

International Journal of Research in Health and Allied Sciences

Journal home page: www.ijrhas.com

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803

Index Copernicus value [ICV] = 68.10;

Original Research

Assessment of pulpal sensory thresholds with different conducting media

Rakesh¹, Vishal Chhabra², Sonia³

¹B.D.S, M.D.S, Dental Surgeon, Sub Divisional Hospital Gohana, Health department, Haryana.

²B.D.S, Dental Surgeon, Urban Health Centre Ghosli, sec.12 Huda Panipat, Health department, Haryana.

³B.Sc Nursing, M.Sc Nursing, Staff Nurse, Community Health Centre Ahar, Health department, Haryana.

ABSTRACT:

Background: The present study was conducted to assess pulpal sensory thresholds in human teeth with different conducting media. **Materials & Methods:** The present study was conducted on 45 maxillary first molars. We divided teeth into 3 groups of 15 each. Group I was control where no conducting media was used, group II used lox 2% Jelly and group III used toothpastes sensodyne repair. The media were used in random order and each medium was tested twice on the tooth with 1 minute interval. The mean of the two threshold values for each conducting medium and the VAS scores were recorded. **Results:** The mean VAS score in group I was 5.18, in group II was 5.26 and in group III was 5.84. The difference was non- significant ($P > 0.05$). The mean sensory threshold (μA) in group I was 0.624 μA , in group II was 0.97 μA and in group III was 1.04 μA . The difference was significant ($P < 0.05$). **Conclusion:** Authors found that Lignox 2% Gel proved to be superior to toothpaste when used as a conducting medium for EPT.

Key words: Lignox 2% Gel, Sensodyne Repair, Meswak.

Received: 22/06/2020

Modified: 18/08/2020

Accepted: 22/08/2020

Corresponding Author: Dr. Rakesh, B.D.S, M.D.S, Dental Surgeon, Sub Divisional Hospital Gohana, Health department, Haryana.

This article may be cited as: Rakesh, Chhabra V, Sonia. Assessment of pulpal sensory thresholds with different conducting media. Int J Res Health Allied Sci 2020; 6(4):75-78.

INTRODUCTION

Dental pulp tests are investigations that provide valuable diagnostic and treatment planning information to the dental clinician. If pathosis is present, pulp testing combined with information taken from the history, examination, and other investigations such as radiographs leads to the diagnosis of the underlying disease which can usually be reached relatively easily.¹ Electric pulp testers (EPTs) are widely used diagnostic tools in endodontics. They deliver a current sufficient to overcome enamel and dentin resistance to stimulate the myelinated sensory fibers (A fibers) at the pulpal-dentinal junction.² The unmyelinated C fibers of the pulp do not respond because greater current is needed to stimulate them. The ability of electric tests to indicate pulp vitality is based on sensitivity of neural transmission, which can lead to false-positive and false-

negative values, but a positive response usually indicates that there are vital sensory fibers present.³ Testing with an EPT requires electrode contact onto tooth surface. Studies have reported the optimum positions of the electrode for anterior teeth and premolars. Bender et al concluded that placing the electrode at the incisal edge of anterior teeth evoked a response with the least amount of electrical current. Several studies have reported electric pulp testing of molars. A conducting medium is used between the tip of electric pulp tester and tooth surface for conductance and concentration of the electric field to invoke a threshold response from the patient.⁴ The present study was conducted to assess pulpal sensory thresholds in human teeth in different conducting media.

MATERIALS & METHODS

The present study was conducted in the department of Endodontics. It comprised of 45 maxillary first molars. We divided teeth into 3 groups of 15 each. Group I was control where no conducting media was used, group II used lox 2% Jelly and group III used toothpastes sensodyne repair. The media were used in random order and each medium was tested twice on the tooth with 1 minute interval. The tooth probe of the tester was

coated with a thin layer of the test medium and a stimulus was applied on the tooth until felt by the participant. At the faintest sensation felt by the patient, the sensory threshold value and the pain scores were recorded. The mean of the two threshold values for each conducting medium and the VAS scores were recorded. Results were tabulate and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of teeth in groups

Groups	Group I	Group II	Group III
Media	No	Lox 2% Jelly	Lidocaine 2%
Active ingredients	Control	Sensodyne Repair	Calcium sodium phosphosilicate

Table I shows that group I was control, in group II lox 2% jelly was used with sensodyne repair toothpaste and group III used 2% lidocaine with calcium sodium phosphosilicate as active ingredients.

