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Knowledge And Perspective On Butterfly Effect In Teeth

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Abstract

INTRODUCTION

The butterfly effect is an optical phenomenon and is related to the presence of sclerotic dentine in the roots. The unique pattern of sclerotic dentine formation produces a characteristic butterfly shape in transverse sections of the roots. The consequence was first photographed by Beust in 1931 as a physical phenomenon in some cross-sections of tooth roots. The dentinal tubular sclerosis differs within the mesiodistal and buccolingual directions said by vasiliadis et al by noting a characteristic butterfly shape in transverse sections of the roots that were caused by different reminder dentin. Unlike normal dentin, the sclerosed dentine is more transparent. because the number of dentinal tubules decreases, it leads to greater light transmission to offer a translucent appearance. The present study aims to identify the knowledge and perspective on the butterfly effect in teeth.

MATERIALS AND METHOD

A cross-sectional study was done using google docs. A self-structured questionnaire containing 10 questions was prepared and approved by the SRB of Saveetha Dental College and Hospitals. The link was shared with 100 Undergraduate dental students, and the results were analyzed using SPSS statistics 19 and represented in the form of a pie chart using descriptive statistics. Pearson chi-square test is done by SPSS software 23.

RESULT

In the present study, 96% of students know about the butterfly effect and the remaining 4% of students do not know about the butterfly effect. 1% of students said that teeth are more prone to vertical fracture in the mesiodistal direction and 99% of students said that teeth are more prone to vertical fracture in buccolingual direction. 95% of students said that dental sclerosis makes the tooth harder and 5% of students said that dental sclerosis does not make the tooth harder. Pearson chi-square test was done and p value< 0.05 was considered statistically significant.

CONCLUSION

Regarding Knowledge, Attitude, and Practise among dental students in Saveetha Dental College. Pertaining to knowledge and perspective on butterfly effect in teeth, the following conclusion can be drawn - viz students in Saveetha Dental College have vast knowledge towards knowledge and perspective on butterfly effect in teeth and most of the students have positive attitudes towards this study. But they do not carry out most of the practices involved in preventive dentistry regarding the butterfly effect in teeth and this needs to be improved.

KEYWORDS:

Butterfly effect, teeth, knowledge, perspective, innovative method

INTRODUCTION

Butterfly effect is an optical phenomenon and is related to the presence of sclerotic dentine in the roots. The unique pattern of sclerotic dentine formation produces a characteristic butterfly shape in transverse sections of the roots. The consequence was first photographed by Beust in 1931 as a natural phenomenon in some cross-sections of tooth roots. The dentinal tubular sclerosis differs within the mesiodistal and buccolingual directions by noting a characteristic butterfly shape in transverse sections of the roots that were caused by different reminder dentin. Unlike normal dentin, the sclerosed dentine is more transparent. because the amount of dentinal tubules decreases, it results in greater light transmission to supply a translucent appearance. Although the consequence is claimed to be sclerosis, the tubule density also plays a role in the formation of butterfly appearance. Investigation shows that teeth with consequence have lower hardness scores buccolingually than mesiodistally. By a study done by(1)5)the consequence was uniform all along with the idea of incisors and canines and premolars, but with a slight predominance in incisors and canines(2).

The consequence was a natural phenomenon seen in some sections of tooth roots. This study aimed to research the density of dentinal tubules in mesiodistal and buccolingual cross-section of roots exhibiting the consequence and to hunt out whether the consequence is age-related (2,3). The test called the microhardness test was performed by employing a vickers hardness test. A higher frequency of consequence was found within the apical root section and root dentine with consequence were harder mesiodistally. Prevalence of consequence in lower premolars increased from coronal to apical with increased hardness mesiodistally. More buccolingual cracks were found in radicular dentine with consequence and most of them exhibit type 1 and type 2 cracks. Roots of lower premolar with consequence could even be susceptible to a far better rate of vertical root fracture in buccolingual directions, especially after passage treatment. Thus, special attention should tend to not overload instruments during passage preparation(4). The consequence could also be a phenomenon that was seen in some roots and it's related to the density of dentinal tubules(5). Our team has extensive knowledge and research experience that has translate into high quality publications

(6),(7),(8),(9),(10),(11),(12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25). The study aims to find knowledge and perspective on butterfly effect in teeth among dental students.

