

# OCCLUSION

Occlusal theory  
Temporomandibular disorders  
Occlusal disease  
Osteoarthritis of TMJ  
Disease of lateral pterygoid muscle (provisional name)  
Disease of retrodiscal tissue (provisional name)  
Centric relation  
Determining of centric relation  
Malocclusion  
Occlusal analysis  
Occlusal equilibrations  
Examinations and diagnosis for occlusal equilibration

Method of occlusal equilibration  
Case of occlusal equilibration  
Occlusal plane

## Theory of Vertical dimension

Smile design  
Anterior guidance  
Long centric  
Bruxism  
Noise of TMJ  
Occlusal splint  
Ideal occlusion



( OCCLUSION )

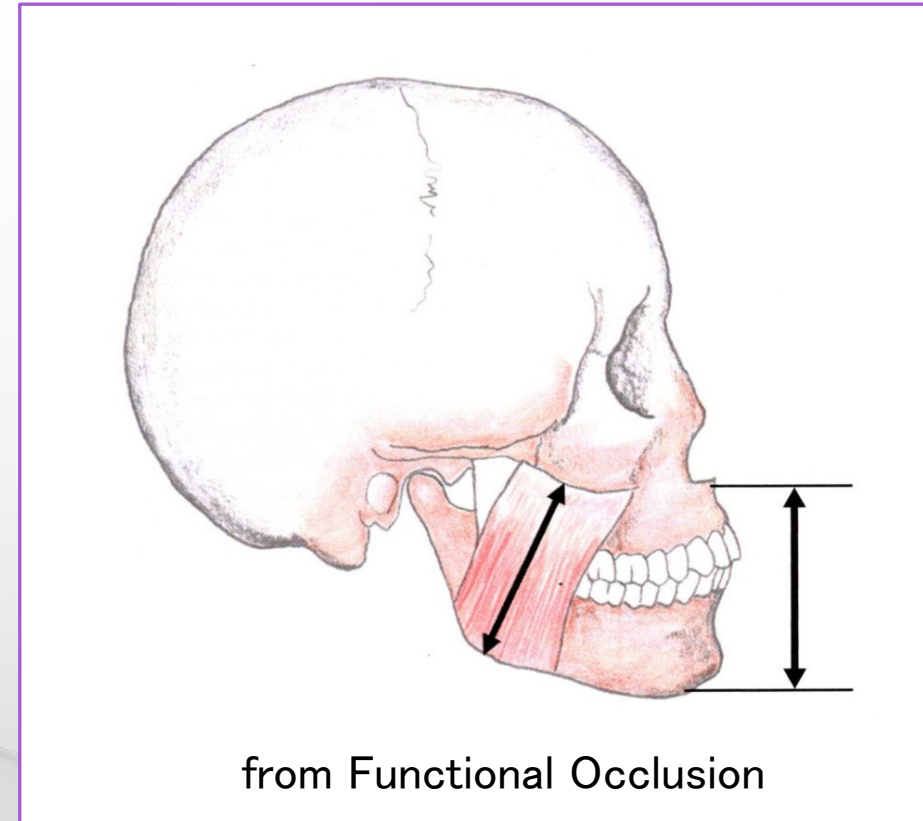
## Theory of Vertical Dimension

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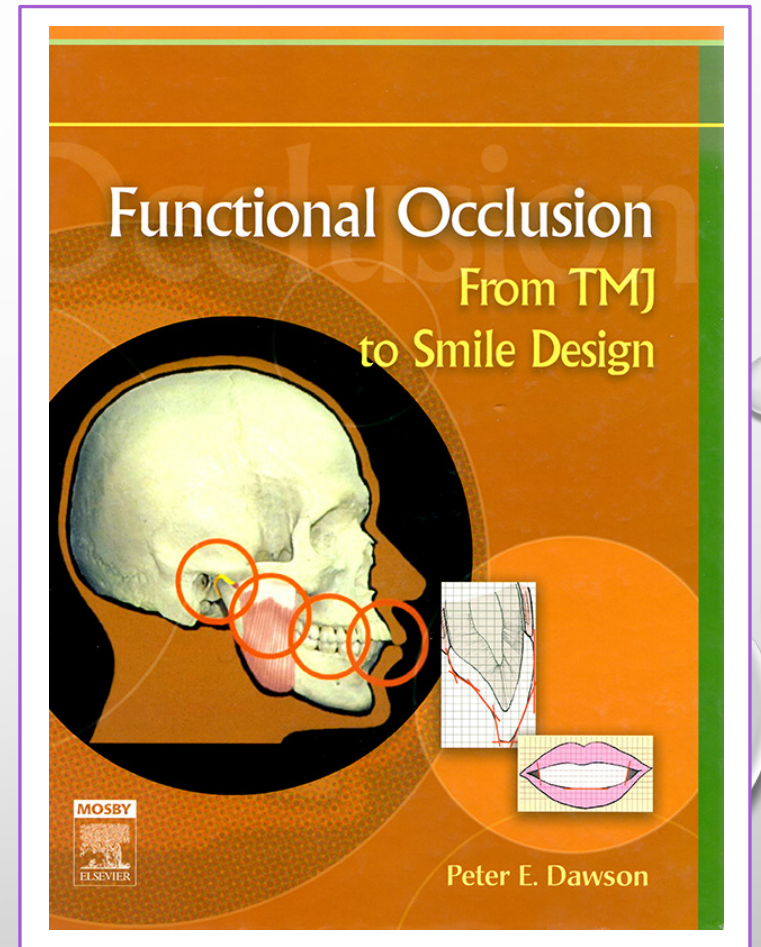


# ( THEORY OF VERTICAL DIMENSION )

## 1. Discussion on Vertical Dimension

The theory of vertical dimension is one of the issues in occlusion theory that is still debated by many researchers, and a unified view is still needed. Although researchers do not differ greatly in their interpretation of the term vertical dimension, there are considerable differences in how the term is used in clinical practice.

The following is an explanation of the term vertical dimension in the various professional literatures.

