Case Report

University J Dent Scie 2026; Vol. 12, Issue 1

Conquering Deep Overbite: Strategies for Restoring Functional Bite Synchronising with Associated Structures

Abstract:

Increasing the vertical dimension of occlusion (VDO) is a common practice in the management of severely worn dentition to achieve sufficient space for restoration. It may also be necessary for aesthetic reasons, such as in cases of short lower facial height, deep/complete bite, or incomplete eruption of teeth.

Deep overbite can be managed by opening the posterior bite with anterior teeth in contact with the help of a modified Dahl's appliance. Deep overbite situations can also be corrected by different types of removable and fixed orthodontic appliances causing intrusion and extrusion of teeth. The choice of depends on the individual patient's needs and preferences. It is important to carefully consider the risks and benefits of increasing VDO before making a decision.

Key-words: Deep bite, Functional occlusion, Smile correction, Passive eruption, unilateral splint

Introduction:

It is a general practice to increase the vertical dimension of occlusion (VDO) to achieve sufficient space for restoration in the management of severly worn dentition. Sometimes increasing VDO is necessary in other cases also to improve aesthetics as in short lower facial height, deep/complete bite, incomplete eruption of teeth. In presence of inadequate space, restoration or prosthesis provided, holds high chances of fracture or failure.

Vertical dimension of relation(VDR) and VDO are changeable and adaptable to certain extent. Atwood stated that VDR remains constant even after the loss of tooth contacts.[1] Warren stated that there is a great possibility of adaptation if VDO is not increased extremely and does not encroach into VDR.[2]

However, VDO increase should be done cautiously, as it can lead to fractures or failure of restorations or prostheses. VDO is adaptable to a certain extent, and there are four basic modalities of increasing it: occlusal overlay splints, temporary cover dentures, Dahl's modality, and orthodontic bite raising appliances.

Overlay splints are generally used for 4 months to get the patient accustomed to the newVDO. It evaluates the response of patient's TMJ to the new OVD. These splints are fabricated in mutually protected occlusion protrusive guidance and canine protected occlusion in lateral movements.[3-4] Cover dentures are tried for for 6–7 weeks to test the patient's acceptance to increased VDO. Aesthetics can be restored by this modality; hence patient's compliance is better for it than the overlay splints. Deep overbite can be managed by opening posterior bite with anterior teeth in contacts with the help of modified Dahl's appliance.[5,6]

[1]PRIYANJALI PAUL, [2]JAHAR ROY, [3]MITALI MAJUMDER

[1]Department of Prosthodontics, Dr. R. Ahmed Dental College and Hospital, Kolkata

[2,3]Department of Prosthodontics, Burdwan Dental College and Hospital, Burdwan

Address for Correspondence: Dr. Priyanjali Paul
Assistant Professor,
Department of Prosthodontics, Dr. R. Ahmed Dental College and Hospital, Kolkata
Email : priyanjalipaul48@gmail.com

Received : 31 March, 2025, **Published :** 31 March, 2026

Access this article online

Website: www.ujds.in

DOI: https://doi.org/10.21276/ujds.2026.12.1.15

How to cite this article: Paul, D., Roy, J., & Majumder , M. (2026). Conquering Deep Overbite: Strategies for Restoring Functional Bite Synchronising with Associated Structures. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 12(1).

Deep overbite situations can also be corrected by different types of removable and fixed orthodontic appliances causing intrusion and extrusion of teeth.[7]

Case Report:

A boy of 20 years old came to our department with missing lower right central and lateral incisors and left central incisor. He lost these teeth a year back because of an accident. In addition he had generalized spacing in the upper anterior teeth with peg lateral 12,22. On examination we found that he has deep bite condition which was hindering the fabrication of any sort of prosthesis (Fig1). Considering his age and esthetic demands we decided to go for a fixed partial denture prosthesis but which was only possible after the correction of deep bite condition.

Treatment Plan:

Enhanced VDO leads changes in interocclusal relationship as the mandible retruds posteriorly. Desired occlusal relationship can be achieved by controlled mandibular glide and repositioning by myofunctional appliance.