MATERIALS AND METHODS

A cross-sectional study was done using google docs. A self-structured questionnaire containing 10 questions was prepared and approved by the SRB of Saveetha Dental College and Hospitals. The link was shared with 100 Undergraduate dental students and the results were analyzed using SPSS statistics 19 and represented in the form of a pie chart using descriptive statistics. Minimizing errors, framing questions in simple language, and avoiding leading questions were some of the measures taken to minimize bias. The advantage of the study is that it was economical, easy to do, and quickly interpreted. The disadvantages were homogeneous population, survey fatigue, and response bias. All the undergraduate students who were willing to participate in the survey were included in the study and those who were not willing to participate were excluded from the study. Pearson chi-square test was done and the p-value is less than 0.05. Hence, it is statistically significant

The questionnaire comprised a series of questions including their demographic characteristics like age and gender. The other questions are as follow

1. What is the shape of dentinal tubules?
2. Whether dental sclerosis makes the tooth harder?
3. Do you know about the butterfly effect?
4. Do you think sclerotic dentine is more transparent?
5. Selecting the cross section with butterfly effect.
6. Teeth with butterfly effect are more prone?
7. Tubules involve shows?
8. Sclerotic dentine is predominantly seen in?
9. Do you think sclerotic dentine affects age estimation during forensic investigation?
10. Whether sclerosis?

RESULT

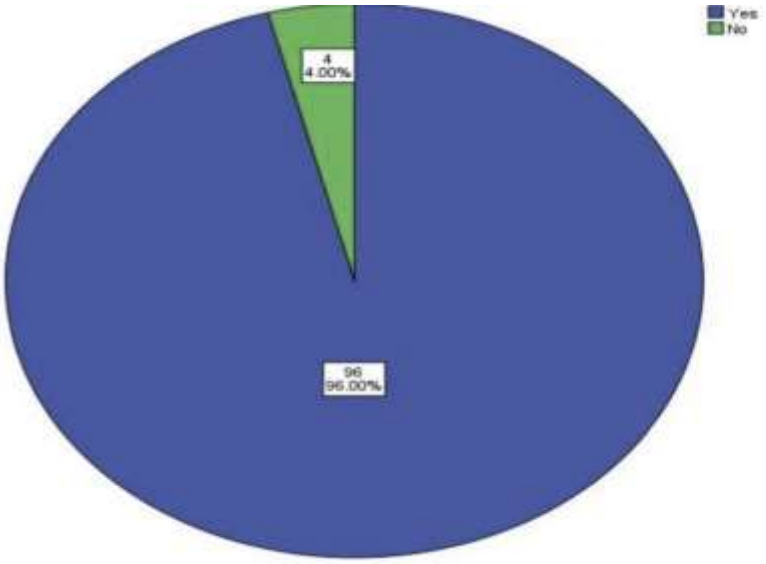

FIGURE 1: Pie Chart showing the percentage distribution of how many people know about the butterfly effect. 96% (blue) of the participants answered yes and 4 % (green) of the participants answered no. The majority of participants responded that they know about the butterfly effect.