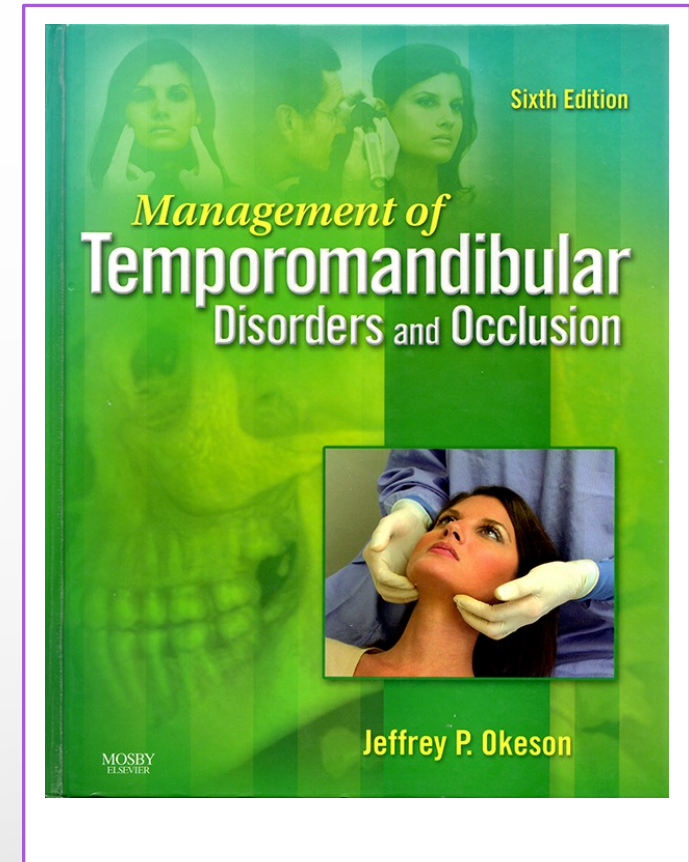


# ( THEORY OF VERTICAL DIMENSION )

## 2. Commentary by Okeson

The vertical dimension of occlusion represents the distance between the maxillary and mandibular arches when the teeth are in occlusion. It can be affected by loss of teeth, caries, drifting, and occlusal wear. A common condition that results in a loss of vertical dimension is created when a significant number of posterior teeth are lost and the anterior teeth become the functional stops for mandibular closure. The maxillary anterior teeth are not in position to accept heavy occlusal forces, and often they flair labially. Space is created between the anterior teeth as the vertical dimension decreases. This is referred to as a posterior bite collapse and can be associated with functional disturbances. On occasion, the vertical dimension is inatrogenically increased by the placement of restorations that are too high. Any alterations in the vertical dimension of occlusion, whether an increase or a decrease, are noted during examination.

Unlike Dawson's theory of occlusion, this commentary lacks an explanation of the disorders caused by an increase or decrease in occlusal height diameter. Therefore, it is difficult to apply this perception alone to occlusal analysis.



from Temporomandibular Disorders and Occlusion



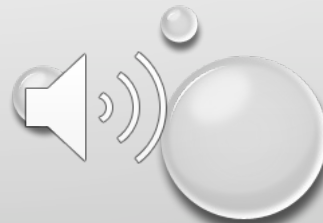
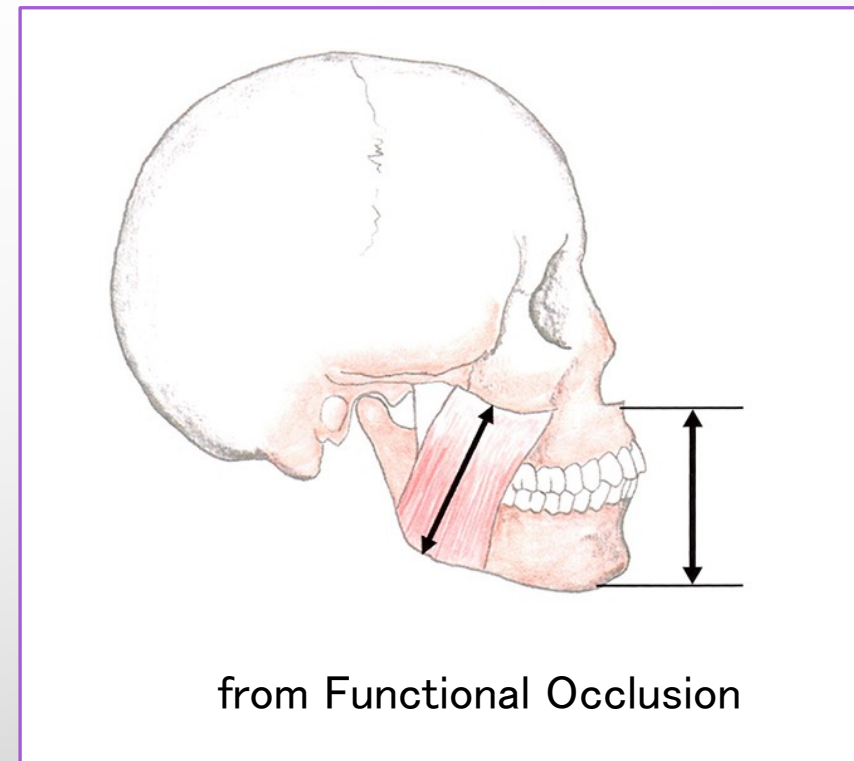
## ( THEORY OF VERTICAL DIMENSION )

### 3. Four Important Concepts of Dawson

There are four serious misconceptions about vertical dimension to get out of the way. You need to know:

- (1) You cannot determine vertical dimension based on whether the patient is comfortable.
- (2) Measuring the freeway space is not an accurate way to determine the correct vertical dimension of occlusion.
- (3) Determining the rest position of the mandible is not a key to determining vertical dimension.
- (4) Lost vertical dimension is not a cause of temporomandibular disorders.

Each of these will be explained.



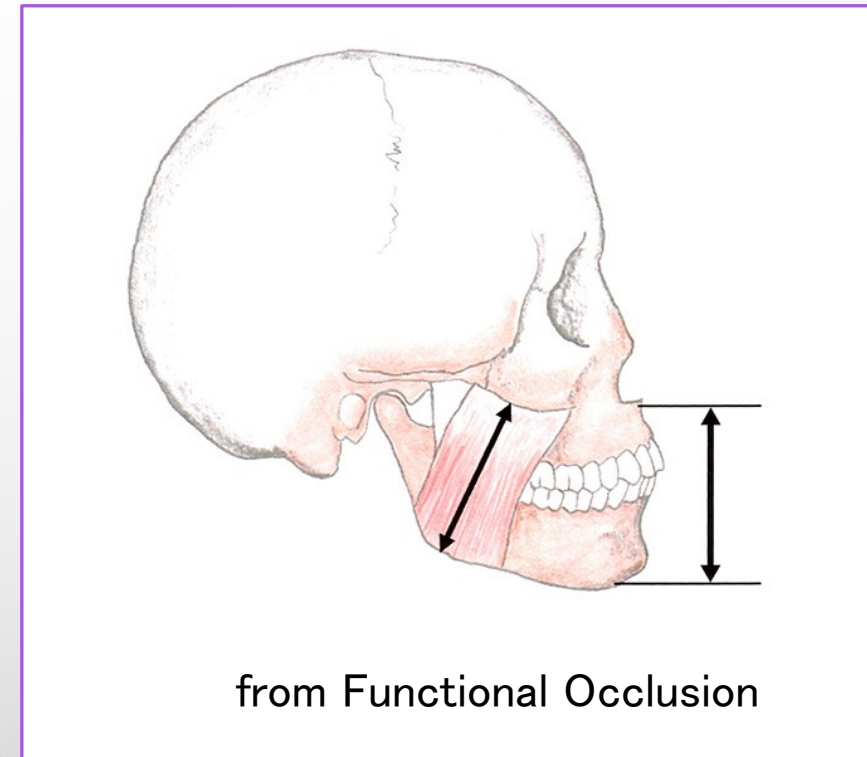
## ( THEORY OF VERTICAL DIMENSION )



