduced occlusal vertical dimension (VDO) due to moderate to severe worn dentition. This pattern of tooth loss generally occurs when the occlusal wear of teeth occurs at a faster pace than the compensatory continuous eruption of teeth. Second, interim and permanent ORPDs are often prescribed to patients with severe dental and skeletal malocclusion. These malocclusions can be resulting from cleft palate class II or III skeletal malocclusion or openbite or open occlusal relationship. Third, the last common indication for ORPDs is medical or financial limitation for fixed prosthodontics. Some patients can have malocclusion or worn dentition that can ideally be restored with fixed prosthesis perhaps in conjunction with orthodontic, periodontal, and surgical treatments. However, financial concerns or general medical problems could prevent these treatments.

The major advantages of ORPDs are that they are relatively simpler and less expensive than the fixed prosthetic option. An interim ORPD provides a reversible treatment that allows validation of VDO and functional occlusion [3,4]. This validated VDO and functional occlusion by interim ORPDs can then be transferred to the final prosthesis. ORPDs offer an advantage that patients can use them all the time even during normal function including speaking or eating. ORPDs also do not permanently change the dentition during the assessment period.

The potential disadvantages of this prosthesis include compromised esthetics when the dentures are removed, caries and periodontal diseases as a result of poor oral hygiene; and veneer material fracture, debonding, discolouration and wear. The remaining tooth structure is often visually exposed contributing to esthetic challenge compared to conventional overdentures where the abutment teeth are completely covered [2].

When tooth wear occurs as a natural physiologic process, the average wear rate on occlusal contact areas were estimated to be 29 micro meters per year for molars and 15 for premolars. 5 Tooth wear is considered excessive or pathologic when the normal rate of wear is accelerated by endogenous or exogenous factors and the degree of wear exceeds the level expected at any particular age. Tooth wear by parafunction is estimated to progress 3 times faster than physiological wear. Tooth surface loss (TSL) has been classified as the following types (1) erosion: loss of tooth surface by chemical processes not involving bacterial action. (2) attrition: tooth structure loss by wear of tooth or restoration surface caused by tooth to tooth contact during functional or parafunctional activity of the teeth and (3) abrasion: loss of tooth surface caused by the frictional action of a foreign substance on the teeth (other than tooth-to-tooth contact), such as that caused by tooth brushing [6,7,8].

Several changes take place in the relationship of the teeth as they wear: Flat occlusal contacts create lack of stability, reduced clinical crown height, and the exposure of large areas of dentin that may limit the use of conservative adhesive techniques. This creates many difficulties for the restorative dentist, who may have to compromise the form of the restorations, their occlusal relationships, and the stability of the occlusion. Adequate retention and resistance forms for fixed prostheses are also difficult. Patients often seek help for problems of pain, altered function, and compromised appearance [3,9,10].

Etiologic factors include bruxism, harmful oral habits, diet with excessive intake of citrous fruits or beverages with low ph, eating disorders, gastroesophageal reflux disease, environmental and salivary factors as in xerostomic patients and congenital anomalies such as amelogenesis imperfecta and dentinogenesis imperfecta [6, 11]. Usually the causative factors for generalized attrition are parafunctional habits, partial loss of tooth, dietary factors, enamel hypoplasia, faulty treatment like indiscriminant grinding of tooth structure.

Normally patients having generalized attrition have few choice of treatment. When the disease advances, the vertical height is lost subsequently. The patients presenting with moderate to severe loss of vertical height are rehabilitated by over denture or overlay denture.

The space required can be obtained by an overall increase in OVD. This allows the opportunities to restore the teeth and reestablish esthetic and occlusal stability. Determining the OVD, can be achieved through several methods such as phonetics, interocclusal distance, swallowing and esthetics.

This case describes an example of the most common indication of ORPD, the rehabilitation of patient with severe worn dentition with interim ORPDS.

Case history:

A female patient aged 60 years reported at the outpatient department of University Dental College and Hospital during October of 2010. Her chief complaints were unsatisfactory facial appearance, chewing difficulty, poor esthetics (small teeth), cheek biting, increased salivation. Her medical and dental histories were recorded and diagnostic radiograph was made. There was no medical or dental history that contraindicated dental treatment.

