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## A study to evaluate the satisfaction level in conventional complete dentures patients after reducing the vertical dimension of occlusion

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### Abstract

Determining the vertical dimension of occlusion is a critical procedure for a totally or partially edentulous patient. Many edentulous patients have adapted to a vertical dimension which has decreased due to bone resorption and posterior tooth wear. Restoring the proper vertical dimension is further complicated because the rest position may be subject to change. Swerdlow found that the vertical dimension of rest varies after natural tooth contacts are lost. Also, the rest vertical dimension can undergo a reduction comparable to the loss of occlusal vertical dimension [1]. It is believed that an increase of the OVD may elicit masticatory disorders, and in edentulous patients accelerate bone resorption and cause denture soreness because of increased pressure on the denture-bearing tissues [2]. McGee found that patients tend to register a reduced vertical dimension of occlusion because they feel more comfortable in this position [3].

**Purpose:** This study aim to evaluate the satisfaction level in conventional complete dentures patients after reducing the vertical dimension of occlusion.

**Material and Methods:** Fifteen completely edentulous subjects, their ages were between (39 - 66) years, the mean age of the subjects was 50 years. For each subject, one maxillary complete denture and two mandibular complete dentures were made. The first denture was made with appropriate occlusal vertical dimension (OVD), while the second denture was reduced by 3 mm less than the appropriate occlusal vertical dimension (OVD) of the first denture.

A questionnaire was used to evaluate the results of this study through the use of the visual analyses scale (VAS).

**Results:** The average of satisfaction level for suitable OVD was (58.66), in reduced OVD was (67.33)/VAS.

### Conclusions

- There was a significant differences in the satisfaction level between suitable OVD and reduced OVD
- Patients were more comfortable by using dentures with reduced occlusal vertical dimension.

**Keywords:** Complete denture, satisfaction. appropriate occlusal vertical dimension (OVD) [4]

### Introduction

Determination of the correct vertical dimension of occlusion for edentulous patients is one of the most important steps in making dentures with adequate esthetics and function [5]. Vertical dimension is the length of the face as determined by the amount of separation of the jaws [4]. There are two vertical dimensions. One is the length of the face when the teeth are in contact and the mandible is in centric relation (occlusal vertical dimension) and the other is the length of the face when the teeth are separated and the mandible is in a physiologic rest position (vertical dimension of rest). The physiologic rest position has been considered by some to remain constant throughout life regardless of the presence or absence of the teeth [3, 5, 6]. No rigid rules are available for determination of the occlusal vertical dimension when all of the teeth have been lost, because of the wide variation in the physical characteristics of patients. Various methods have been suggested. According to Wright the use of "pre-extraction records" is quite helpful in determining and establishing the vertical dimension of occlusion in

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edentulous individuals [7]. If these records are lacking, he recommends the use of measurements obtainable from old photographs of the patients. A study by Willis [8] indicates that when the teeth are in occlusion, the distance from the bony shelf under the nose to the bottom of the mandible should be equal to the distance from the pupil of the eyes to the rima oris, or parting line of the lips. Boos determined the vertical dimension of occlusion by measuring the maximum biting force [9]. Pleasure [13] calculated the rest vertical dimension by using artificial landmarks (adhesive tape triangles) on the nose and chin. The distance between the adhesive triangles was measured at the physiologic rest position when the patient was induced to relax without support of back or headrest, and again when the patient closed in centric occlusion with the teeth, or equivalent, in occlusion. On the basis of his findings, the distance between the triangles at centric occlusion should be approximately 3 mm less than the measurement at physiologic rest position. The 3 mm difference is the interocclusal space, which is not the same for all patients and can range from 1.5 to 6 mm [10]. Another technique for determining vertical dimension of occlusion in edentulous patients is the use of the patient's own judgment in different trials [11, 12]. McGee found that patients tend to register a reduced vertical dimension of occlusion because they feel more comfortable in this position [3]. The acquired phonetic jaw positions have also been used to determine the position of the anterior teeth [13, 14]. Phonetics in establishing the OVD, Esthetic appearance, Open-rest method [15]. All of these methods are inaccurate in determining the vertical occlusal dimension that may result in a plus or a low dimension. A decreased OVD can lead to the appearance of lesions, such as angular cheilitis, facial disharmony, and temporomandibular disorders; meanwhile, an increased VDO may lead to the onset of joint and muscle pain, tension in functional speech, difficulty in swallowing, impaired chewing, tooth sensitivity due to traumatogenic forces, pathologic bone resorption, abnormal wearing of teeth, the appearance of an elongated face, and a facial expression of

fatigue [16]. Niswonger observed that the patients whose vertical dimension of occlusion was excessive complained that they could not use the dentures tissue change until an interocclusal for mastication because of continual soreness on the residual ridges. Trauma to the ridges of these patients caused continuous distance of 4/32 inch had been obtained. Not until this space had developed was the patient able to masticate food with satisfaction and comfort [17]. Tenth felt that nature may shorten muscles, but rarely, but rarely, if ever, is their functional length increased. There are conflicting reports in the literature regarding the effects of decreasing the OVD. Some authors have suggested that the stomatognathic system naturally adapts to decreases in OVD, for example in cases of tooth loss or severe dental attrition. Conversely, other authors have suggested that a decrease in OVD can predispose the patient to TMD. Nevertheless, there is no strong evidence in the literature supporting either of these statements [18]. McGee found that patients tend to register a reduced vertical dimension of occlusion because they feel more comfortable in this position [3].