### 3. Four Important Concepts of Dawson

(1) You cannot determine vertical dimension based on whether the patient is comfortable.

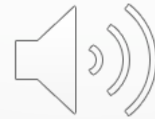
We can make patients comfortable at an increased vertical dimension. We can make them just as comfortable at a decreased vertical dimension, or at the same vertical dimension they had. We can place an occlusal splint at an increased vertical dimension and make patients comfortable. We can remove the splint and correct the occlusion, and they will be just as comfortable. Patients can tolerate or even be comfortable at a wide range of vertical changes. Comfort is not a determination of correct vertical dimension.



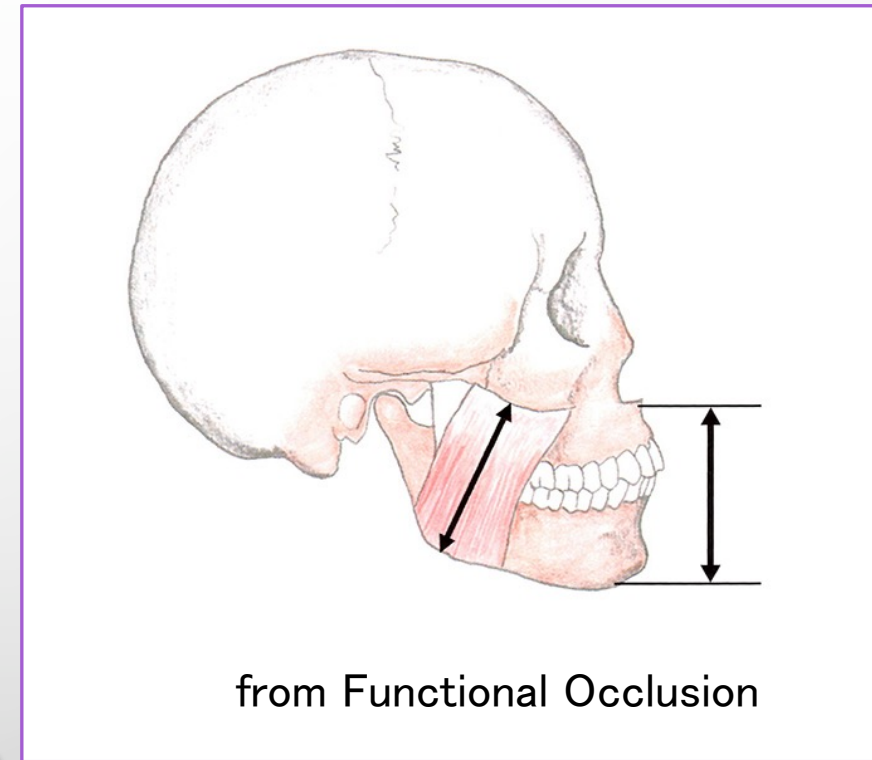
## ( THEORY OF VERTICAL DIMENSION )

### 3. Four Important Concepts of Dawson

(2) Measuring the freeway space is not an accurate way to determine the correct vertical dimension of occlusion.



Patients readily adapt to changes in vertical dimension and quickly develop a new freeway space. Freeway space is highly variable from patient to patient and at various times within the same patient.



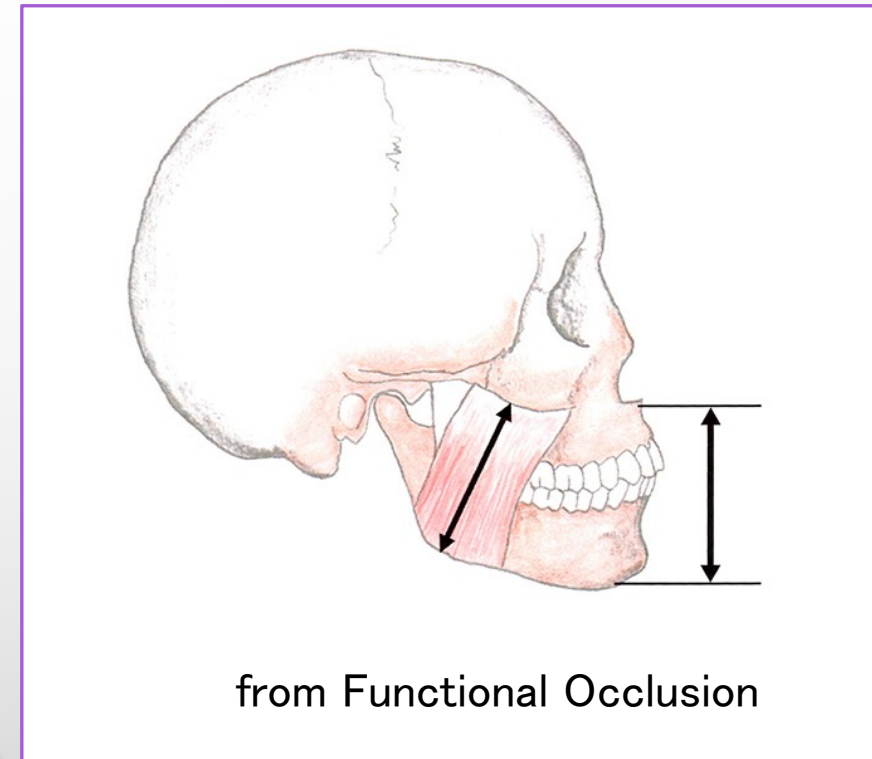
## ( THEORY OF VERTICAL DIMENSION )



### 3. Four Important Concepts of Dawson

(3) Determining the rest position of the mandible is not a key to determining vertical dimension.