So We planned and anterior inclined plane characterised with a tunnel placed near the free margin (anterior) of the inclined plane. Inclined plane glides the mandible anteriorly and tunnel with its location conforms the newer mandibular position following kokhis approach for newer plane of occlusion.

Along with this we decided to use the supra-eruption capability of natural teeth to combat this situation. Next we planned to fabricate a tooth coloured acrylic splint of around on the right lower quadrant of the jaw which in turn will produce interarch gaps on the left side of jaw. To compensate this gap the teeth on the left side of the jaw will supra-erupt and the vertical dimension will automatically be raised.

To keep occlusion plane correct we wanted the lower jaw Teeth only to be supra-erupted. So in order to prevent any supra–eruption from upper arch teeth planning was made to fabricate a clear acrylic resin plate with tunnel in the anterior inclined and adams clasps over right and left 1st premolar and 1st molar(Fig.3). This retention plate with Adam clasps will keep the upper arch integrated and prevent any sort of movement.

Fig.1: preoperative intraoral view

Methods:

For this purpose we first made upper and lower arch impression with alginate (Algitex). Cast was poured with dental stone(Kalstone,kalabhai). Next we measured the vertical dimension of rest and occlusion of the patient. As he had a collapsed lower facial height, we calculated that a rise of 2.5 mm vertical dimension of occlusion will be possible without encroaching the free way space.

2.5 mm hike posteriorly will lead creation of 5mm open up anteriorly according to rule of third.[2] Anterior inclined plane glides the mandible.Desired amount of overjet and overbite was achieved by the thickness of inclined plane and location of the tunnel in the inclined plane.

After analyzing the facial esthetics and free way space, we recorded the bite in wax at the desired VDO. Casts were mounted in the articulator. After removing the wax bite an unilateral splint was made involving lower right canine to second molar using tooth coloured acrylic resin. (Fig.2).

Fig.2 : Clear acrylic resin inclined plate with tunnel with adams clasps

Fig 3: Unilateral splint creating space for supraeruption of contralateral side

On delivering the acrylic inclined plane and the splint, we achieve 2.5mm gap on the left sideof the jaw.The patient was asked to wear these appliances continuously and meticulously for 4 weeks.

After 4 weeks we found that the space present between the upper and lower teeth on the left side, is occupied by the supreruption of left lower teeth to the desired occlusal height. Then the patient was asked to discontinue the use of splint on the right side. As a result now 2.5 mm gap was created on the

right side of the jaw as the left side of the jaw was stable at the achieved occlusal height.

Again after 4 weeks as we did the follow up and identified that the lower teeth on the right side has also undergone supraeruption to the desired level. Now as the the goal of raising the vertical height was accomplished maintaining the occlusal level, we planned for final restoration.(Fig.4)

Fig.4: Crown preparation after achieving desired vertical dimension

Crown preparations were done for 32,33,43,44 for PFM restorations. Impression was made with single mix putty (Dentsply Aquasil) and light body (Dentsply Reprosil) material. Cast was poured with die stone(Dentrock). Shade selection was performed under daylight condition. Provisional restoration was placed.

Cast was sent to the laboratory for final PFM bridge fabrication. On the next appointment after removal of temporary restoration,final bridge was tried in the patient mouth. Occlusal prematurities were checked and removed. Interferences were checked in protrusive and lateral excursive movements. After final polishing the FPD was cemented with Type 1 GIC cement. Excess cement was removed after initial setting.(Fig.5)

Fig.5: Final PFM restoration

Discussion:

The patient was presenting with lower anterior facial height and deep bite , gaining enough space for restorative material was our prime motto.

