

# Life changing dentistry with Full Mouth Rehabilitation – a case report

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## ABSTRACT:

Tooth wear is caused by a variety of reasons, many of which are unknown. Tooth wear management is difficult and complex. For effective treatment, accurate measurement of occlusal vertical dimension (OVD), interocclusal rest space, and centric relation records are required. The analysis of facial soft tissue contours is very crucial. A clinician must remember two things before treating a case with full mouth rehabilitation; severe wear does not always cause loss of OVD and it also does not eliminate all defective occlusal interferences.

A systematic method may be beneficial in achieving a predictable and desirable result. This paper describes the step-by-step treatment of a 63-year-old patient who had lost occlusal vertical dimension due to parafunctional habits. Making occlusal overlay bilateral splints in acrylic resin and provisional restorations in mandibular teeth for the healing of the intermaxillary distance was the first strategy for oral rehabilitation. The ultimate rehabilitative therapy evolved into direct composite resin restorations associated with all-ceramic crowns fortified by lithium disilicate after the patient's adaption and muscle stability to the new occlusal situation. We established that all teeth had solid connections with similar intensity in centric relation, as well as anterior guiding in line with functional jaw movement.

**KEY WORDS :** Occlusal vertical dimension, Parafunctional habits, Restorative treatment, Occlusal splint, Full mouth rehabilitation

## INTRODUCTION

In full mouth rehabilitation (FMR) patients, establishing an adequate occlusal vertical dimension (OVD) is critical. As a result, OVD is a delicate issue that should not be treated without careful consideration<sup>1</sup>. The reinstallation of the OVD is one of the most difficult and complicated operations in oral rehabilitation. All teeth wear out at some point during a person's life owing to functional activity<sup>3</sup>. Attrition, erosion, abrasion, and parafunctional behaviors have all been blamed for occlusal wear<sup>4,5</sup>. Diet, as well as conditions such as gastric reflux, congenital anomalies, and eating disorders, play a role in increased occlusal wear<sup>6</sup>. Excessive wear of anterior dental pieces has a significant impact on the esthetics and harmony of the smile<sup>5-7</sup>. Excessive occlusal attrition may lead to pulpal diseases and reduced occlusal function as conditions get more complex<sup>8</sup>.

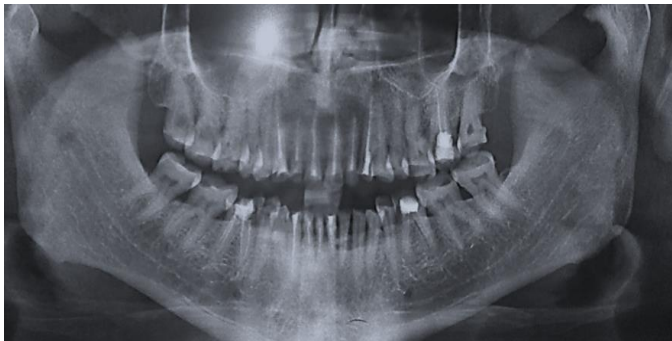
The Occlusal Vertical Dimension is one of the most essential characteristics of facial attractiveness, since the esthetics of the face are impacted by facial shape and facial height<sup>9</sup>. When a patient has diminished OVD, his or her facial appearance ages owing to a reduction in the bottom third of the face, lips intrusion, nose drop, phonetic and masticatory abnormalities, and likely involvement of the temporomandibular joint (TMJ) and mastication muscles<sup>7,9-12</sup>. In general, loss of OVD must be regained gradually at the start of treatment before any final restoration operation is performed. Interim crowns, composite restorations, an occlusal splint, or even an interim detachable prosthesis should be employed for early adaptation, especially in identifying a stable and functional

occlusal vertical dimension<sup>7,13</sup>. Following the restoration of a restorative space and the establishment of an optimal maxillo-mandibular connection, the treatment strategy can progress to a final rehabilitation<sup>14</sup>.

