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Original Article

To assess the efficacy of Electric Pulp Tester in different conducting media- An in vitro study

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***ABSTRACT*:**
Background: In endodontics, pulp testing may involve thermal and electric pulp testing (EPT). The present study was conducted to assess the efficacy of electric pulp tester in different conducting media. **Materials & Methods:** The present study was conducted on 60 mandibular incisors of both genders. The three conducting media tested were gel based product – Lox 2% Jelly and toothpastes- colgate sensitive and herbal tooth paste. The participants were asked to rate the sensation felt after each stimulus using a simple visual analogue scale (VAS). **Results:** Out of 60 patients, males were 30 and females were 30. The mean sensory threshold with Lox 2% Jelly in males was 0.725 and in females was 0.531, with colgate sensitive was 0.926 in males and 0.798 in females, 1.282 in males and 0.821 in females with herbal tooth paste. The difference was significant (P< 0.05). The mean VAS core in males was 5.423 and in females was 2.612 with Lox 2% Jelly. 5.564 in males and 2.248 in females with colgate sensitive and 5.505 in males and 2.431 in females with herbal tooth paste. The difference was significant (P< 0.05). **Conclusion:** Author found that pulpal sensory thresholds to electric stimuli generated by electric pulp tester differ in different conducting media.
Key words: Conducting media, Electric pulp tester, Sensory thresholds.

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INTRODUCTION

Disease identification in the initial stage allows for a conservative management protocol. Unambiguous determination of pulp vitality or non vitality is essential for the successful diagnosis of endodontic pathology. Certain pulp tests, along with a detailed patient history, clinical & radiographic examination aid in achieving the same. Evaluating the blood supply within the dental pulp (pulp vitality) is the first and only available true yardstick to assess the actual state of pulpal health.[1]

In endodontics, pulp testing may involve thermal and electric pulp testing (EPT). These tests are also defined as sensibility tests, as they assess whether there is response to a stimulus.[2] 'Pulp vitality' implies blood supply, which thermal and electric tests do not confirm. Further information when attempting to diagnose the condition of the pulp may come from appropriate radiographs, blood flow tests such as laser Doppler flowmetry if available, preparation of test cavities and anaesthetic tests. However, none of the current pulp testing methods meets all criteria.[3] Consequently a medium that permits maximum electrical conduction would allow a response at the lower threshold thus helping to determine the state of the pulp. A recent study has shown that type of conducting media and gender influence the sensory threshold response to electrical stimuli in human teeth.[4] The present study was conducted to assess the efficacy of electric pulp tester in different conducting media.

MATERIALS & METHODS

The present study was conducted in the department of Endodontics. It comprised of 60 mandibular incisors of both genders. The study protocol was approved from institutional ethical committee. All patients were informed regarding the study and written consent was obtained.

General information such as name, age, gender etc. was recorded. The three conducting media tested were gel based product – Lox 2% Jelly and toothpastes- colgate sensitive and herbal tooth paste.

The stainless steel anterior tooth probe of the tester was coated with a thin layer of the test medium to allow electrical conduction from tooth probe to the tooth surface. The tooth probe tip was placed on the incisal third of the tooth. The participant was asked to respond at the first felt faintest sensation by raising hand. The participants were asked to rate the sensation felt after each stimulus using a simple visual analogue scale (VAS). The results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 60		
Gender	Males	Females
Number	30	30

Table I shows that out of 60 patients, males were 30 and females were 30.

Table II Assessment of sensory threshold with different conducting media

Conducting media	Males (Mean)	Females (Mean)	P value
Lox 2% Jelly	0.725	0.531	0.01
Colgate sensitive	0.926	0.798	0.02
Herbal tooth paste	1.282	0.821	0.05

