ORAL STEREOGNOSIS IN PREDICTING DENTURE SUCCESS*

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إن لمعرفة تجسيم الفم دوراً مهمًا في التنبؤ بنجاح الأجهزة السنية الكاملة. تم في هذه الدراسة تقييم معرفة تجسيم الفم في ٣٠ مريضًا أدردا حيث بلغ المتوسط ٨,٥٣٣ (+ ٣,١١٥). تم تزويد نفس الأشخاص بأجهزة سنية كاملة. تم ملىء إستفتاء من قبل الأشخاص للمساعدة في التقييم الشخصي لوظيفة الجهاز السني وذلك فيما يتعلق بالثبات والإستقرار، المضغ والكلام. تم تصنيف وظيفة الجهاز السني بناء على التقييم الشخصي إلى: جيد، معتدل، ضعيف. أشارت الدراسة إلى وجود علاقة ذات مغزي بين معدل متوسط إدراك التجسيم الفموي والتقييم الشخصي لوظيفة الجهاز السني فيما يتعلق بالثبات والإستقرار (٠,٠٠٧)، المضغ (٠,٠٠٠٧)، والكلام (٠,٠٠٠١).

Oral stereognosis has been reported to play an important role in predicting the success of complete dentures. In this study, the oral stereognostic ability of 30 edentulous subjects was evaluated and the mean score was 8.533 (± 3.115). The same subjects were provided with complete dentures. A questionnaire was completed by the subjects to aid in the subjective evaluation of denture performance with respect to retention and stability, mastication and speech. Based on the subjective denture performance, they were grouped into 3 categories: good, fair and poor. The study indicated a significant relationship between the mean stereognostic score and subjective performance in relation to retention and stability (P = 0.0077), mastication (P = 0.0007) and speech (P = 0.0001).

The ability to predict patient's performance with complete denture is difficult no matter which approach and level of clinical proficiency is employed in the fabrication of a prosthesis. Several investigators have reported that the patient's adaption to complete dentures may be predicted by oral stereognostic tests.[15] Stereognosis has been employed to evaluate the integrity of sensory feedback and is used in neurological evaluation of the central nervous system[6]. It involves identification of forms of objects without the aid of vision by hand or oral manipulation.

The oral stereognosis test consists of placing objects into the mouth without being seen by the patient and having the patient identify the form. A correct identification of the form of the object is recorded as a score. A high score in oral stereognostic test indicates that the patient is receiving accurate information from his sensory feedback mechanism.

The level of oral stereognostic score demonstrated a definite relationship with denture performance, that is, patients with high scores had more complaints in the post-insertion phase, whereas, patients with low scores had fewer or no complaints.[2,5,7] However, a study by Van Aken et al[8] concerning the relationship between oral stereognosis and satisfaction with complete dentures demonstrated no such correlation.

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Thus, controversy still exists in relation to oral stereognosis and prediction of denture acceptance.

The purpose of this study was to compare the level of oral stereognosis with post-insertion complaints of subjects rehabilitated with complete dentures.

Materials and Methods

Thirty edentulous subjects with an age range of 56-61 years, comprising of 26 males and 4 females having normal residual ridges, free from systemic diseases, neurological and temporomandibular joint disorders were selected for the study.

Oral Stereognostic Test

The test consisted of identification of objects of different shapes and surface alterations when placed in the mouth without visual aid. The shape and surface alterations of the objects used in this study were developed by Hockberg and Kabcenell.[9] Ten cubes with a dimension of 5 mm were constructed in base metal alloy.* The ten cubes were divided into two groups of five each. The first set of cubes were altered into different shapes [Fig. la]. The second set consisted of cubes with surface alteration by means of grooves in varying numbers [Fig. lb].

Plaster duplicates of the test specimens were made approximately five times larger than the original test objects. The duplicates were used for the purpose of identification and remained accessible as a visual aid to the subjects throughout the test period [Figs. 2a and 2b].

Methods

The subjects were informed as to the nature of the experiment and sufficient time was given to get them familiarized with the plaster test models. Each of the ten oral test specimens were randomly selected, concealed and placed in the mouth without dentures.