One of the most serious flaws in the current promotion of so-called “neuromuscular dentistry” is the use of an artificially stimulated rest position as a guide to occlusal relationships. That too often results in overtreatment by unnecessarily increasing the VDO. As a determining factor in measurement of the freeway space, the rest position is too variable to establish a consistent pattern regardless of how it is determined.





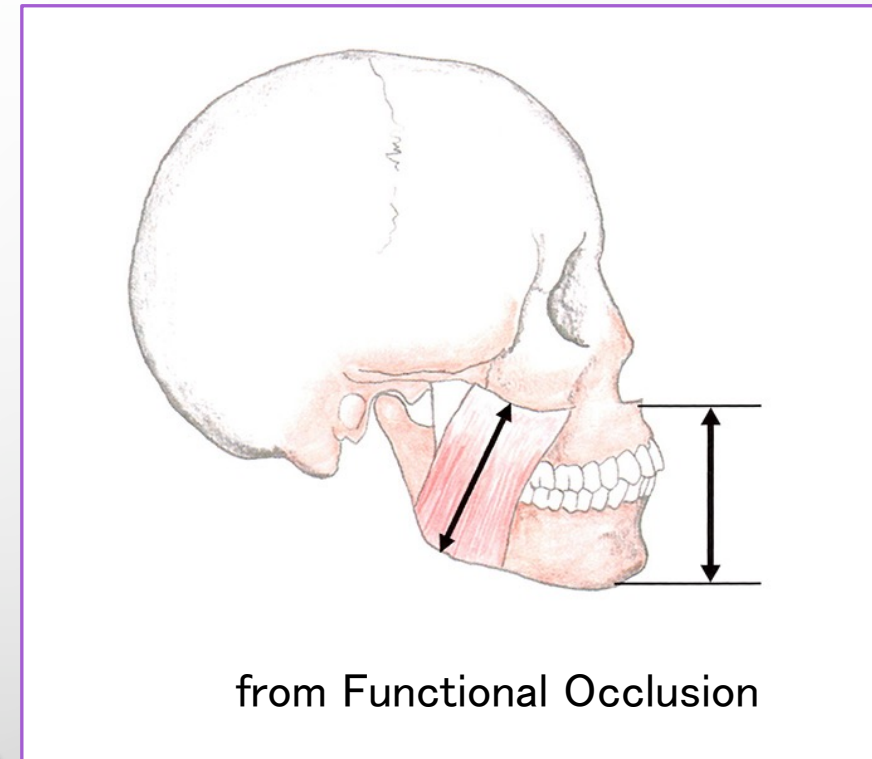
## ( THEORY OF VERTICAL DIMENSION )



### 3. Four Important Concepts of Dawson

(4) Lost vertical dimension is not a cause of temporomandibular disorders.

One of the most prevalent (and erroneous) are caused by a loss of vertical dimension. To understand why this is incorrect thinking, you must have an accurate perspective of the anatomy and biomechanics of the TMJs. The VOD is altered by rotation at the condylar horizontal axis. The misconception that the condyles move vertically up or down with changes in the VOD has led to misdirected attempts to “unload” the TMJs by increasing the VOD.



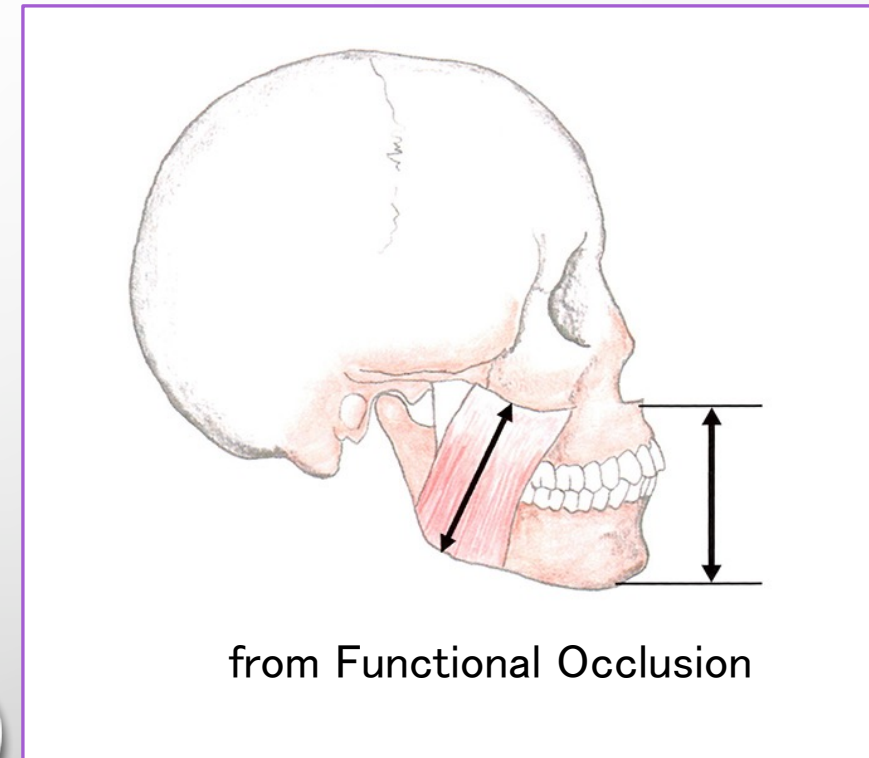
## ( THEORY OF VERTICAL DIMENSION )



### 4. Questions and Answers on Vertical Dimension

The big question: If altering the VDO does not cause discomfort and does not cause TMDs, why should we even be concerned about the VDO?

Answer: We should be concerned because failure to understand the physiology and biomechanics of vertical dimension has led to inappropriate overtreatment and has resulted in iatrogenic damage to dentitions and missed diagnosis of TMD, and because failure to understand the true nature of vertical dimension affects a major amount of the decisions every dentist must make in practice.



