

Comparative Evaluation of Oral Stereognosis in Epileptic and Nonepileptic Patients: An Original Research

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Abstract

Introduction: Oral stereognosis basically is the ability of our sensory mechanism to recognize the shape of objects placed in oral cavity. The science of stereognosis is very important for the dentist as well as technician so that to understand the expectation level of the patients and predict the prognosis of the prosthesis.

Subjects and Methods: This study was carried out on 60 selected patients. The patients were divided into two groups, one being epileptic group and another control group. Five types of different test samples were cured in heat cured resin and a hole was drilled in the center of the test samples using frenum relieving bur and a floss of 10 cm length was tied to the test sample avoiding the risk of engulfment. Dimensions of all different test samples were multiplied by 5 and the geometric designs were drawn on the chart paper and marked as 1-5. A time period of 1 min was provided to each patient for the identification on the chart followed by gap of 30 s for the next test sample to be placed in the mouth. A score of 2 was given for each correct identification, score of 1 for no identification, and score of 0 for wrong identification of sample.

Results: The oral stereognostic scores were statistically analyzed using analysis of variance and *t*-test. In intergroup comparison between two groups, epileptic group patients (7.52 ± 3.02) recorded less value than control group (12.65 ± 3.65) which was statistically significant ($P < 0.001$). In intragroup comparison of control group, partially edentulous group (11.5 ± 3.57) had higher mean values than completely edentulous group (9.01 ± 4.09) which was statistically significant ($P < 0.001$).

Conclusion: Oral stereognosis predicts the prognosis of the treatment provided. Epileptic patients have decreased stereognostic activity both in dentulous as well as edentulous patients against the physiologically healthy patients.

Key words: Dentulous, Epileptic, Physiologic, Stereognosis

INTRODUCTION

Prediction of a dental prosthesis to be successful not only depends on the clinical proficiency and accuracy level of the clinician but also on the ability of the patient to adapt to his prosthesis. As aging occurs, several changes such as

decreased masticatory efficacy, loss of taste, and alterations in proprioceptive responses take place.

Human brain is equipped with certain sensory feedback mechanisms that are important in motor control and learning.¹ During the oral phase of deglutination, somatic sensation is only feedback source in oral cavity. Size and shape of an intraoral bolus of food provides oral sensory information important for oropharyngeal swallowing and tongue is responsible for stereognosis.²⁻⁴

Oral stereognosis also called as haptic perception or tactile gnosis is the ability of the oral mucous membrane to perceive and recognize the forms of objects placed in

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www.ijss-sn.com

Month of Submission : 10-2016
Month of Peer Review : 11-2016
Month of Acceptance : 11-2016
Month of Publishing : 12-2016

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oral cavity.⁵ Rossetti *et al.*⁶ classified stereognosis in four different types:

- General stereognosis: Overall capacity to recognize the shape of objects
- Homo stereognosis: Self body recognizing capacity, e.g., palate, tongue
- Organ stereognosis: Capacity to recognize muscular units as target areas, e.g., position of limbs to execute routine tasks
- Hetero stereognosis: Capacity to recognize foreign body inside oral cavity, e.g., glass particles, wood stick.

Several investigators^{7,8} have conducted researches to study the diagnostic effect in dentulous as well as edentulous patients using both removable as well as fixed type of prosthesis⁹ and concluded to undergo oral stereognostic tests before fabrication of prosthesis for better prognosis of treatment. However, to our knowledge, no study has been published which reflected the stereognostic effect in epileptic patients.

Epilepsies are a group of disorders of the central nervous system characterized by a paroxysmal cerebral dysrhythmia, manifesting as brief episodes of loss or disturbance of consciousness, with or without characteristic body movements, sensory or psychiatric phenomena.¹⁰ Epilepsy has a focal origin in the brain; manifestations depend on site of focus and regions into which discharges spread. (Table 1).

This study aims to compare the oral stereognosis in dentulous as well as completely edentulous patients having epilepsy against the physiologically healthy patients. Null hypothesis states that no difference exists between the epileptic group and the control group in terms of stereognostic activity both in dentulous and completely edentulous patients.

SUBJECTS AND METHODS

This study was carried out on 60 selected patients that reported to the Indira Gandhi Government Dental College, Jammu. The study was approved by the college Ethical Committee, and the patients were divided into two groups, each having 30 patients. Patients were informed of the objective of the study and verbal consent was taken by the patients (Tables 2 and 3).

Oral stereognosis test was performed on the patients using five types of different test samples. 60 test samples of each shape were prepared in modeling wax (Hiflex) and were cured in heat cured resin using compression molding technique (Table 4).