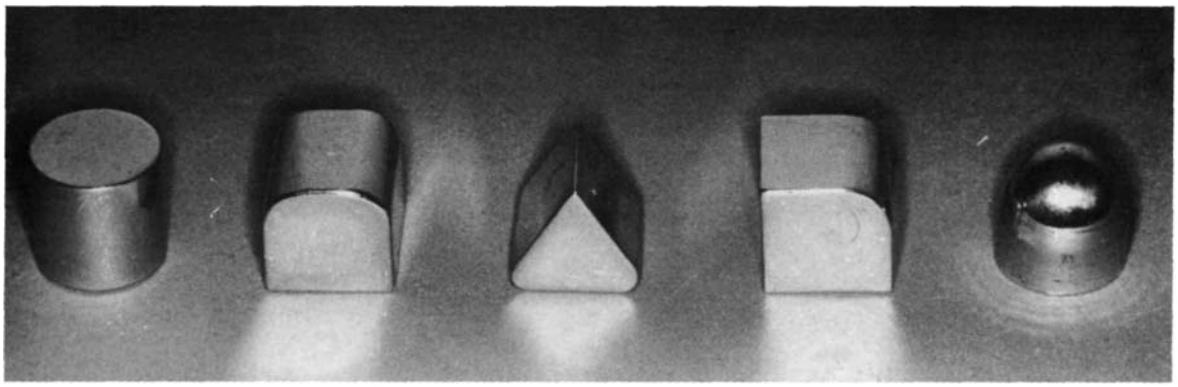

Figure 1a. Five metal test specimens with different shapes.

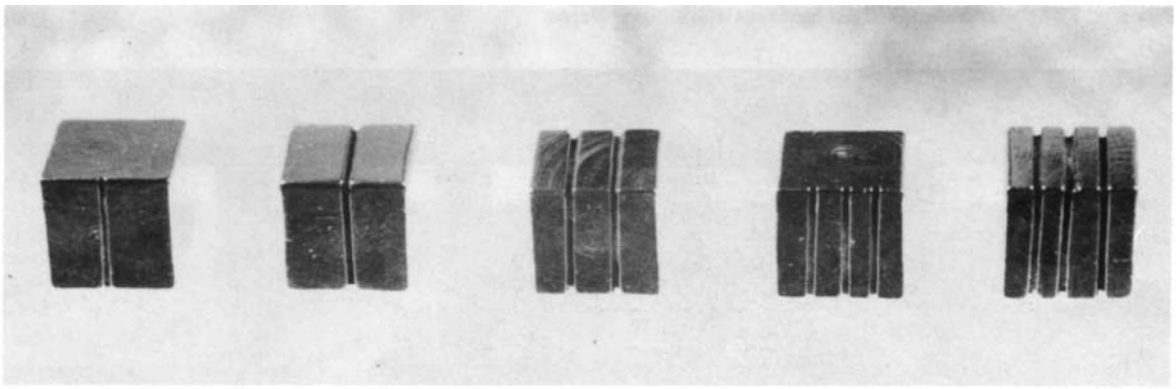

Figure 1b. Five metal test specimens with surface alterations by means of grooves in varying numbers.

•Wironit Cobalt-Chrome Alloy, Bego Bremer Goldschlagered Wilherbst Gimbh Co.

The subjects were allowed to move the tongue against the specimen for identification. Immediately after identification of the test specimen in the mouth, the subjects were instructed to point out at the plaster models used for reference. This procedure was repeated twice for each of the thirty subjects. The resulting correct identification of the test specimens was recorded as oral stereognostic score.

Evaluation of Post-Insertion Response to the Prosthesis

Complete dentures were fabricated by standardized clinical and laboratory procedures using cusp posterior teeth with balanced occlusion. Pressure areas and border extensions were evaluated and corrected using pressure indicating paste. Occlusal equilibration was done by clinical remount procedure prior to fitting the denture for each of the 30 subjects. The patients were instructed to report after 24 hours for adjustment which was done when required. After a period of one month, the patients were recalled to complete a questionnaire for evaluating denture performance from their viewpoints. Based on the subjective performance, the subjects were then classified into three categories such as good, fair and poor relative to retention and stability, mastication and speech. The subjective evaluation was compared with oral stereognostic ability using non-parametric ANOVA, Kruskal Wallis and Dunn multiple range tests.