# ( THEORY OF VERTICAL DIMENSION )

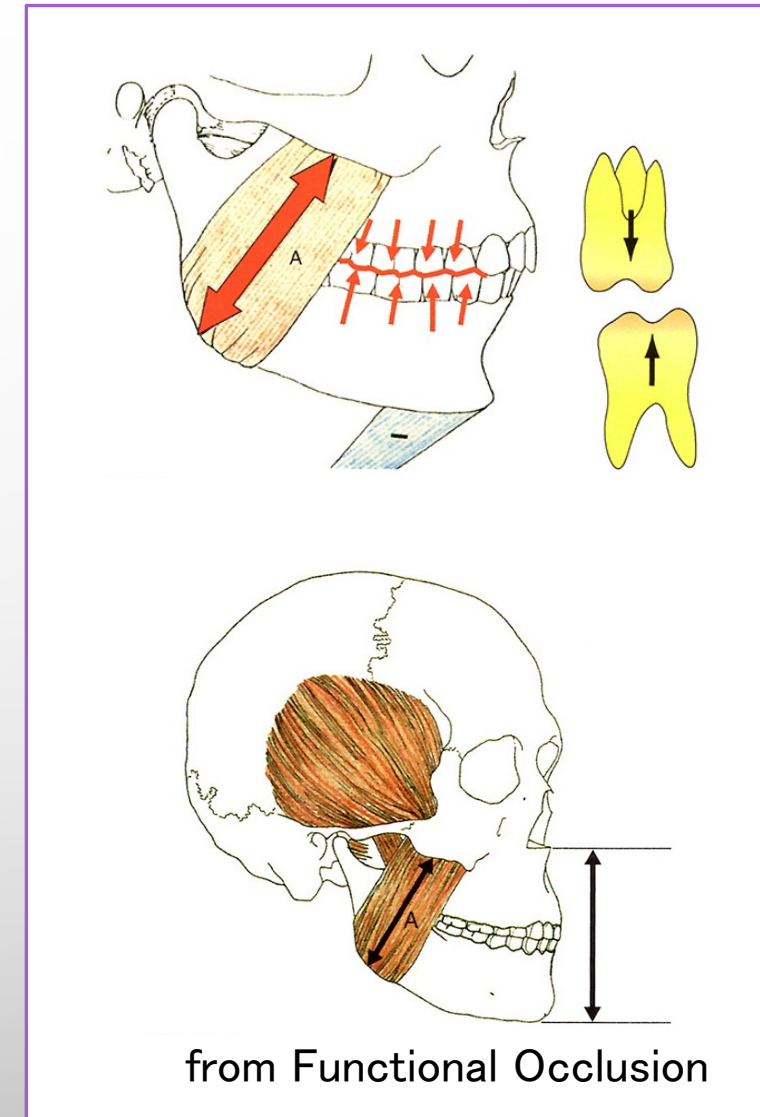
## 5. Dawson's Theory



### (1) Dawson's basic theory

Even though the VDO occurs when the teeth are fully articulated the teeth are not the determinants of vertical dimension. Rather, their position is determined by the vertical dimension of the space available between the fixed maxilla and the muscle-positioned mandible.

The most important thing to understand about vertical dimension is that the mandible goes repetitiously to the position dictated by the contracted elevator muscles (Fig: upper right). The upper and lower teeth erupt into the space until they meet at that jaw-to-jaw relationship (Fig: lower right). Thus the repetitive-contracted length during the power cycle of the elevator muscles sets the jaw-to-jaw relationship to which the teeth erupt.

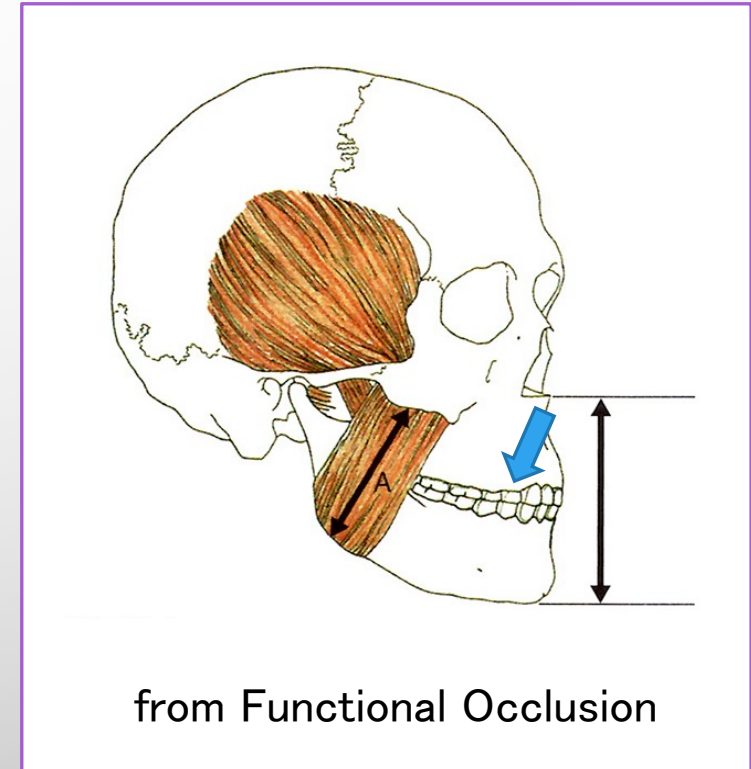


## ( THEORY OF VERTICAL DIMENSION )

### 5. Dawson's Theory

#### (2) Reasons why treatment with occlusal elevation is denied

Six months to a year after occlusal elevation, as indicated by the blue arrows in the right illustration, only adverse adaptive reactions will remain, such as tooth pressure and implantation in the alveolar bone, tooth erosion due to bruxism, and tooth movement due to decreased resistance of the periodontal tissue.



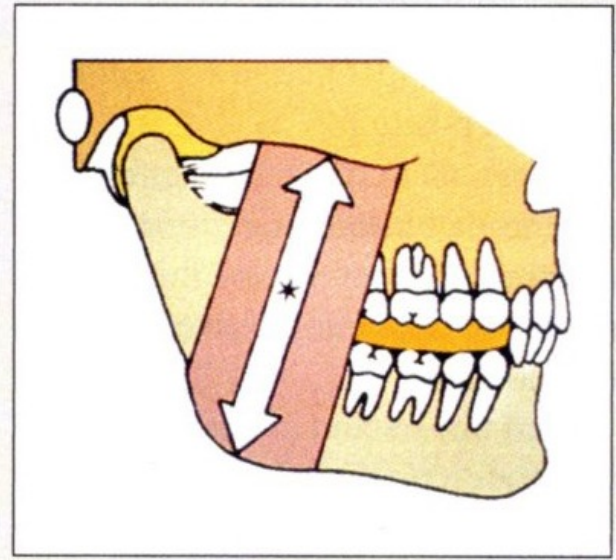
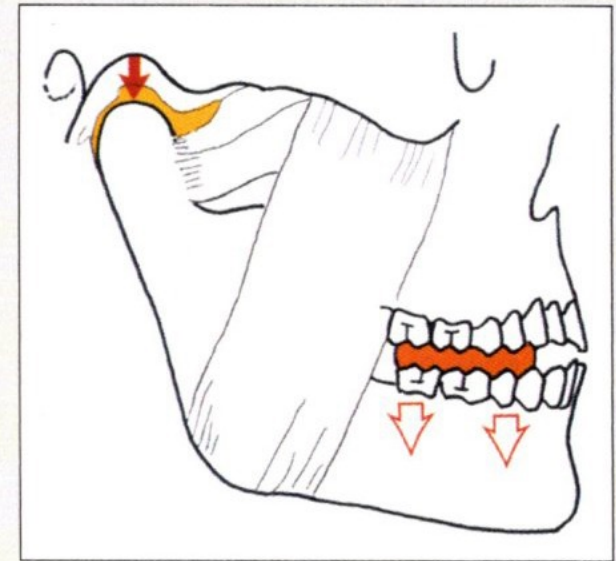
# ( THEORY OF VERTICAL DIMENSION )