Table 1: Types of epilepsy

Generalized seizures	Partial seizures
Generalized tonic-clonic seizures	Simple partial seizures
Absence seizures	Complex partial seizures
Atonic seizures	Simple partial or complex partial seizures secondarily generalized
Myoclonic seizures	

Table 2: Distribution of samples

Group	Type of patients	Total number of patients	Subgroups (presence of teeth)	
			(a) Edentulous	(b) Dentulous
I	Epileptic	30	15	15
II	Normal	30	15	15

Table 3: Inclusion criteria

Age group >30 years
Absence of any other systemic disease except epilepsy
All teeth up to second molars present in both the arches in dentulous group

Table 4: Different shapes used with dimensions

Shape of the test sample	Dimension of the test sample	Diagram
Circle	1 cm radius	
Square	2×2 cm	
Rectangle	3×2 cm	
Triangle	2×2×2 cm	
Star		

Heat cured samples were sand papered and polished to high finish. A hole was drilled in the center of the test sample using freem relieving bur and a floss of 10 cm length was tied to the test sample. Dimensions of all different test samples were multiplied by 5 and the geometric designs were drawn on the chart paper and marked as 1-5. A time period of 1 min was provided to each patient for the identification on the chart followed by gap of 30 s for the next test sample to be placed in the mouth. A score of 2 was given for each correct identification, score of 1 for no identification, and score of 0 for wrong identification of sample.

RESULTS

The oral stereognostic scores were recorded, mean values were calculated, and statistically analyzed using analysis of variance and *t*-test. In intergroup comparison between two groups, Group I (7.52 ± 3.02) recorded less value than

Group II (12.65 ± 3.65) which was statistically significant ($P < 0.001$).

In intragroup comparison of Group I (epileptic group), sub group Ia (7.43 ± 2.24) had less mean values than sub group Ib (7.71 ± 2.51), which was not significant statistically ($P < 0.001$).

In intragroup comparison of Group II (control group), sub group IIb (11.5 ± 3.57) had higher mean values than sub group IIa (9.01 ± 4.09) which was statistically significant ($P < 0.001$).

DISCUSSION

Oral stereognosis basically is the ability of our sensory mechanism to recognize the shape of objects placed in oral cavity. The science of stereognosis is very important for the dentist as well as technician so that to understand the expectation level of the patients and predict the prognosis of the prosthesis. A defect or nonintegration of the proprioceptive changes can result in poor function or pathologic changes in the system.⁵ Various authors⁷⁻⁹ have conducted studies to compare the dentulous and edentulous state in terms of stereognosis and found varying results. However, none of the author has compared the epileptic patient with normal patient in terms of oral stereognosis. In this study, both dentulous and completely edentulous patients were tested so that to note whether the presence of teeth has any influence on the stereognostic score of epileptic patients. No attempt was made to evaluate the stereognostic score with the complete dentures in the mouth as it has been reported that stereognostic ability is not affected by the presence or absence of dentures.^{11,12}

Furthermore, no differentiation was made in males and females in this study as a previous study by Chauvin and Bessette¹³ reported that no difference exists in oral stereognosis between males and females. Five different forms ranging from simple circle to complex star with edges was used as test sample with floss attached to center to avoid any risk of engulfment of the test sample. Null hypothesis that no difference exists between epileptic group and control group in terms of stereognostic capability stands rejected as a statistically significant difference exists between the two groups. During intergroup comparison, it is found that the epileptic group patients were having less mean values than the control group. This may be explained as most of the patients reported to us were on antiepileptic therapy. They were consuming drugs such as phenobarbitone, carbamazepine, and phenytoin which may have caused adverse reactions such as diminution

of intelligence, impairment of learning, and memory and mental confusions.¹⁰ Furthermore, in intragroup comparison in epileptic group both dentulous as well as edentulous patients showed poor stereognostic score indicating sensory feedback mechanism is impaired in epileptic patients. In intragroup comparison in control group completely edentulous patients showed less mean score than the dentulous patients. This can be explained as aging reduces the perceptive responses. This is in agreement with the study by Landt and Fransson¹⁴ which stated that elder people has less stereognostic capability than the younger adults due to weakening of sensory feedback mechanism. It can be suggested that stereognostic score should be recorded during initial appointment only and the treatment plan should be directed keeping in mind the score obtained. In compromised patients or patients with severely less score, a training program and proper counseling before fabrication of prosthesis should be carried out.

CONCLUSION

1. Oral stereognosis predicts the prognosis of the treatment provided
2. Epileptic patients have decreased stereognostic capability than the control group
3. In epileptic patients, proper counseling and training program should be carried out before fabrication of prosthesis.

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How to cite this article: Gupta R, Gupta M, Gupta B, Khajuria RR, Sharma A, Singh R. Comparative Evaluation of Oral Stereognosis in Epileptic and Nonepileptic Patients: An Original Research. *Int J Sci Stud* 2016;4(9):104-107.

Source of Support: Nil, **Conflict of Interest:** None declared.