Table II Assessment of sensory threshold

Group	Mean	P value
Group I	0.624	0.01
Group II	0.97	
Group III	1.06	

Table II, graph I shows that mean sensory threshold (μA) in group I was 0.624 μA , in group II was 0.97 μA and in group III was 1.04 μA . The difference was significant ($P < 0.05$).

Graph I Assessment of sensory threshold

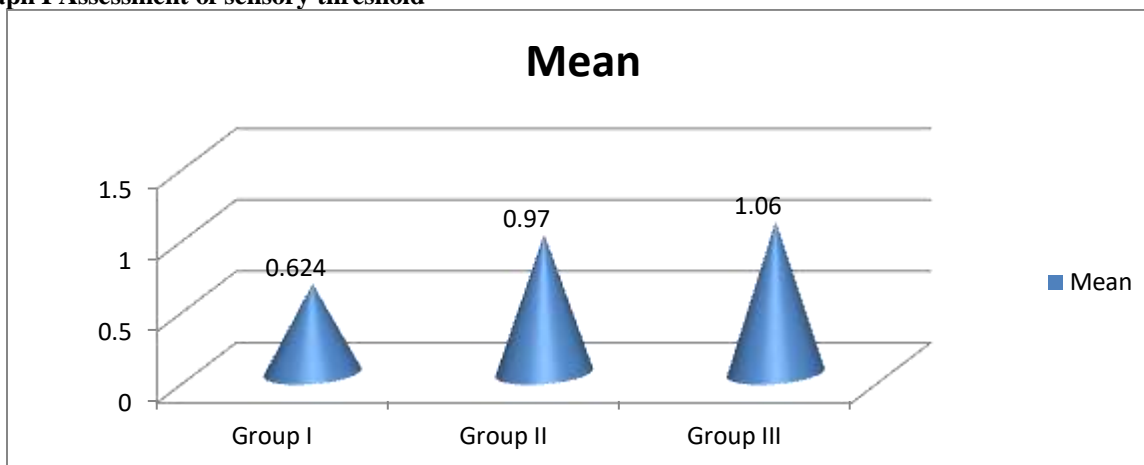
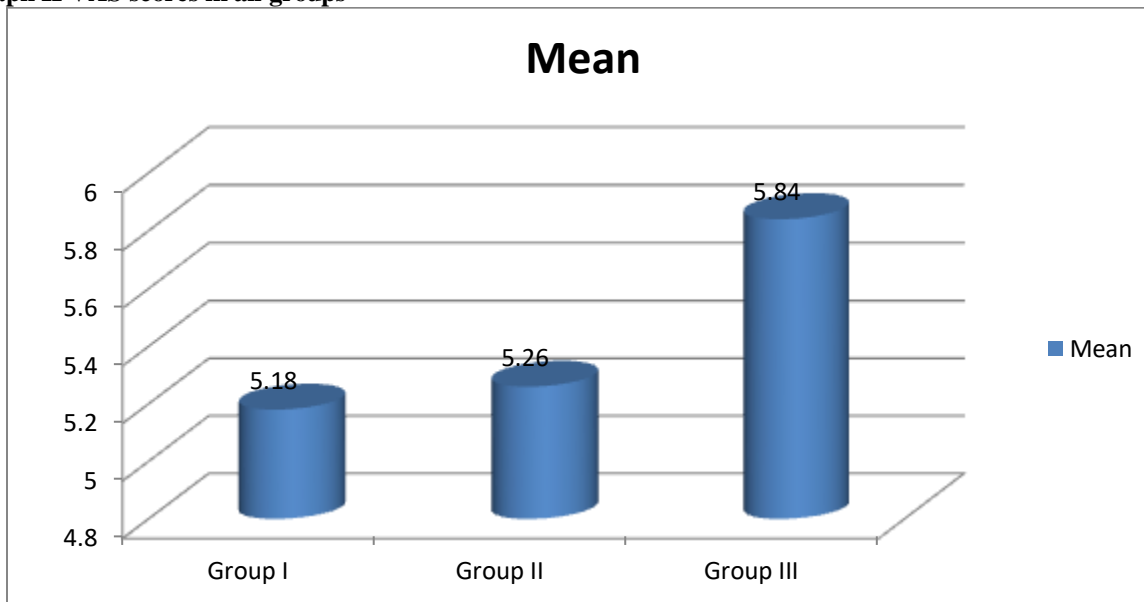


Table III Assessment of VAS scores in all groups

Group	VAS scale (Mean)	P value
Group I	5.18	
Group II	5.26	
Group III	5.84	

Table III, graph II shows that mean VAS score in group I was 5.18, in group II was 5.26 and in group III was 5.84. The difference was non- significant ($P > 0.05$).