## 5. Dawson's Theory

### (3) The Fallacy of Bite Raising for TMDs

Attempts at "unloading" the TMJs by increasing the VDO was popularized by advocates of posterior bite-raising appliances. The practice was based on a misconception that the TMJs could be vertically distracted. Such vertical unloading cannot occur as illustrated because all elevator muscles are posterior to the teeth.

Then what happens is this results in increased bite force because the increased VDO interferes with repetitive contracted muscle length," and results in increased bite force. The covered teeth are intruded while the uncovered teeth erupt with the alveolar process. A stepped occlusion is the typical end result.



from Functional Occlusion

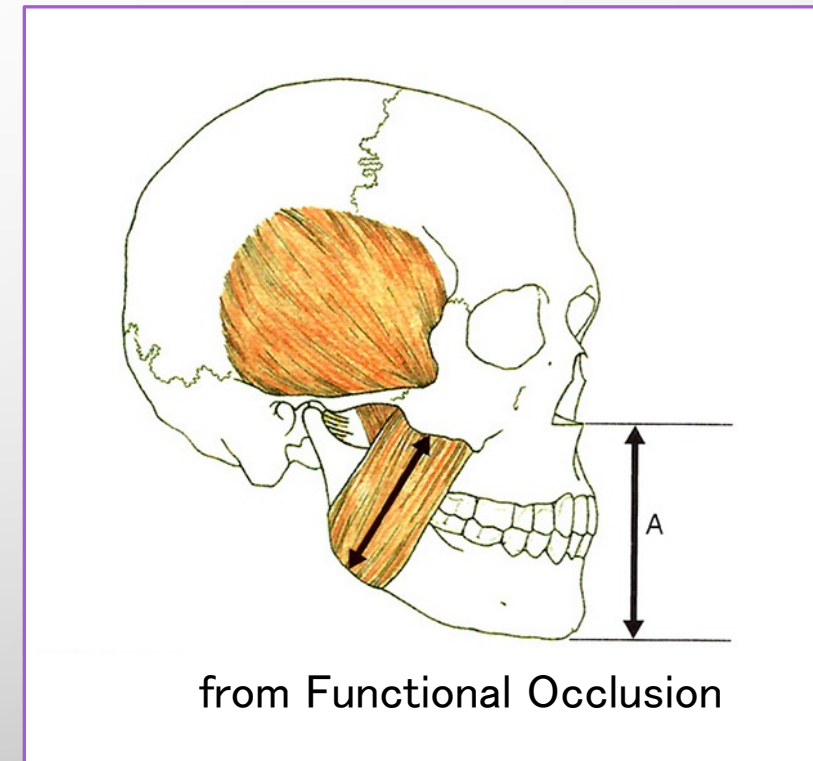


# ( THEORY OF VERTICAL DIMENSION )

## 5. Dawson's Theory

### (4) Bite raising for temporomandibular joint disorder

The VDO has in itself nothing to do with causing TMDs. If pain is from a true pathosis, vertical changes could actually increase the muscular loading of compromised tissues. The pain and dysfunction associated with occlusion-muscle imbalances can be resolved at any vertical dimension up to the point of condylar translation or closed down to the point of coronoid impingement. As long as the correctly aligned condyle-disk assemblies are free to go to the most superior position against the eminent, the pain of muscle incoordination can be relieved. Condylar access to centric relation is not dependent on any given vertical dimension because the condyles are free to rotate on a fixed axis.



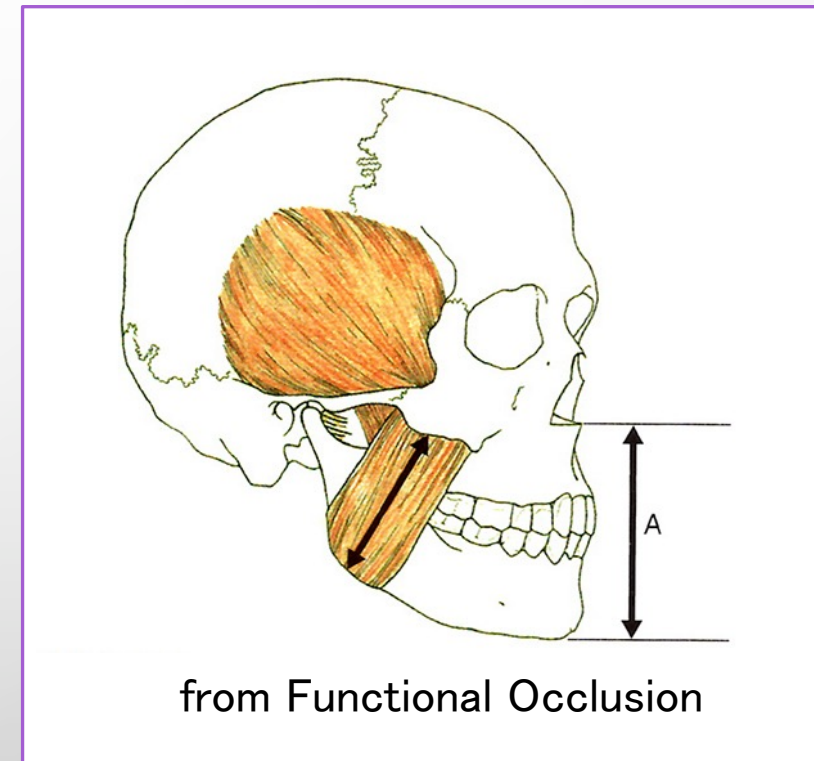
# ( THEORY OF VERTICAL DIMENSION )

## 5. Dawson's Theory

### (5) “unloading” in the temporomandibular joint

Occlusal elevation does not decrease TMJ loading.