### Material and Methods

Fifteen completely edentulous subjects. Their ages were between (39 - 66) years, the mean age of the subjects was 50 years. For each subject, one maxillary complete denture and two mandibular complete denture were made Fig (1). The first denture was made with appropriate occlusal vertical dimension (OVD), while the second denture was reduced by 3 mm less than the appropriate occlusal vertical dimension (OVD) of the first denture Fig (2).

A questionnaire is a subjective method to evaluate the satisfaction level. Questionnaires have been used in several epidemiologic surveys. It allows the patient to judge comfort or discomfort when using the denture two month for both situation. The use of a scale, for example, a scale of values from 0 to 100, would be used with the highest value representing a very good, c Fig (3).



**Fig 1:** Reduction of the 3 mm OVD on hanau articulator



Fig 2: Two lower complete denture were made for each patient, one with an appropriate OVD, and the other was reduced by 3 mm than the first.

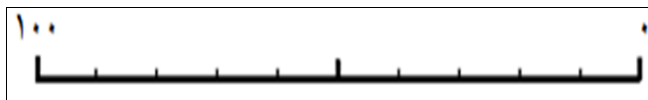


Fig 3: visual analyses scale (VAS).

**Results**

Paired *t* test was conducted to compare the differences in the average patient satisfaction levels between the two studied conditions (the appropriate OVD and the low OVD) in the research.

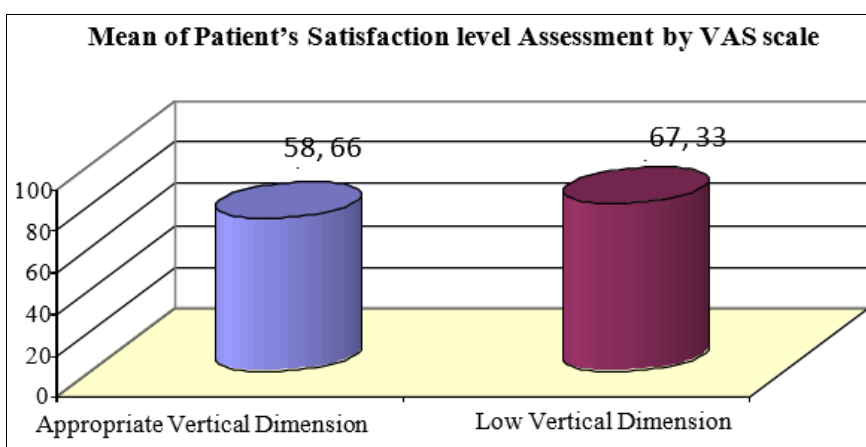


Chart 1: Represents The Mean of Patient's Satisfaction Levels in the Research Sample according To the Condition Studied

Table 1: Paired *t* test results

	Paired Differences					t	df	Sig. (2- tailed)
	Mean	Std. Deviation	Std. Error mean	95% confidence interval of the difference				
				Lower	upper			
Pair 1 appropriate OVD - decreased OVD	-8.67	15.173	3.918	-0.26	-17.07	2.2121	14	0.0441

By conventional criteria, this difference is considered to be statistically significant.

**Discussion**

In this study, mean of the patient's satisfaction level for using complete denture with a reduced vertical dimension is greater than the mean patient's satisfaction level using complete denture with the appropriate vertical dimension, chart (1), Paired *t* test was used, There are statistically significant differences in the average patient's satisfaction level table (1). Patient comfort may be due to the freedom of movement provided by the decreased OVD and also the decrease in the size of the complete denture, as well as increasing the freeway space provides a suitable space for the movement of the tongue during functional movements, values vary from one patient to another, it may be due to the different personalities and capabilities in patients, these results are consistent with the study of Fouda, S.M., *et al.* [19], in the effect of personality traits on the extent of adaptation and satisfaction in patients, In this study the OVD of 3 mm was reduced so as not to affect the Esthetic appearance of the patient. Comfort in some patients can be attributed to the fact that this reduction has achieved the original freeway space from which the patient was born with, The results of this study can explain some

patients dissatisfaction to the increase the reduced vertical dimension resulting from wearing the occlusal surfaces of the artificial teeth. And it did not affect the Esthetic appearance. The results of this study also consistent with that of Zhang and his colleagues in 2012, where he reduced the OVD by 3 mm in the aged patients with a very severe alveolar resorption [20].

**Conclusion**

Within the limits of this study it can be concluded that Patients were more satisfied by using dentures with reduced occlusal vertical dimension.

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