



Evaluation of the effect of tongue space encroachment on the rest vertical dimension

Dr. Zainab S. Abdullah B.D.S, M.Sc. (Assistant Lecturer)

Abstract

This study is aimed to evaluate the effect of tongue space encroachment on the rest vertical dimension. The sample consisted of 30 Iraqi subjects (12 females and 18 males), average age is 25 years old. The rest vertical dimension is measured for them with and without a bulky acrylic appliance. The results of this study found that the effect of tongue space encroachment not immediately but in a longer time increase the rest vertical dimension. In this study we concluded that the rest vertical dimension is not stable.

Introduction

The rest position is defined as the length of the face when the mandible in rest position, this is the position of the mandible to maxilla when the maxillofacial musculature are in a state of tonic equilibrium. This position is influenced by the muscles of mastication, muscles involved speech, deglutition and breathing.⁽¹⁾

The tongue and the mandible are the organs which function in mutual harmony, changes in the tongue cause changes in the mandible and vice versa.⁽²⁾

The effect of total extractions on the postural position of the mandible has been widely investigated and a tendency for patients to adopt a rest position as a reduced vertical facial height has been demonstrated.^(3,4,5)

Narin and Cutters⁽⁶⁾ have shown that the change in the rest position of mandible occurred immediately following extraction of teeth.

Wyke⁽⁷⁾ suggested that the mass of the mandible and it's contained teeth may in part control rest position. He further hypothesized that the loss of

mass was responsible for the upward shift which follows the removal of teeth.

Takade et al⁽⁸⁾ and Seniz et al⁽⁹⁾, hypothesized that the capacity of the oral cavity and the tongue volume are balanced by alteration in the level of the floor of the mouth, which are probably reflected in the position of the tongue – hyoid – larynx column.

Young⁽¹⁰⁾ investigated that the influence of palatal coverage on the physiologic rest position and concluded that the rest position was affected by the presence of palatal plates.

Improvement in myofascial pain – dysfunction symptoms when treated by using a splint which only covered palatal mucosa. This could be attributed to encroachment of available tongue space producing a reflexive drop in the mandibular rest position⁽¹¹⁾.

Richardson and Allen⁽¹²⁾ have been advanced that the tongue space is made larger by removal of teeth as the tongue spreads into it and is aided in this operation by elevation of the mandible.

Materials and methods

30 adult Iraqi subjects were selected (12 females and 18 males) they have average age of 25 yrs. old, they have full set of teeth with class I occlusion, no sings and symptoms of TMJ disorders.

The method of facial measurements after swallowing and relaxing was used to measure the rest vertical dimension.

The subject is asked to sit upright and relax, two reference points are marked on the tip of the nose and tip of the chin.

The subject is asked to perform functional movements like wetting his/her lips and swallowing and then relax.

Once the subject performs the above mentioned movement, his/her mandible will come to it's physiologic rest position.

The distance between the two reference points is measured when the mandible in it's physiologic rest position.

A bulky acrylic appliance were made for each subject to reduce tongue space and not interfere with occlusion.

The rest vertical dimension measured immediately after insertion of the appliance, and also measured after a night wearing of the appliance.

Results

Means, slandered deviations of the data were taken table I.

Table II show a highly significant difference between occlusal (OVD) vertical dimension and rest (RVD) vertical dimension, and also show a significant difference between rest vertical dimension after immediate insertion of the appliance (RVDI) and rest vertical dimension after a night wearing of the appliance (RVD II).

Table III show a highly significant difference between (OVD) and

(RVDI), significant difference between (RVD) and (RVD II).

Table IV show a highly significant difference between (OVD) and (RVDII), a non – significant difference between (RVD) and (RVDI). A histogram showing these differences between the groups (diagram I).

Discussion

The results of this study (paired t-test) showing an increase in (RVD) after a night wearing of the appliance (diagram I).A non– significant difference between (RVD) and RVDI.

As the appliance did not interfere with the occlusion the change must have been due to an alteration in the space available for the tongue.

Sheppard and sheppard⁽¹³⁾ studying the effect of insertion of dentures found an increase in resting face height.

It has been suggested that the weight of the lower denture may influence the rest position of the mandible but this seems unlikely as the weight must be almost negligible when compared to the weight of the mandible. In this study upper appliances only were used and so the weight was of no significance. On immediate insertion of the appliance there is a non – significant difference with the original (RVD), this can be explained as the initial reaction is the tongue displacement backwards and the results in lifting the floor of the mouth.

On the other hand the night wearing of the appliance resulted in significant changes in mandibular posture, this would take as evidence that an innate of motor activity must be broken down before these changes can occur.

Conclusion

In this study we set out to determine the effect of tongue space encroachment on the rest position and we feel the results have been consistent with the theory that tongue space encroachment not initially but, in a longer term results in an increase in vertical position of the mandible.