The increase in occlusal height diameter is caused by rotation of the mandible about the mandibular condyle. In other words, even if the upper and lower dentition are separated using a bite lifting device, the mandible rotates with the load on the mandibular condyle, and the mandibular condyle does not move vertically away from the articular tuberosity.

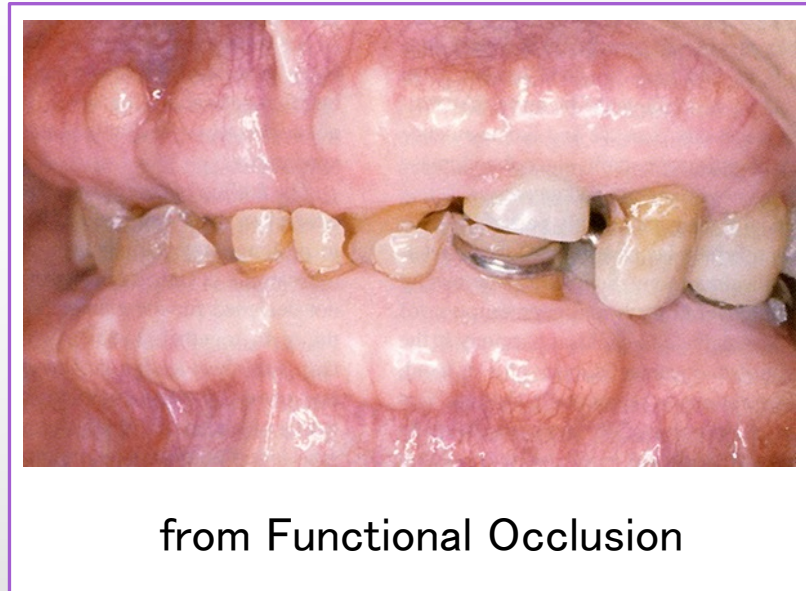


# ( THEORY OF VERTICAL DIMENSION )

## 5. Dawson's Theory

### (6) Restoring “lost” vertical dimension

Much clinical evidence indicates that even severely worn occlusions do not lose vertical dimension. Restoring “lost” vertical dimension in a worn occlusion really amounts to opening the bite because wear does not normally produce a loss of vertical dimension. Patients can wear their teeth down to the gum line and still not lose vertical dimension because the eruptive process matches the wear to maintain the original vertical dimension.



from Functional Occlusion





# ( THEORY OF VERTICAL DIMENSION )

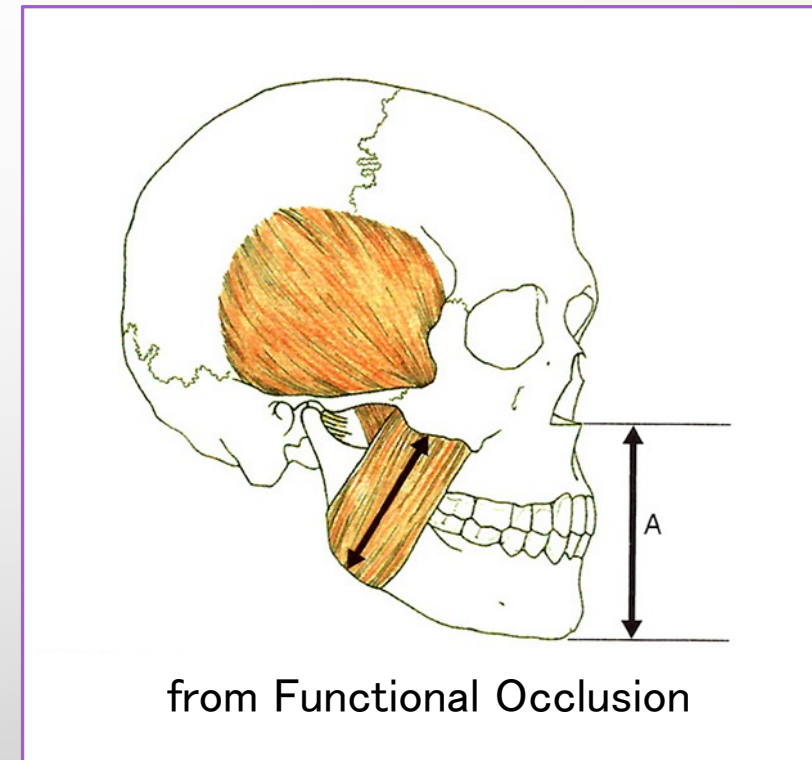


## 6. Rules for Determining the VDO on Patients with Teeth

(1) The VDO that requires the least amount of dentistry to satisfy esthetic and functional goals is always the VDO of choice. Extensive treatment done solely for the purpose of increasing the vertical dimension to a perceived stereotypical dimension is contraindicated.

(2) Maximal intercuspation of the posterior teeth determines the existing VDO. This dimension will be in harmony with the jaw-to-jaw relationship established by the repetitive contracted length of the elevator muscles.

(3) The muscle-determined VDO must be measured from origin to insertion of the elevator muscles. This is best measured clinically from the zygoma to the angle of the mandible, the origin to insertion dimension of the masseter muscle.

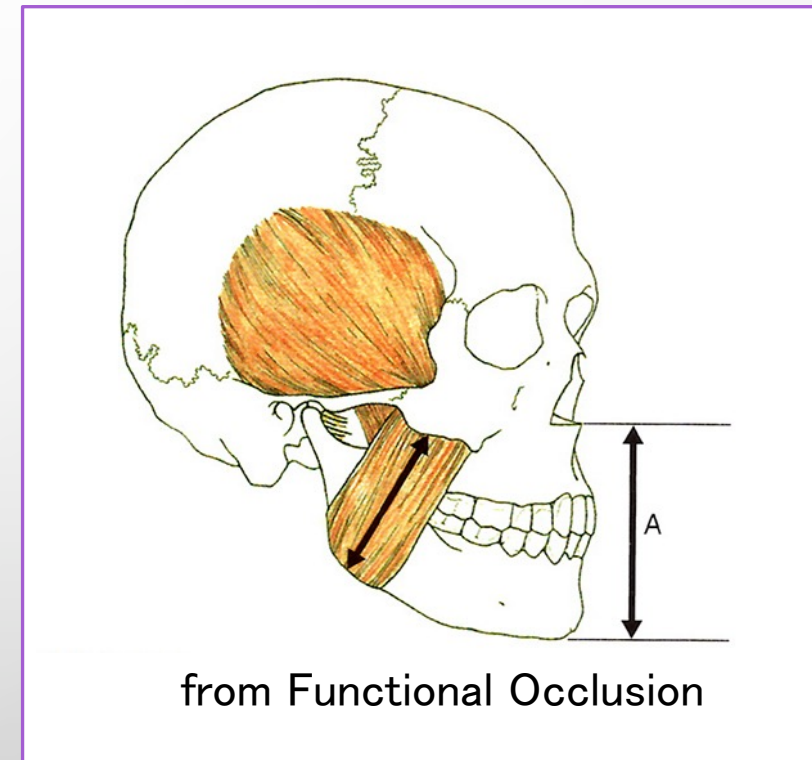


## ( THEORY OF VERTICAL DIMENSION )

### 6. Rules for Determining the VDO on Patients with Teeth

(4) The position of the condyles during maximal intercuspation must be considered when evaluating VDO. This is so because any change up or down of the condyles affects muscle length during maximal intercuspation.