Graph II VAS scores in all groups

DISCUSSION

Pulp sensibility tests (thermal and electric) are used to assess the condition of the nerves within the dental pulp and indirectly assess the pulpal health. Although, research depicts that cold test and electric pulp test (EPT) provide equally accurate diagnosis on status of pulp vitality in majority of the cases, EPT does have some limitations.⁵ A positive response is indicative of vital sensory fibers present within the pulp, but information regarding the health or integrity of the pulp is still inconclusive. Attempts to connect the EPT results to the histological condition of the pulp continue to be unclear due to a number of variables such as the conducting media, gender, patient and doctor related factors.⁶

Pulpitis can be considered as reversible or irreversible, depending on the severity of pain and whether the pain lingers or not. Typically mild pain of short duration is considered to indicate reversible pulpitis while severe pain that lingers indicates irreversible pulpitis. The absence of responses to sensibility tests is usually associated with the likelihood of pulp necrosis, the tooth is pulpless, or has had previous root canal therapy.⁷ The present study was conducted to determine pulpal sensory thresholds in human teeth with different conducting media.

In present study, 3 conducting media were used. Teeth were divided into 3 groups of 15 each based on conducting media used. Group I was control, in group II lox 2% jelly was used with sensodyne repair toothpaste and group III used 2% lidocaine with calcium sodium phosphosilicate as active ingredients. Chunnacheeva chaloke et al⁸ found that sensory threshold values elicited by Lox 2% Jelly was significantly lower than

the other conducting media ($P < 0.001$). Gender wise comparison revealed that males have a higher sensory threshold value. Significant difference was noted between male and female readings in Lox 2% Jelly group ($P = 0.003$) whereas highly significant difference was noted in Sensodyne Repair & Protect ($P < 0.001$) and Meswak groups.

We found that mean sensory threshold (μA) in group I was 0.624 μA , in group II was 0.97 μA and in group III was 1.04 μA . The difference was significant ($P < 0.05$). We observed that mean VAS score in group I was 5.18, in group II was 5.26 and in group III was 5.84. Lidocaine, the chief constituent of Lignox 2% Gel has a higher dissociation constant causing it to be more ionic in nature than benzocaine. This increased ionic nature of lidocaine resulted in its improved conduction of impulse in the present study. Sensodyne Repair showed better electrical conduction. Conduction of impulse through a medium depends on factors such as viscosity and surface tension between the medium and the tooth surface.⁹ Lower the surface tension, better will be the adaptation of the medium to the tooth which may result in improved conduction. The constituents of the toothpaste may also affect the conduction of electric impulses from the pulp tester to the tooth. One example is Sodium carrageen an a sea weed product, which is an ingredient in herbal toothpastes like Meswak. It acts as a stabilizer. It is known to increase viscosity of the toothpaste which may negatively affect its ability of conduction.¹⁰

Lin et al¹¹ included 20 subjects with first molars. One molar from each arch was selected, and rubber dam was applied. Seven sites on each crown were electric pulp tested 4 times with an Elements Diagnostic Unit, and

lowest threshold responses were recorded. The lowest response for both the maxillary and mandibular teeth was with the probe on the mesiobuccal cusp tip. Other sites showed an increase in level from the mesiobuccal cuspal surface, mesiobuccal gingival surface, and the center of the supporting cusps (palatal of maxillary molar, buccal of mandibular molar). No significant difference in responses was found between male and female subjects; however, male subjects responded at higher thresholds than female subjects on all test sites except the mesiobuccal cusp tip. The optimum site for pulp testing first molars is the mesiobuccal cusp tip.

CONCLUSION

Authors found that Lignox 2% gel proved to be superior to toothpaste when used as a conducting medium for electric pulp testing.

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