References

- 1- Veeraiyan, Ramalingam, Bhat (2005), text book of prosthodontics.
- 2- Pascal P., Joseph P., Yahan P. (1998): Degrees of freedom of tongue movements in speech may be constrained by biomechanics. J.A. coust. Soc. Am, 103 (3), 1615-27.
- 3- Michelotti A., Farella. M., Vollara S. and Martin R. (1997): Mandibular rest position and electrical activity of masticatory muscles. J. prosth. Dent. 78: 48 – 53.
- 4- Al – Ani. M. (2001): Influence of facial type on the occlusal vertical dimension. Thesis, college of Dentistry, Baghdad University.
- 5- Rahan, A.O. and Heart well, C.M. (1993): Text book of complete dentures, 5th ed. USA: lipincott Williams and Willkins. Ch. 1&11.
- 6- Narin R. and Cutters t. (1967): changes in mandibular rest position following removal of remaining teeth and insertion of immediate complete dentures. Br. Dent. J. 122-303.
- 7- Wyke B. (1974): Neuromuscular mechanisms influencing mandibular posture. J. Dent. 211.
- 8- Takada K. Sakuda M., Yoshida K. (1980): relation between tongue volume and capacity of the oral cavity proper. J. Dent Res. Sq, 2026.
- 9- Senizk., Erol A., Kerim O., Osman B. (2006): Dynamic MRI evaluation of tongue posture and deglutitive movements in a surgically open bite. Angle orrho. 76,6.
- 10- Young P. (1996): Acephalometric study of the effect of acrylic test palatal piece thickness on the physiologic rest position J. Phil. Dent. Ass oc. 19.1.
- 11- Rugh, J. and Drago, J.C. (1981): Vertical dimension: A study of clinical rest position and Jaw muscle activity. J. Prosth. Dent 45: 670-675.
- 12- Richardson A. and Allen R. (1980): Mandibular posture following tooth extractions. 8:315.
- 13- Sheppard I and Sheppard S. (1975) vertical dimension measurements. J. Prosth. Dent. 34, 269.

Table (I): Mean & SD of the groups

	Mean	SD
OVD	69.55	4.383
RVD	71.917	4.200
RVD1	72.187	4.505
RVD2	74.463	4.387

Table (II): Paired t-test showing the differences between OVD and RVD, RVD₁ and RVD₂

	t-test	p-value	Sig.
OVD & RVD	13.074	0.000	H.S
RVD ₁ & RVD ₂	2.02	0.049	N.S

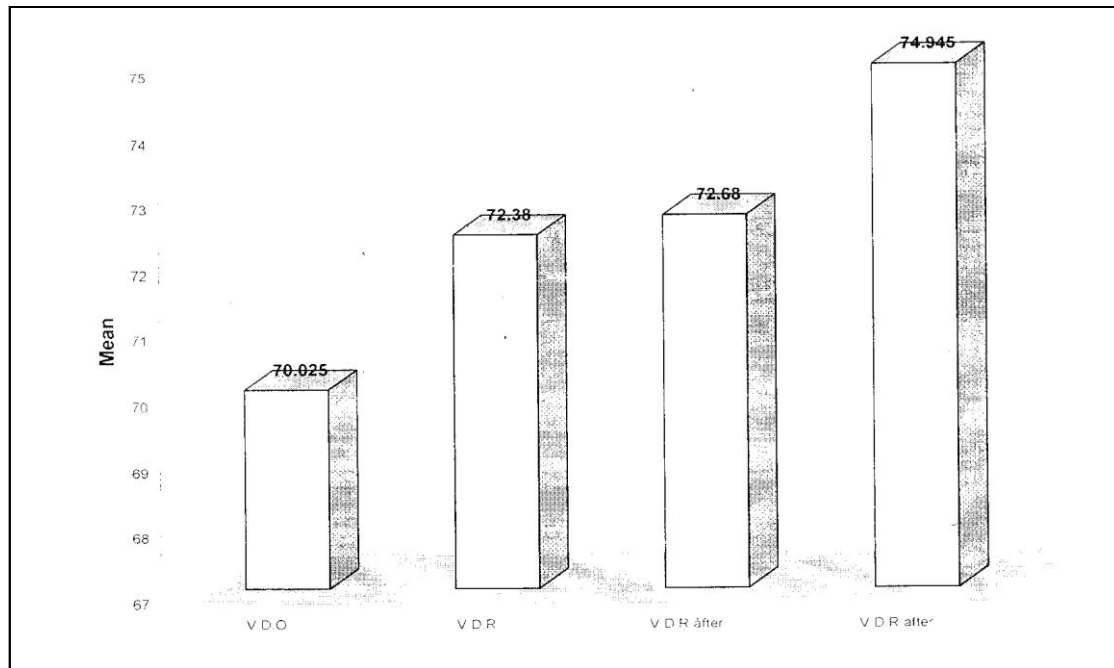
*P<0.0001 high significant

Table (III): t-test showing the differences between OVD & RVD₁, RVD and RVD₂

	t-test	p-value	Sig.
OVD & RVD ₁	11.564	0.000	HS
RVD & RVD ₂	2.30	0.035	S

Table (IV): t-test showing the differences between OVD & RVD₂, RVD & RVD₂

	t-test	p-value	Sig.
OVD & RVD ₂	18.43	0.000	HS
RVD & RVD ₁	0.24	0.81	NS

**Diagram (1)**

Histogram showing the differences between the groups.