

Case report

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Rehabilitation of the occlusal vertical dimension with an overlay removable partial denture—a case report

Abstract:

Loss of occlusal vertical dimension is a frequently observed problem in the middle aged and aged population who intends to retain their natural dentition. This type of patient has very few treatment options one of which is overdenture. In this case report, a patient was treated with overlay removable partial denture for restoring the lost vertical dimension. This was provided as interim prosthesis. The follow up was done to observe the fulfillment of desired results. The clinical and laboratory procedure is described briefly. The treatment used for this case is cost effective and conservative solution for esthetic and functional rehabilitation. Since the material is acrylic resin, long term wear resistance is crucial for success of treatment. The rehabilitation would be fixed prosthesis with newly adjusted vertical dimension.

Key words : Overlay removable partial denture, occlusal vertical dimension, tooth wear.

Introduction:

Prolonged tooth maintenance by a more aged population considerably increases the probabilities of dentists having to treat patients with high levels of tooth wear. Tooth wear is commonly found in every dentition and may have physiologic or pathologic causes. Pathologic tooth wear is becoming more evident today, with an aging population who is retaining their natural tooth for significantly longer. 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. 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. Patients often seek help for problems of pain, altered function, and compromised appearance. Etiologic factors include bruxism, harmful oral habits, diet with excessive intake of citrus 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.

In situations where 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.

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. A correct determination of the OVD and an appropriate jaw relationship form the basis of treatment whether this employs fixed or removable prosthesis.

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.

In situation where loss of OVD has occurred because of non compensated TSL, 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.

Overlay removable partial dentures, a subset of overdentures, are often referred to as an RPD, that has part of their components covering the occlusal surfaces of the abutment teeth to restore them to a functional occlusion. Unlike conventional overdentures, 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. This remaining tooth structure is often visually exposed contributing to esthetic challenge compared to conventional overdentures where the abutment teeth are completely covered.

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

In our country there are a good number of patients having generalized attrition, erosion and abrasion. Usually the causative factors for generalized attrition are parafunctional habits, partial loss of tooth, dietary factors (especially betel nut chewing), 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.

Overdenture is a prosthesis that derives support from one or more abutment teeth by completely enclosing them beneath its impression surface. The idea of using roots and remaining crown for supporting is century old. Making overlay denture need the collaboration and skills of periodontology, endodontics and prosthetic techniques.

Case history:

A female patient aged 41 years reported at the outpatient department of University Dental College and hospital during mid February of 2010, with the chief complaints of inability to eat, cheek biting, increased salivation, phonetic problem, over eruption of remaining natural teeth and swelling of upper anterior region. The gingival swelling was being enlarged for last one or two months with bleeding.

Initial examination revealed a partial edentulous patient with extensive wear on maxillary 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 with chronic gingivitis of upper anterior region. 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.

Her medical history revealed that she was suffering from diabetes for five years and hypertension for three years. She was taking medication for the above mentioned diseases.



Fig 1&2: pre-operative intra oral view & occlusion



Fig 2: pre operative model of upper jaw



Fig 3: pre operative model of lower jaw.

Treatment plan:

The patient was treated for her periodontal problems at first. Scaling and deep curettage of the remaining natural teeth was done. She was also advised to take clindamycin and perform oral hygiene measures. After two days the impression was made with alginate 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 upper jaw. The treatment plan was to restore the vertical height, phonetics, esthetics and function or mastication.

Laboratory and Clinical procedure:

Abutment selection and preparation: All the remaining natural teeth were selected as abutment. Clinical and radiological examination revealed favourable crown root ratio and periodontium. Abutments were prepared by transforming the severe undercuts to moderate undercuts on the palatal surfaces of all the remaining natural teeth. This transformation was done to use the moderate undercuts as retentive undercuts. Impression was taken with alginate and cast was poured in the usual process.

Bite registration was done by silicon putty



Fig 4: Wax pattern for the over lay denture.



Fig 5: Articulated upper and lower jaw with fabricated wax pattern.

Articulation was done in the semiadjustable articulator. 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.

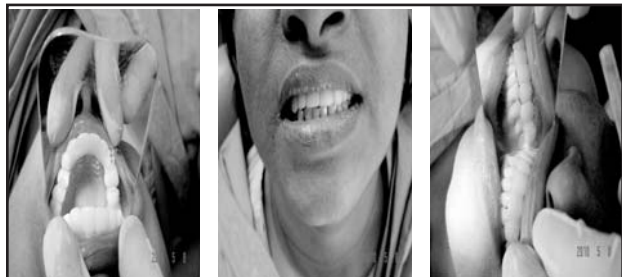


Fig 6: Post insertion view: occlusal, frontal and lateral

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.

Interval	Chewing efficiency	Maintenance of oral hygiene	Patient satisfaction	Assessment of vertical height
1 st week	Better than the time of insertion	Satisfactory	Acceptable	Coincides with the measurement during insertion
2 nd week	improved	Satisfactory	Acceptable	Coincides with the measurement during insertion
1 month	Can chew efficiently	Satisfactory	Acceptable	Coincides with the measurement during insertion
2 month	Can chew efficiently	Satisfactory	Acceptable	Coincides with the measurement during insertion
3 month	Can chew efficiently	Satisfactory	Acceptable	Coincides with the measurement during insertion

Discussion:

The patients with generalized attrition if remains untreated or treated in wrong way, gradually develop reduced lower facial height which in turn affects aesthetics, difficulty in chewing, temporomandibular dysfunction syndrome ultimately affecting the general and mental well-being of most of the patients.

If the patients of generalized attritions are treated by fixed prosthesis without restoring the vertical height, the symptoms which the patient developed gradually are not treated, moreover this may aggravate the disease condition or symptoms.

Patients wearing overlay dentures gradually become accustomed to the newly adjusted vertical height, gets sufficient time for the remodeling of TMJ and occlusion.

This treatment procedure acts as interim treatment for restoration of lost vertical height. In this stage, little adjustment of vertical height can be done if necessary. Patient is observed for a period of three to six months for alleviation of symptoms, and also radiological analysis of vertical bone loss, periodontium. After all the symptoms are subsided, a definitive treatment is planned. Definitive treatment should fulfill all the criteria of overlay denture. This definitive treatment is usually a fixed prosthesis.

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