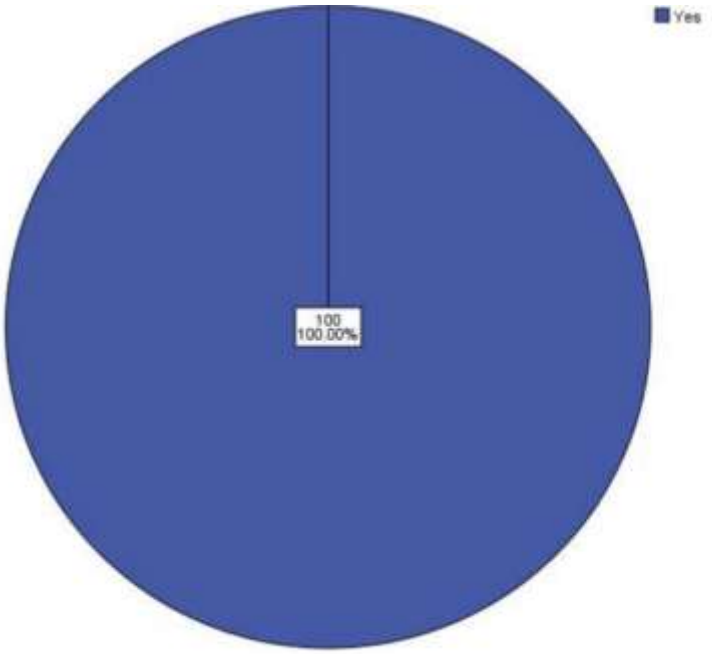

FIGURE 2: Pie Chart showing percentage distribution about whether sclerotic dentine is more transparent. 100% (blue) of participants responded that sclerotic dentine is more transparent.

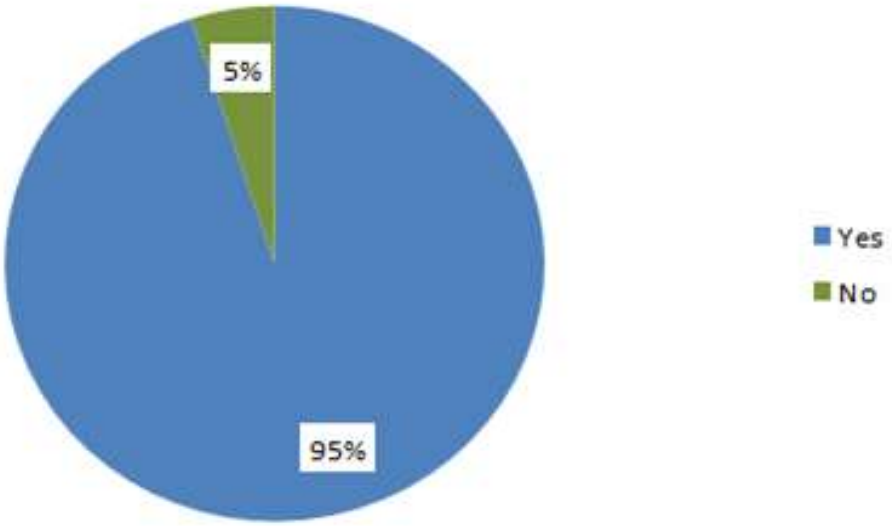

FIGURE 3: Pie Chart showing the percentage distribution about whether dental sclerosis makes the tooth

harder. 95% (Blue) participants answered yes and 5% (green) participants answered no. The majority of the participants had responded that dental sclerosis makes the tooth harder.