Initial examination revealed a partial edentulous jaw with extensive wear on mandibular anterior and posterior teeth. An extensive evaluation was performed that included intraoral and extra oral examinations of the teeth and supporting structures. The patient presented mandibular Kennedy class II, maxillary Kennedy class IV, with severe loss of OVD. The mandibular arch had been previously restored with a long span FPD extending from lower right canine upto lower right 3rd molar at her existing OVD.

There was severe attrition of mandibular anterior teeth, In maxilla there was a three unit FPD replacing upper left 2nd premolar. Patient's chief concern was to be able to regain proper function at lowest cost. Palpation of the temporomandibular joints and muscles of the mastication revealed no evidence of joint sounds and tenderness. The mandibular range of motion was within normal limit.

Clinical determination of the OVD was achieved using several methods such as facial measurements and esthetic. This distance varies for persons in a range of 2mm to 4 mm. Phonetics were used to also determine the optimal position of the maxillary central incisor edges, with the incisors lightly touching the junction of the wet and dry border of the lower lip during pronunciation of fricative sounds. Patient preferences and facial appearance were also evaluated.



Fig 9: Recording the occlusion by silicone putty.

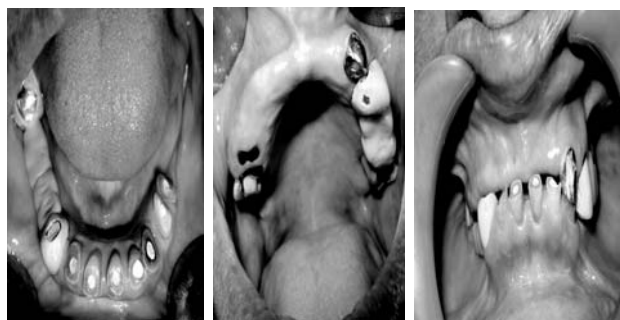


Fig 1, 2 & 3: Pre-operative intra oral view of both jaws & occlusion.



Fig 10: Wax pattern for lower ORPD in frontal, right and left lateral view.

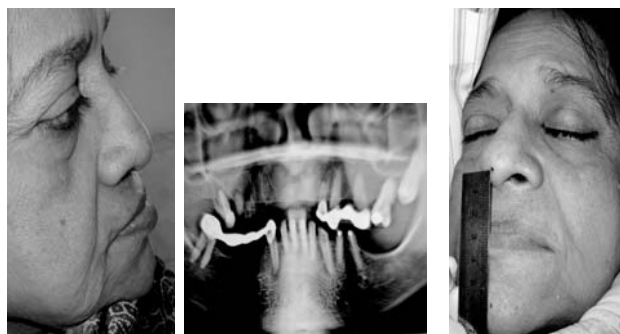


Fig 4: Pre-operative face profile & OPG Fig 5: Measuring VDO

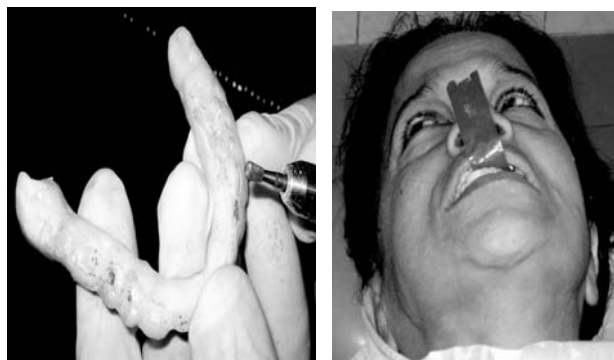


Fig 11: Cured ORPD being trimmed and trialed for supracontacts.



Fig 6, 7 & 8: Pre-operative model for upper and lower jaw & occlusion.

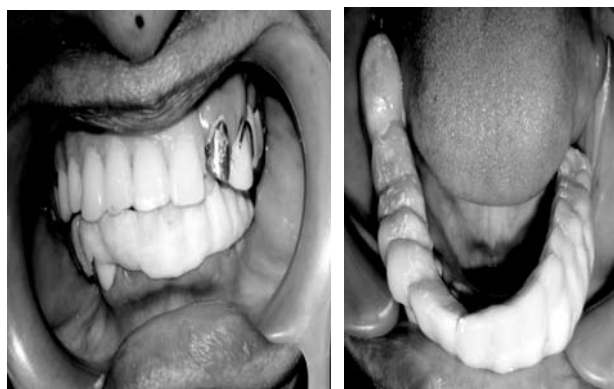


Fig 12: Frontal and intra-oral view of inserted ORPD.