The purpose of this case report is to highlight the brief history, current procedures, and stepwise treatment protocol used to effectively create a whole mouth rehabilitation case in a 63-year-old patient with reduced/ decreased OVD.

### CASE DESCRIPTION

A 63-year-old male patient, came along for restorative treatments because he was having difficulties chewing and was unhappy with his look. Following a comprehensive history and clinical examination, information on a clinical evaluation sheet were established. The patient stated that he was relatively alright fifteen years back. Then he developed tooth wearing which gradually caused reduced tooth height. Five years back he developed pain and sensitivity on several teeth and received endodontic treatment of the affected teeth. Now he was referred to Prosthodontic department of BSMMU for further management. Excessive wearing on the mandibular anterior teeth, several restorations, and the involvement of endodontically restored teeth were identified during a dental examination (Figure - 1). There was also a loss of anterior guidance and a decrease in OVD. The patient claimed a propensity of grinding his teeth, as well as periodic episodes of severe sensations. Periodontal health was good, with normal mucosa color and no tooth movement.



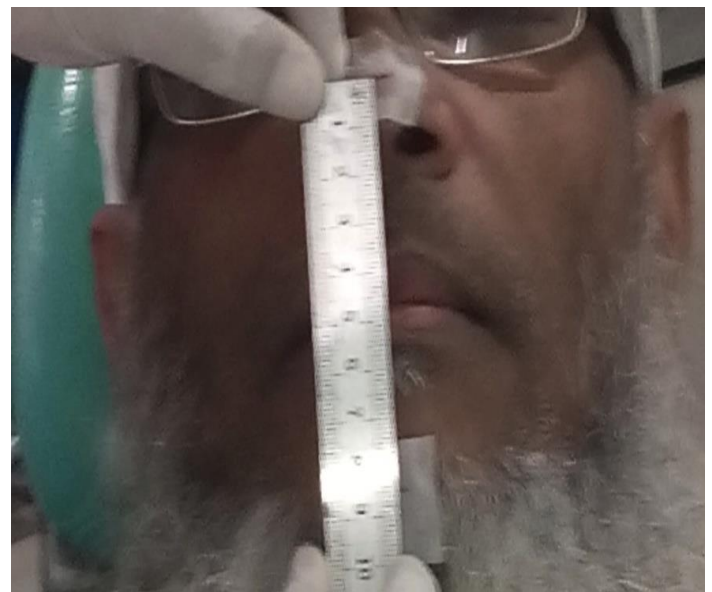
**Figure 1.** Orthopantomogram of the patient showing severe wear on occlusal surfaces with multiple endodontically treated teeth on both jaws.

Impression was taken with irreversible hydrocolloid, and casts were constructed by pouring with type III dental stone, duplicating the patient's present occlusion. (Figure-2).



**Figure 2.** Diagnostic cast.

Next the OVD was assessed as follows. The participant was advised to sit up straight and relax. Two reference points were marked on the tip of the nose and the tip of the chin using two triangular pieces of adhesive tape. The patient is then instructed to make functional actions such as wetting his lips and swallowing, as well as to pronounce the letter "m" a specified number of times. The patient is instructed to take a deep breath and relax his shoulders. This was accomplished by relaxing the suprahyoid and infrahyoid muscles. Following the above-mentioned motions, the patient's mandible returned to the physiological rest position before returning to the usual rest position. The centric relation (CR) position was therefore established in this manner. When the mandible was in its physiological rest or centric relation position, the distance between the two reference locations was measured with a scale. Thereafter, the patient was requested to close his mouth such that all of his teeth were in contact, or to conduct the occlusion at the utmost intercuspal position, confirming centric occlusion (CO). When the patient was in CO position, the distance between the two reference locations was measured again with a scale. Then the total space was calculated by subtracting the vertical height (VH) in CO from VH in CR. The standard freeway space (2-4mm) was deducted from the total space (5mm). Therefore, total OVD to be increased was 3mm (Figure-3).