Results

The mean oral stereognostic score of 30 edentulous subjects was 8.533 ± 3.115 and ranged from 5 to 15. Based on the subjective denture performance, patients were grouped into three categories as good, fair and poor. The mean, standard deviation, minimum, maximum and range values of oral stereognostic score of 30 subjects with good, fair and poor responses to complete dentures with respect to retention and stability, mastication and speech are shown in Table 1. The subjects that were rated as poor appeared to have higher mean

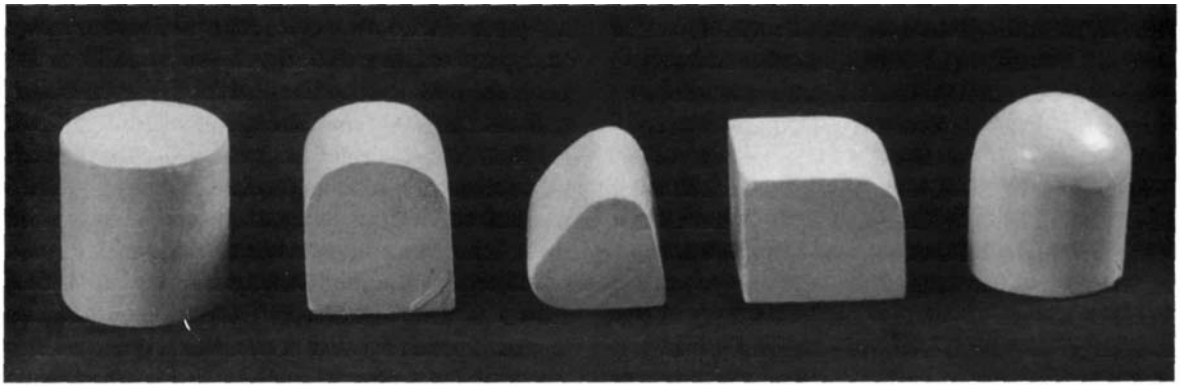

Figure 2a. Five plaster duplicates of test specimens with different shapes.

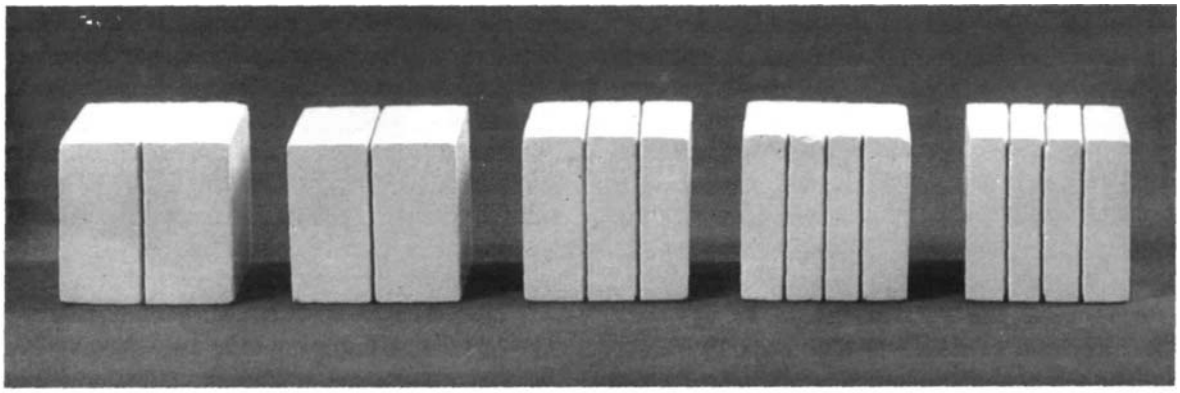

Figure 2b. Five plaster duplicates of test specimens with surface alterations by means of grooves in varying numbers.

oral stereognostic scores, whereas subjects rated as good appeared to have the lowest scores. The mean score values are in ascending order for good, fair and poor [Fig. 3].

When subjective evaluation of retention and stability was compared with the mean stereognostic scores, the results of ANOVA indicated that at least one pair of means was significantly different (P<0.01). The multiple range test showed that among the three pairs (poor versus good, poor versus fair, and fair versus good) only one pair, i.e., poor versus good, was statistically significant (P<0.01).