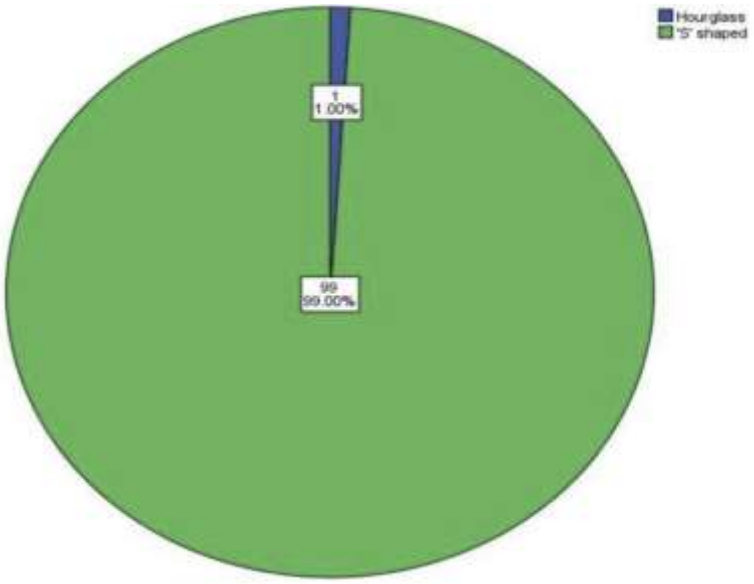

FIGURE 4: Pie Chart showing percentage distribution of about the shape of dentinal tubules. 99% (green) of the participants responded S shaped and 1% (blue) of the participants responded hourglass. The majority of the participants had responded that the shape of the dentinal tubules is S shaped.

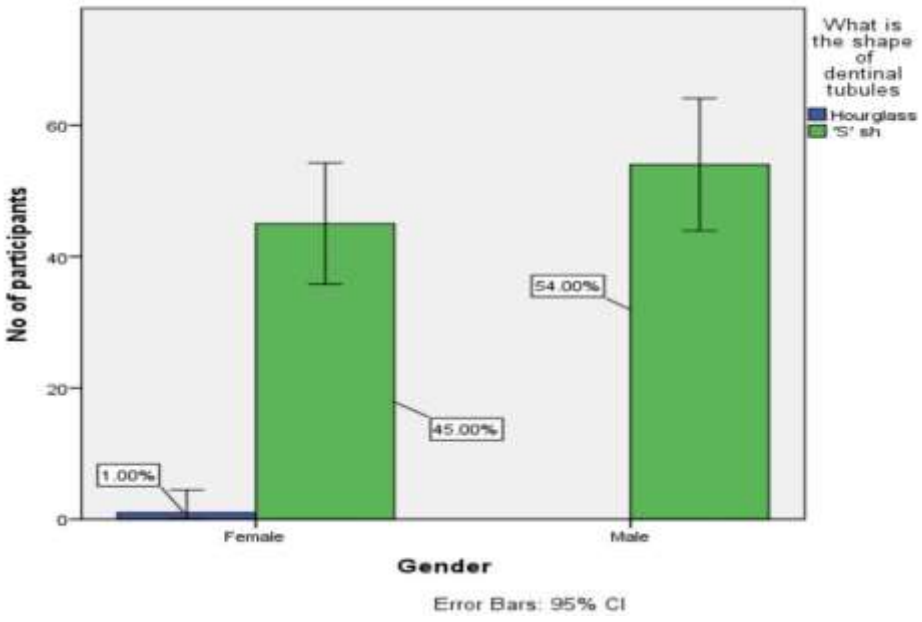

FIGURE 5: The bar graph represents the association between gender and shape of dentinal tubules. The X-axis represents the gender and Y-axis represents the percentage of responses.Blue color denotes

hourglass(1%) and green color denotes S-shaped (54% and 45%). Pearson chi square test shows p-value is 0.276,(p value>0.05). Hence, it is statistically not significant. Majority of males responded that shape of dentinal tubules is S shaped as compared to females.