**Figure 3.** Measurement of Vertical Height.

VH in Centric Relation: 80 mm, VH in Centric Occlusion: 75 mm, Total Space: 5 mm, Standard Freeway space: 2-4 mm, Therefore total OVD to be increased: 3 mm

After that the reduced vertical height of upper jaw was preliminary established by acrylic splint and in case of lower arch the reduced vertical dimension was established by

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composite restorations on all lower teeth (Figure-4). In this way true vertical height was re-established with splint and restorations.

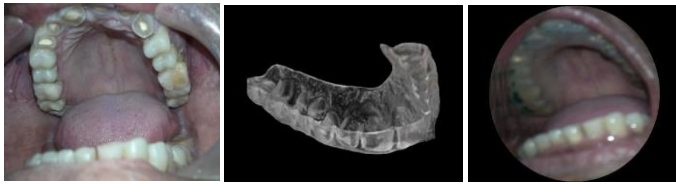


Figure 4: Re-establishing OVD using occlusal splint and composite restorations. (from left to right) i. Attrited Upper arch without splint & Composite restored lower teeth. ii. Custom made occlusal splint to compensate lost OVD, iii. Established vertical height with Splint & restoration

After 6 weeks, acrylic splint was replaced with composite restoration, that means all teeth of upper arch were restored with composite. In this way patient remained upto next 6 weeks. After 6 weeks, the composite restorations of upper anterior arch were replaced by temporary prosthesis (Figure-5).



Figure 5: Re-establishing OVD using provisional restorations and final restorations. (from left to right) i. Restored upper & Lower teeth with Composite, ii. Provisional restorations with temporary crowns, iii. Final restorations on upper incisors

Next we replaced all the lower composite restorations from lower anterior arch with temporary prosthesis. Having the anterior relationship established with temporary prosthesis and patient feels comfortable with it with no complaints, we replaced all the temporary prosthesis with final prosthesis that is full veneer crown (FVC). After establishing the anterior true vertical height, we gradually developed the true vertical dimension of occlusion using the same procedure in upper arch, followed by lower arch.

After re-establishing true OVD all centric and eccentric movements were evaluated properly (Figure-6). The patient's physiological resting position (facial muscle relaxation), adequate phonetics, aesthetics, and swallowing abilities were all used to evaluate the re-established OVD.



Figure 6. Final restoration on centric and eccentric movements

#### DISCUSSION

Before treating a case with FMR, it is of paramount importance to know that severe wear does not always cause reduced OVD. Also emphasis should be given to the facts that severely worn out teeth also not eliminate all defective occlusal interferences, even with flat occlusal surfaces. The intervention of patients with persistent occlusal wear is complicated and challenging to address, making it one of dentistry's most challenging issues<sup>7,15,16</sup>. Patients are increasingly interested in rehabilitation techniques. Since these situations get more challenging, issues connected to the patient's OVD re-establishment must be studied because its recovery is critical for creating prosthetic works<sup>11</sup>, despite the fact that it is not taken into account in the majority of instances. Physiologically, all teeth wear as a result of functional activity; however, this process can be accelerated and intensified when posterior elements are lost, causing overloading of the remaining anterior teeth and increasing the potential for wear<sup>10</sup>, occlusal disorders, and parafunctional habits such as bruxism<sup>17-19</sup>. Bruxism is defined as the parafunctional grinding of teeth, or an oral habit characterized by involuntary rhythmic or spasmodic nonfunctional gnashing, grinding, or clenching of teeth, other than chewing motions of the mandible, which may result in occlusal injuries. There is no single cause of bruxism, but some etiologic factors include: morphological factors such as dental occlusion, psychosocial factors such as stress and certain personality traits, pathophysiological factors (i.e., diseases, trauma, genetics, smoking, alcohol, caffeine intake, illicit drugs and medications), and sleep disorders (sleep apnea and snoring)<sup>20</sup>. The parafunctional load of bruxism is initially applied on dental enamel. When the mandible changes from side to side, large horizontal stresses are applied to the teeth, which is not well-accepted and increases the possibilities of tooth and/or supporting structural injury. Furthermore, bruxism occurs in eccentric postures, which results in the application of high