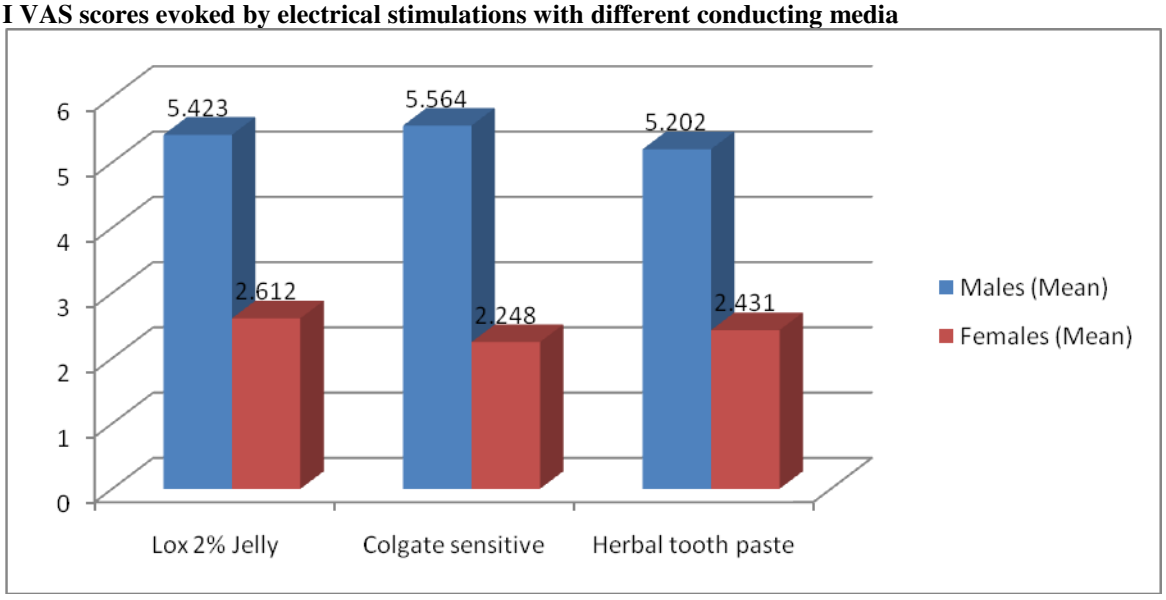
Table II shows that the mean sensory threshold with Lox 2% Jelly in males was 0.725 and in females was 0.531, with colgate sensitive was 0.926 in males and 0.798 in females, 1.282 in males and 0.821 in females with herbal tooth paste. The difference was significant (P< 0.05).

Table III VAS scores evoked by electrical stimulations with different conducting media

Conducting media	Males (Mean)	Females (Mean)	P value
Lox 2% Jelly	5.423	2.612	0.01
Colgate sensitive	5.564	2.248	0.01
Herbal tooth paste	5.202	2.431	0.01

Table III shows that mean VAS core in males was 5.423 and in females was 2.612 with Lox 2% Jelly. 5.564 in males and 2.248 in females with colgate sensitive and 5.505 in males and 2.431 in females with herbal tooth paste. The difference was significant (P< 0.05).

Graph I VAS scores evoked by electrical stimulations with different conducting media



DISCUSSION

Electric pulp testing is based on stimulation of sensory nerves, and requires and relies on subjective assessments and comments from the patient. These can lead to false-positive and false-negative results. Nevertheless, EPT remains an important aid, and when properly used, it is a safe clinical test that can provide useful information regarding health and disease.[5]

Pulp vitality is determined in its true sense by the vascular supply to the pulp. Presence of reactive A delta fibres in the pulp chamber can be detected by an EPT but, no information on the pathological status of the pulp can be deciphered. Furthermore, EPT produces flawed results in scenarios like crowned teeth, teeth during and post orthodontic treatment, immature teeth, consumption of alcohol and narcotics. Moreover, as EPT works by stimulation of sensory nerves and relies on patient's judgement and interpretation of the impulse generated on to the tooth.[6] In present study we compared the electric pulp tester with three different conducting media.

In this study, out of 60 patients, males were 30 and females were 30. The mean sensory threshold with Lox 2% Jelly in males was 0.725 and in females was 0.531, with colgate sensitive was 0.926 in males and 0.798 in females, 1.282 in males and 0.821 in females with herbal tooth paste.

A et al[7] in their study performed on 40 maxillary central incisors in 40 healthy participants, 20 males and 20 age-matched females. Lox 2% Jelly and toothpastes- Sensodyne Repair and Protect & Meswak were three conducting media. 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 used. Sensory threshold values elicited by Lox 2% Jelly were significantly lower than the other conducting media. 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 whereas highly significant difference was noted in Sensodyne Repair & Protect and Meswak groups.

We observed that the mean VAS core in males was 5.423 and in females was 2.612 with Lox 2% Jelly. 5.564 in males and 2.248 in females with colgate sensitive and 5.505 in males and 2.431 in females with herbal tooth paste. Monopolar and bipolar testers are based on the production of impulses of negative polarity. These are reported to reduce the voltages required to stimulate nerve response in the pulp, and reduce the possibility of stimulating the nerves in the periodontium. Testers produce different electric impulses. The output can be increased by turning a dial or is automatically increased with digital readout in more recent models.[8]

CONCLUSION

Author found that pulpal sensory thresholds to electric stimuli generated by electric pulp tester differ in different conducting media.

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