Fig 13: Post insertion frontal and proximal view of patient demonstrating better appearance.

Treatment plan:

The patient was treated for her periodontal problems. Scaling and deep curettage of the remaining natural teeth was done. She was also advised to perform oral hygiene measures. The patient was treated endodontically for lower anterior six teeth as the pulp of the involved teeth were exposed. The right upper 1st molar was extracted since it was badly broken down.

After completion of endodontic treatment, the impression was made with irreversible hydrocolloid and the cast was poured with hard plaster. After analyzing the master cast and OPG, history of the patient and intra oral examination, the diagnosis was loss of vertical height of lower jaw. The treatment plan was to restore the vertical height, phonetics, esthetics and mastication.

Laboratory and Clinical procedure: All the remaining natural teeth were selected as abutment. Clinical and radiological examination revealed favorable crown root ratio and periodontium. Abutment preparation was not done as all the remaining anterior teeth were attrited to gingival margin. Natural undercuts was used as retentive undercuts. Impression was taken with alginate and cast was poured in the usual process. Bite registration was done by silicon putty. Articulation was done in usual method. A space of two mm was created at the molar region of articulated cast with the view to restore the lost vertical height of the patient. This space was utilized during making the wax pattern for restoration of vertical height, occlusion, esthetics, tooth contour, phonetics and mastication.

The waxed up overlay denture was processed in the laboratory for the fabrication of overlay denture by opaque variety heat cured acrylic resin. After polishing, it was inserted in the patient's mouth. It was retained intraorally by natural retentive undercuts. Occlusion was checked for any supra contacts. Vertical height was checked by Niswongers method.

Follow up was done according to the following chart. The dentures were adjusted to proper VDO and centric occlusion. The patient was instructed to wear the dentures all the day and remove them at night. The follow up was done at one week, two week, one month, two month and three month interval. At each visit, minor adjustment of the ORPD was done. The patient reported no muscle or TMJ tenderness. She was comfortable and functional with the prosthesis.



Fig 14: Pre and post operative view of face profile.

Discussion:

When tooth wear exceeds compensatory mechanism (non compensated TSL), loss of OVD will occur. With non compensated TSL, the collapse of the anterior facial height needs an increase in the vertical dimension to restore the subjects to their presumed original OVD before the TSL took place. This will create the interocclusal space required to accommodate the restorative material. Because the tooth structure is already worn, avoiding further reduction to create space is highly desirable. Careful evaluation of decreased VDO, by using evidences of loss of posterior support, history of wear, phonetics, interocclusal distance, and facial appearance, is probably one of the most important steps in full mouth rehabilitation for these patients. Patients with reduced VDO can use ORPDs instead of occlusal splint to accurately evaluate their proper VDO [3,4,12].

Long term observations have confirmed that for the majority of patients, moderate alteration to the OVD may be well tolerated. It is commonly believed that change in OVD should be conservative and that a carefully monitored trial period with an interim prosthesis is desirable. Transitional RPD at the desired OVD, acrylic splints, or provisional restorations are several techniques that can be used. Because treatment can be costly and time consuming, it is preferable to use a prosthesis that does not permanently change the dentition during the assessment period. The obtained position can be used for the definitive rehabilitation.

And the final treatment is dependent on the condition of patient,s remaining teeth. Regular recall and maintenance visits are necessary to ensure long term success of ORPDs. The patient should also be instructed to maintain the oral hygiene and denture hygiene with occlusal overlay prosthesis.

Conclusion:

The etiology for the condition described in this case report could not be established clearly because of the lack of pretreatment records. Though compromised esthetics, caries and periodontal disease are some of the few disadvantages of overlay removable partial dentures, this reversible, conservative and cost effective treatment frequently remains the only treatment option allowing esthetic and functional rehabilitation. the patient can well tolerate the established VDO in the existing intraoral condition.

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