(5) If the VDO must be changed, it should be determined at the point of anterior teeth contact. If posterior interferences prevent anterior contact in centric relation and occlusal equilibration is determined to be the best choice of treatment, the posterior teeth may be adjusted until anterior contact is achieved in centric relation

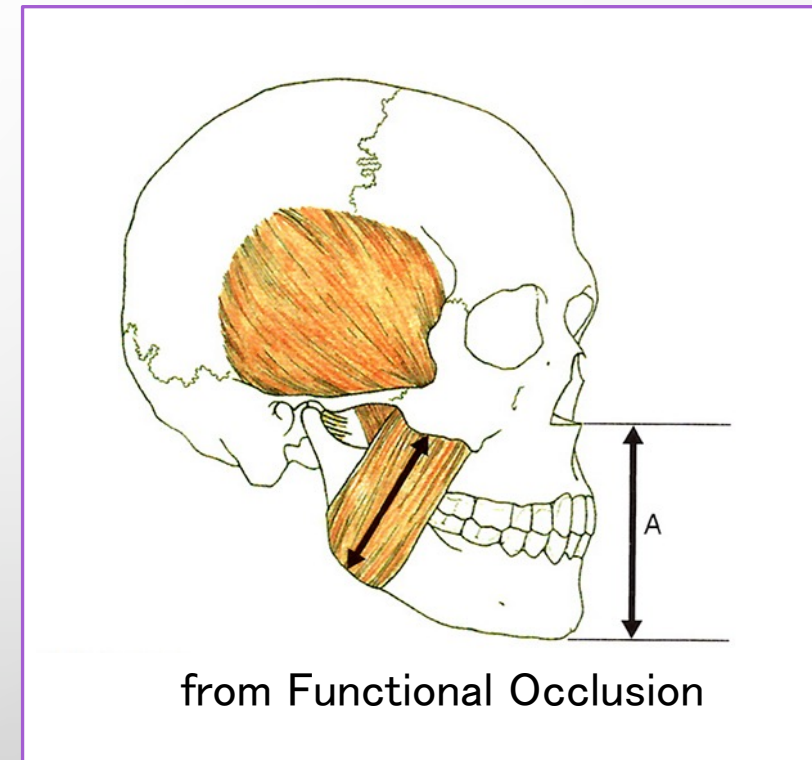


## ( THEORY OF VERTICAL DIMENSION )

### 6. Rules for Determining the VDO on Patients with Teeth

(6) Changing the VDO by either increasing or decreasing it is tolerated well by patients and within reason causes no harm to teeth or supporting structures if tooth contact includes the complete arches and the condyles are completely seated in centric relation during maximal intercuspation.

(7) Changes in the true VDO are not permanent. The VDO will return to its original dimension measurable at the masseter muscle. Unnecessary increases in the VDO are contraindicated as they are not maintained.



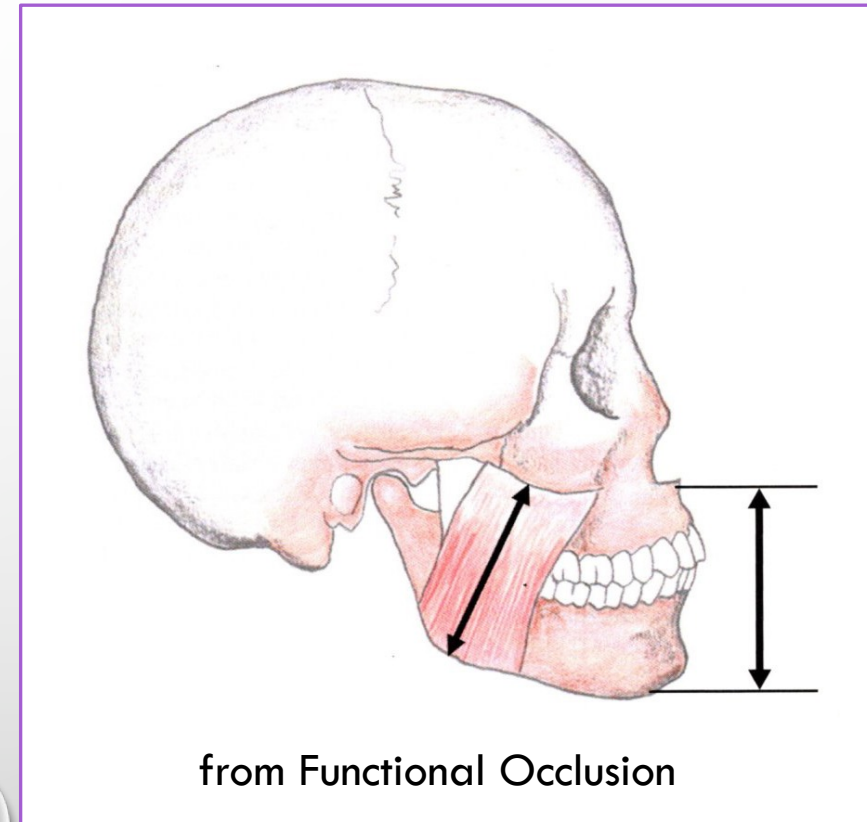
# ( THEORY OF VERTICAL DIMENSION )

## Summary

The existing vertical dimension should not be changed if at all possible.

If it is necessary to change the vertical dimension, the least invasive dental treatment should be selected to achieve the best esthetic and functional results.

Dental treatments that alter the vertical dimension often result in inappropriate outcomes. Therefore, dentists need to have a correct understanding of vertical dimension.



( OCCLUSION )

# Theory of Vertical Dimension

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If you have any questions or doubts, please leave them in the public comment section below.

The next topic will be ” Smile design “.