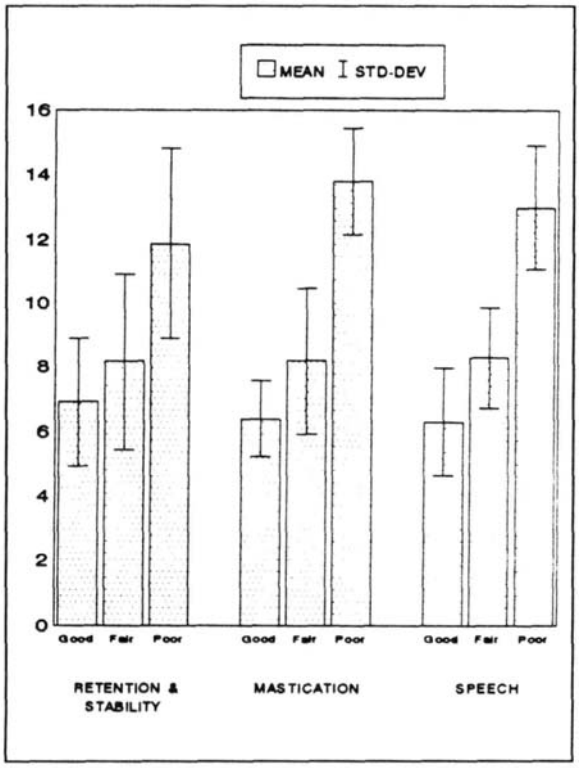

Figure 3. Mean stereognostic scores and subjective performance of patients with the prosthesis.

The results of ANOVA indicated that at least one pair was significantly different (P<0.001) when speech evaluation was compared with the mean stereognostic score. The multiple range test revealed that the difference between poor and good alone was significantly different (P<0.001).

Comparing the subjective evaluation of mastication with mean stereognostic scores, the result of ANOVA revealed that one pair of the means was significantly different (P<0.001). The multiple range test indicated that three pairs: poor versus good, poor versus fair, and fair versus good were significantly different and the P values were P<0.001, P<0.05, and P<0.005, respectively.

Discussion

None of the edentulous subjects made all correct identifications when the test was provided twice. The mean stereognostic score was 8.533 and ranged from 5 to 15. Thus, the mean correct identification of objects by 30 patients was 42.67%. The mean value of this study and that reported by Litvak et al[5] at 37.4% was quite comparable. However, the mean values reported by Von Aken et al[8] and Garrett et al[1] were 63% and 68%, respectively which were higher compared to this study. All the investigators used ten objects with different variation in shape and surface alterations, and administered the test twice.

In this study, no attempt was made to evaluate the stereognostic ability of the subjects with complete dentures in the mouth because it has been reported by several investigators that stereognostic ability was not significantly affected by the presence or absence of dentures in the mouth.[1,3]

The small number of females in this study did not permit evaluation of the effect of gender on the oral

Table 1. Mean, standard deviation, minimum, maximum and range values of oral stereognostic score of 30 subjects with good, fair and poor responses to complete dentures with respect to retention and stability, mastication and speech.

Variables	Retention/Stability			Mastication			Speech		
	Good (12)	Fair (11)	Poor (7)	Good (10)	Fair (15)	Poor (5)	Good (13)	Fair (10)	Poor (7)
Mean	6.9	8.2	11.8	6.4	8.2	13.8	6.3	8.3	13.0
S.D.	1.9	2.7	2.9	1.1	2.2	1.6	1.6	1.5	1.9
Minimum	5.0	5.0	7.0	5.0	5.0	11.0	5.0	7.0	11.0
Maximum	11.0	14.0	15.0	8.0	11.0	15.0	10.0	11.0	15.0
Range	6.0	9.0	8.0	3.0	6.0	4.0	5.0	4.0	4.0
P-value for Anova	P = 0.01			P = 0.0007			P = 0.0001		

stereognostic ability. Furthermore, Chauvin and Bessette[2] reported that there was no significant difference between males and females in oral stereognosis.

The subjective response after the insertion of the prosthesis related to retention and stability, mastication and speech compared with the mean stereognostic score in these groups demonstrated an inverse relationship [Fig. 3]. The subjects with highest mean stereognostic score had poor performance with the prosthesis than those with lowest mean score. The findings of this study is in agreement with several investigators.[2-5,7]

The clinical implication of this study showed that oral stereognosis may be used as one of the clinical aids in predicting patient's performance to a prosthesis. With this source of information, the dentist may educate the patient about the prognosis of the prosthesis so that the patient is mentally prepared about its limitation.

It is therefore concluded that subjects with high stereognostic score showed more subjective complaints (poor performance) than those with low scores. A significant relationship between subjective complaints (retention and stability, mastication and speech) and oral stereognosis was

Acknowledgement

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