

REVIEW

Re-establishment of an occlusal vertical dimension: A literature review

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ABSTRACT

Keywords: Restorativ treatment, Vertical dimension, Parafunctional habits

Determination of the correct Occlusion vertical dimension (OVD) is one of the factors that dentists need to pay attention to in important dental procedures. One of the most important strategies of restorative care is the assessment and re-establishment of the occlusal vertical dimension. Tooth attrition causes changes in facial morphology dimensions and OVD decreases. The occlusion vertical dimension (OVD) was the height of the lower third of the face as measured from the point of subnation to gnathion at the maximum intercuspation position. One of the factors that affect a person's occlusion vertical dimension is the presence of tooth abrasion, attrition and tooth loss. One way to improve a patient's occlusion vertical dimension is by rehabilitative action with restorative treatment by making crowns for teeth experiencing anterior attrition. Tooth attrition causes changes in facial morphology dimensions and occlusion vertical dimension decreases. Determination of the correct occlusal vertical dimension is one of the success factors in rehabilitation treatment, because if it is not restored properly, the guard teeth will decrease, damage to the teeth, muscles, TMJ, swallowing and can occur speech disorders. (IJP 2024;5(1):6-8)

INTRODUCTION

According to the Glossary of Prosthodontic Terms, the vertical dimension is the distance between two anatomical signs, namely the upper half of the face and the lower half of the face. This anatomical sign is a point on the tip of the nose and tip of the chin, where one of the points is on movable tissue and the other point is on immovable tissue.

The occlusion vertical dimension (OVD) is the height of the lower third of the face measured from the point of subnation to the gnathion at the maximum intercuspation position, while the vertical dimension of rest is the height of the lower third of the face measured between two anatomical points when the mandible is in a physiological resting position. It is determined by muscle relationships, using the lower jaw physiological resting position as a guiding factor. Knowledge of the physiological resting position is very important in determining the vertical dimension of adequate occlusion.¹⁻³

The centric relation can be defined as the relationship between the maxilla and the mandible in which the condyle is in a non-tense position and lies posteriorly in the fossa glenoid.

The presence of tooth loss results in the influence of a number of factors, including: location, number of missing tooth elements, interdigitation, condition of the periodontal tissue and tongue. In addition to these things, there are also other influencing factors, namely: age, ability to adapt to changes due to tooth loss and neuromuscular tolerance.⁴⁻⁸

Some of the consequences that occur due to tooth loss that is not replaced area decrease in the support of the alveolar bone periodontal tissue, attrition, tooth loss and TMJ dysfunction, loss of mastication efficiency, tooth shift and changes in the occlusal arch.¹⁻⁶

Occlusal and incisal attrition may occur during deglutition (physiological wear) and may be exacerbated by parafunctional activities such as habitual bruxism

and clenching (pathological wear). Glossy tooth surfaces and circumscribed facets are clearly reliable signs of attrition and are usually consistent with the presence of a facet on the antagonist/opposite tooth during eccentric occlusion, especially in the anterior antagonist tooth. Such facets are usually seen on the functional (occlusal and incisal) surfaces of the teeth, but can also affect the buccal and palatal surfaces of teeth anterior to the mandible and maxilla when there is deep vertical overlap.⁴

Preventive measures are one of the ways to rehabilitate teeth so that they can restore the occlusion vertical dimension. Based on this, the authors are interested in studying more deeply about how to re-establish the vertical dimension of occlusion and its rehabilitation measures.⁷

LITERATURE REVIEW

The jaw relationship is also known as the vertical dimension, the vertical dimension is the vertical distance between the upper and lower jaws that can give a normal expression to a person's face.

The vertical dimension in patients with partial tooth loss is the vertical relationship between one tooth and another when the tooth is in occlusion. In a patient who has lost a tooth in one arch and has practically lost the vertical dimension, this situation must be redefined in various ways so that it is the same as the vertical dimension when the teeth are still complete.^{8,9}

To find out whether the vertical dimension is correct, it can be seen from phonetics and aesthetics.

Rest position vertical dimension; It is an upper jaw relationship in which the muscles of opening and closing the mouth are in balance. This vertical dimension was measured when the mandible was in a state of physiological rest.

Occlusion vertical dimension; An relationship of the mandible to the maxilla, the teeth or the occlusal rim are occluded.

This vertical dimension is measured when the tooth is in centric occlusion.

Gelbier and Copley and Cawson, dental attrition is defined as the gradual wear and tear of the occlusal surfaces of the teeth associated with masticatory movements. that occurs physiologically as a result of mastication.⁹

When the teeth contact, then when it occurs tooth wear occurs. The more frequent contact occurs, the greater the wear. The wear and tear caused by the contact of the teeth is called attrition. Attrition of this tooth can occur in the incisal, occlusal and proximal to the tooth. Considering that the enamel is so hard and that the teeth facing each other do not come into contact very often due to the presence of saliva as a lubricant, wear is usually limited when the teeth have been in the oral cavity for sometime.¹⁰

Some things that need to be considered in restoring the vertical dimension of occlusion are how much the decrease in the vertical dimension of occlusion, changes in facial aesthetics and the condition of the TMJ.