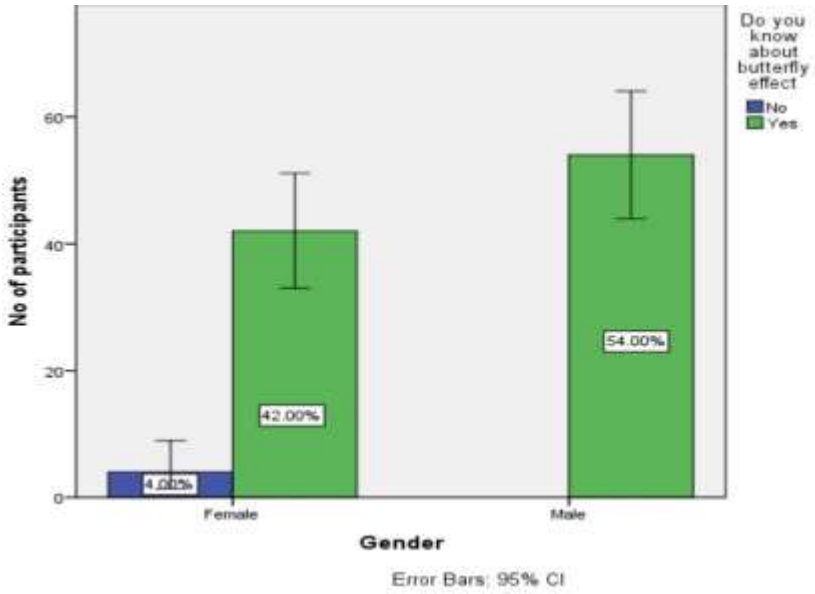

FIGURE 6: The bar graph represents the association between the gender and whether participants knew about the butterfly effect. X axis represents the gender and Y axis represents the percentage of responses. Blue color denotes yes(54% and 42%) and green color denotes no (4%). Pearson chi square test shows p value is 0.027. (p value <0.05). Hence, it is statistically significant. Majority of males knew about the butterfly effect as compared to females.

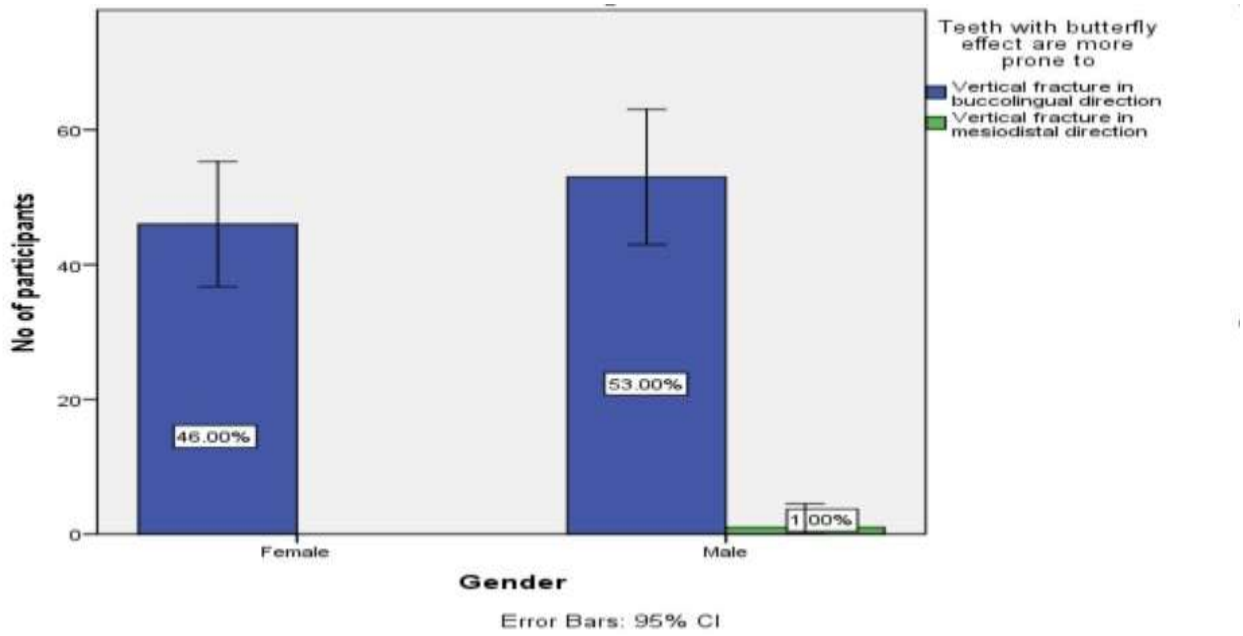

FIGURE 7: The bar graph represents the association between the gender and type of fracture which occurs in teeth with butterfly effect. X axis represents gender and Y axis represents percentage of responses.

Blue color denotes those who responded vertical fracture in buccolingual direction (53% and 46%) and green color denotes those who responded vertical fracture in mesiodistal direction(1%). Pearson chi square test shows p value is 0.354(p value>0.05). Hencse, it is statistically not significant. Majority of males responded that teeth with butterfly effect are prone to vertical fracture at buccolingual dimension.