Increased vertical occlusal dimension by elevation of mandibular premolars and molars and reduction of anterior overbite by using anterior bite plane is of common knowledge.This fact was noted by Quinsby and probably by others before him. The reason for this change has not been firmly established. Bonwill,Salzman, Bahar&Highley, Hemley, Breitner have indicated the passive eruption of mandibular molars along with intrusion of mandibular incisors. That depression of mandibular incisors alone is responsible for the changes mentioned by Jackson,Meherson and Wolfson. That molar eruption accounts for the improvement noted seems to have been the opinion of Davenport, Strange and Hopkins. Either depression of the lowerincisors or eruption of mandibular and maxillary molar or both have been suggested and denied.

Anterior Bite plate promotes muscle re-education by preventing contact between the upper and lower front teeth, the plate aims to influence the resting position of the tongue and lips. This can potentially influence muscle activity and encourage proper lip seal and tongue posture, which are key aspects of myofunctional therapy.

Anterior bite plates can indirectly influence jaw positioning by reducing muscle forces associated with deep bites or anterior open bites. This can contribute to correcting or preventing skeletal malocclusions, which is an objective of some myofunctional approaches. Unlike true myofunctional appliances that actively train and re-educate the muscles, anterior bite plates work passively by simply creating a physical barrier between the teeth. This passive approach might not be as effective in achieving long-term changes in muscle function and posture.

Increasing VDO by passive eruption is due to the effect of musculature, occlusal force, and bony growth of the dentoalveolar complex. The amount of passive eruption is determined by availability of freeway space and closest speaking space and rest position. It is difficult to understand why the normal position doesn't take advantage of this space. The free way space is a static interocclusal space at rest whereas the closest speaking space is a dynamic interocclusal space during speaking. These spaces are always habitual in nature. The amount of free way space and closest speaking space depend upon rest position rather plays a key role.

The rest position of mandible is in a sling of muscles that pull in opposite directions. When the muscles are in their resting stage, teeth are separated. The space between the arches is called freeway space. several studies found stability in the mandible in constant position at rest but group of authors stated that Anything (such as stress) can alter the balance between the opposing muscle.[8]

Multiple factors influence mandibular rest position such as pain,fear,anxiety,any disorder(s) involving the mandibular motor complex, activity of the lips,head posture,following

extraction of natural teeth- occlusal stops,Wearing denture,Parafunctional habit ,Time of recording,The technique used for obtaining the rest position.[9]

It is advocated that any alteration in the occlusal vertical height during restorative procedures is not safe for the stomatognathic system of the patient. However, more studies have shown that moderate increase in the vertical dimension and occlusion are well tolerated provided that a stable position of mandibular closure with anterior guidance is achieved.

Study on adaptability of the stomatognathic system for temporary increase in the OVD by splints in TMJ disorder confirms OVD is not constant and changeable to some extent. Warren stated that there is a great possibility of adaptation if OVD increase is not extreme and does not encroach into VDR.[2]

When OVD is increased within or equal to the pre existing VDR position, muscle activity/tonus is kept to minimal levels and hence there is no muscular tendency to rebound. If OVD is increased above VDR, muscles tend to re-establish the original dimension by compressing tooth into the socket results in tooth mobility, bone resorption,tooth intrusion, strain or fatigue of muscles.[10,11]

In this case the VDO was increased 2.5 mm due to passive eruption of premolars and molars. Newer occlusal plane was established following kokchis approach. We considered the direction of passive eruption to get newer class I occlusal relationship.

In the most of the mammals, the lower arch closes with the upper arch, that is the lower incisors pass up the inside surfaces of their maxillary antagonists causing labial forces on their upper end and lingual forces on the lower incisors, at the same time, active forces on the mandibular premolars and molars in the direction of vertical, medial and buccal in nature whereas on the maxillary premolar and molars,this forces are outward tilting in nature.

Thompson and Brodie in their study focused interest on the path followed by the mandible as it travels from its position of rest to that of full dental occlusion, ultimately snow shoe effect become effective whenever lower occlusal surface comes up with the upper occlusal surface.[12]

KengoToril, Ichiro Chiwata suggested evidence based occlusal adjustment using the bite plate induced occlusal position(BOP) as a muscular position should be evaluated in patient. The percentage of symptom free patient was 86% according to SDI and 76% according to CDI.