stresses to a few teeth rather than many, as occurs in functional activity when the jaw is at or near the centric occlusion position<sup>19</sup>. Tooth sensitivity, excessive reduction of clinical crown height, and probable alterations in OVD owing to the degree of dental wear are all connected with tooth tissue loss caused by this parafunction<sup>21-23</sup>. Pathological wear is associated with excessive for the patient's age, necessitating treatment for functional and/or cosmetic reasons<sup>24</sup>. When the teeth are in occlusion, increased OVD causes dental contact during sibilant sound emission, difficulty with lip closure, difficulty swallowing, and pain<sup>25</sup>, whereas decreased OVD causes an exaggerated closure that is detrimental to the temporomandibular joint, excessive lip contact, and angular cheilitis<sup>26</sup>.

In the case of critical wear in the anterior area, the first step is to re-establish the occlusal dimension, which should be done to restore the height of the bottom third of the face and generate interocclusal space to allow for occlusal reconstruction, anterior and canine guiding<sup>10</sup>.

The Academy of Denture Prosthetics defined the occlusal vertical dimension in 1989 as the height of the patient's facial profile measured by two points chosen from the maxilla and mandible when the teeth are in occlusion, and the rest vertical dimension as the height of the patient's facial profile measured by two points when the mandible is in the rest position<sup>6</sup>. Whenever the mandible will be at resting, there is a vertical gap between both the occlusal surfaces of the maxillary and mandibular tooth surfaces known as freeway space (FWS), which is approximately 2-3 mm wide<sup>27</sup>. OVD has been measured using a variety of methods. However, no approach is scientifically precise, with anatomical, phonological, and metrical ratios being the most widely utilized<sup>28</sup>. Yet another factor that makes OVD re-establishment a challenging operation is the fact that no approach for OVD determination has been scientifically shown superior to anybody other to be employed during OVD restoration<sup>29</sup>, and the other is that the postural rest posture is not established.<sup>10</sup> A comprehensive prosthetic rehabilitation strategy should not attribute the re-establishment of occlusal vertical dimension (OVD) to new prostheses at the risk of the patient failing to adapt to a new vertical dimension condition. OVD restoration should be accomplished gradually. The rehabilitative treatment necessitates a trial phase of OVD repair with the use of interim prosthesis. There is no uniformity on the length of adaptation for the patient to the new VD, but according to the literature study, the minimum is an interval of 04 weeks, while in the current instance we utilized an interval of 06 weeks. TMJ pain, chewing, swallowing, speaking, and appearance are all factors that should be carefully considered. Loss of OVD must be treated in a patient who grinds his or her teeth, even if the patient does not have painful symptoms, because this

parafunction has the potential to impair the aesthetics and function of the masticatory apparatus<sup>24</sup>.

## CONCLUSION

Tooth wear results in dimensional alterations in face morphology and a decrease in OVD. The precise evaluation of occlusal vertical dimension is a success element in rehabilitation treatment because if it is not adequately repaired, maintaining it lowered, there may be harm to the teeth, muscles, TMJ, swallowing, and speech. The therapy using occlusal splints, provisional restorations, and final restorations offered the re-establishment of acceptable standards of function, aesthetics, and comfort, and may be deemed a suitable rehabilitative approach in OVD reduction scenarios. The rehabilitation procedure did not give the patient any uncomfortable symptoms, and the outcome was fairly excellent since the patient was quite happy with the recovery of the previously committed aesthetic.

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## CONFLICT OF INTERESTS

The authors state that the publication of this manuscript does not include any conflicts of interest.

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