Measurement of Decrease in Occlusion Vertical Dimension

How to measure vertical dimension: Rest position vertical dimension; Determine two points on the patient's face parallel

to the median line, namely on the chin and above the lips/nose. Measurements were made using rollers and calipers.

The patient is asked to count from one to ten and maintain the position of his jaw at a count often, at which time the distance between the two points is measured.

Then the patient is asked to say a few words that end in "S" and the distance between the two points is measured again.

Then the patient was asked to swallow and in a relaxed state the third measurement was taken. If the distance between the three measurements is the same, this is the vertical dimension of the resting position.

Occlusion vertical dimension; Measurements were taken after the occlusal rim was placed in the patient's mouth.

The maxillary occlusal rim is inserted, then pay attention to the patient's facial shape whether it is in accordance with the patient's normal expression.

Then insert the lower jaw occlusal rim, the patient is asked to stop the upper and lower jaws in a centric occlusion state, measure the distance between the two points again, it will decrease 2-4 mm from the vertical dimension distance of the resting position. The called vertical dimension of occlusion.¹²

Facial Aesthetics

The determinants of facial aesthetics are the sagittal profile, facial appearance, lip morphology and tooth appearance. Examination of the sagittal profile may reveal pseudoprognathia which is a sign of decreased occlusion vertical dimension and mandibular closure. The cephalometric results showed that worn teeth caused a reduction in arch width and gonial angle, thus showing a pseudoprognathic appearance.

The state of TMJ

Examination of the TMJ before restoring the vertical dimension is important in the form of examination of joint pain, mandibular movement and the presence or absence of clicks. A comprehensive examination and treatment approach needs to be carried out, especially in patients with TMJ disorders, because TMJ symptoms are often detected because they are masked by patient discomfort during the adaptation period to the occlusion vertical dimension before permanent restoration.¹⁰

DISCUSSION

Bruxism is a parafunctional habits of grinding teeth, or the habit of grinding teeth involuntarily in addition to chewing movements of the mandible, thereby triggering occlusal trauma. The cause of bruxism is not specifically known, but several influencing factors are morphological factors such as tooth occlusion, psychosocial factors such as stress and certain personality characteristics, pathophysiological factors (disease, trauma, genetics, smoking, alcohol, caffeine consumption, drugs and sleep disturbances and snoring).¹⁴

Rehabilitation of patients with tooth wear in the occlusal area is a complex and challenging treatment in dentistry. Teeth are prone to wear and tear due to functional activity. However, this condition can be exacerbated in cases of posterior tooth loss because the chewing load will be concentrated on the remaining anterior teeth resulting in impaired occlusion and parafunctional habits such as bruxism.

When the mandible alternately moves laterally, the teeth



Figure 1. Vertical dimension measurement tool called Willis bite gauge

are subjected to great horizontal stresses, increasing the likelihood of damage to the tooth structure to the periodontal tissues. Bruxism also occurs in an eccentric position, resulting in an unequal distribution of pressure but only on a few teeth, does not conflict with functional activities where the mandible is in a centric position for occlusion. Wear of teeth due to parafunctional habits is associated with development of tooth sensitivity, decreased clinical crown height and possible changes in the occlusion vertical dimension. Loss of tooth structure does not directly result in loss of vertical dimension, so to determine whether there is a change in the occlusion vertical dimension, various aspects need to be considered such as how the posterior teeth are occluded, the degree of tooth wear, phonetic evaluation of hissing sounds, interocclusal distance and facial appearance. An increase in the vertical dimension of occlusion causes the teeth not to contact when making a hissing sound, difficulty in closing the lips and difficulty swallowing accompanied by pain, whereas if the vertical dimension of occlusion decreases, it shows a decrease in the face during occlusion, disturbances in the TMJ, excessive lip contact and angular cheilitis.¹⁵

The first step in cases of excessive wear in the anterior region consists in reshaping the occlusal vertical dimension, which must be done to restore the height of the lower third of the face and create an interocclusal space to allow reconstruction of the occlusal and anterior teeth.

Proper prosthetic rehabilitation planning should not link the re-establishment of the occlusal vertical dimension with the creation of a new denture with the risk of the patient not adapting to the new conditions of the vertical dimension. Inpatients with excessive tooth wear, rehabilitation of restoring the vertical dimension of the occlusion by means of a fixed

CONCLUSION

Attrition of the teeth due to functional and parafunctional activities can lead to changes in the morphological dimensions of the face and a decrease in the vertical dimension of occlusion correct is an important factor in the success of rehabilitation treatment, because the reduction in vertical dimension of occlusion cause tooth decay, muscle disorders, TMJ, digestion, and phonetic dysfunction. Rehabilitation vertical dimension of occlusion currently tend to use fixed dentures because they have better aesthetics, adaptation and functional improvement in patients. The use of removable dentures shows that there are complaints that often become complaints that arise due to the use of removable dentures.

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