The changes stated by Saltzman are forward positioning of condylar head and the region of TMJ, Opening of the bite anteriorly either by intrusion and/or extrusion or both of the posterior and anterior tooth, Facial outline changes, Changes to occlusal plane and Changes in the gonion angle with related musculature, Changes of swallowing pattern activity of masticatory muscles.

OVD may be assisted by utilizing an inter occlusal appliance or temporary cowns that can be fabricated at the increased OVD. Permanent occlusal changes should only be attempted after the patient has demonstrated adaptability at the new vertical dimension. The evidence available to the date indicates that the stomatognathic system has the ability to adapt rapidly to moderate changes in OVD (<5mm).

Both reviews by Moreno-Hay and Okeson (2015) and Abduo and Lyons (2012). concluded that the TMJ adapts to increased OVD.In some patients, mild transient symptoms of TMD may occur, but they are most often self-limiting and without major consequence.[13,14]

Strict variation of VDO causes a mandibular rotation around the hinge axis. This rotational condylar movement is completely physiological and induces a very limited intra-capsular movement. An increase by 1 mm on the incisors level is equivalent to a shift of the condylar disc interface of 0.1 mm. So, with healthy TMJ, increase or decrease in VDO will not cause any joint changes.

References:

1. Atwood DA. Clinical factors related to variability of the rest position of occlusal contacts. J Prosthet Dent. 1958;8:698. doi: 10.1016/0022-3913(58)90057-X.
2. Rivera-Morales WC, Mohl ND. Relationship of occlusal vertical dimension to health of masticatory system. J Prosthet Dent. 1991;65:547–553. doi:10.1016/0022-3913(91)90298-B.
3. Ganddini MR, et al. Maxillary and mandibular overlay RPDs for the restoration of worn teeth. J Prosthet Dent. 2004;91:210–213. doi: 10.1016/j.prosdent.2003.12.021.
4. Sato S, Hotta TH, Pedrazzi V. Removable occlusal splint in the management of tooth wear—a clinical report. J Prosthet Dent. 2000;83:392–395. doi: 10.1016/S0022-3913(00)70032-1.
5. Dahl BL, Krogstad O, Karlsen K. An alternative treatment in cases with advanced localized attrition. J Oral Rehabil. 1975;2:209–214. doi:10.1111/j.1365-2842.1975.tb00914.x.
6. Mirzani B. The Dahl principle: creating space and improving the bio-mechanical prognosis of anterior crowns. Quintessence Int. 2006;37(4):245–251.
7. Proffit WR, Fields HW, Sarver DM (2011) Contemporary Orthodontics, 4th edn. Elsevier, St. Louis , pp 536–538.
8. Atwood DA. A critique of research of rest position of the mandible. J Prosthet Dent.

9. Tryde G, McMillan DR, Christensen J, Brill N. The fallacy of facial measurements of occlusal height in edentulous subjects. J Oral Rehabil 1976;3:353–358.
10. Ramford S, Blankenship J. Increased occlusal vertical dimension in adult monkeys. J Prosthet Dent. 1981;45:74. doi: 10.1016/0022-3913(81)90015-9.
11. Beyron HL. Characteristics of functionally optimal occlusion and principles of occlusal rehabilitation. J Am Dental Asssoc. 1954;48:648–656.
12. Thompson JR (1946) The rest position of mandible and its significance to dental science. J Am Dent Assoc.
13. Moreno-Hay, I. and Okeson, J.P. (2015), Does altering the occlusal vertical dimension produce temporomandibular disorders? A literature review. J Oral Rehabil, 42: 875-882
14. Abduo J, Lyons K: Clinical considerations for increasing occlusal vertical dimension: a review. Aust Dent J. 2012;57:2-10
15. Myofunctional Orthodontics: An Evidence-Based Approach" by William R. Proffit (2007)
16. Bolendeŕ CJ. Orthodontic treatment of overbite by the Tip Edge technique in conjunction with an anterior bite elevator. Part 1. Orthod Fr. 2001 Dec;72(4):375-86. French. PMID: 11820029.