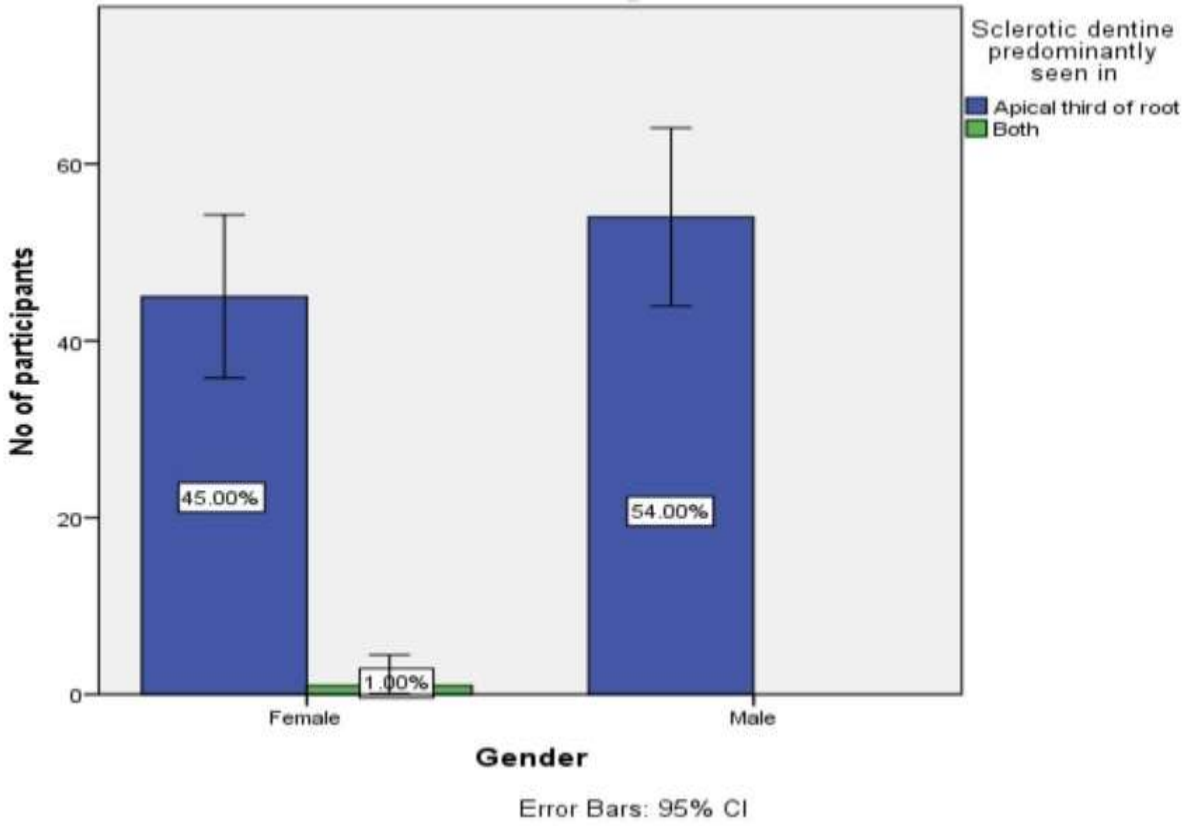

FIGURE 8: The bar graph represents the association between the gender and location of sclerotic dentin. The X-axis represents gender and Y-axis represents percentage of responses. Blue color denotes those who responded sclerotic dentin is seen in apical third of root (54% and 45%) and green color denotes those who responded sclerotic dentin is seen in both apical and coronal third of root (1%). Pearson chi square test shows p value as 0.2 (p>0.05) Hence, it is statistically not significant. Majority of males responded that sclerotic dentin is predominantly seen in the apical third of root.

In our study, 96% of the participants knew about the butterfly effect whereas 4% of the participants didn't know about the butterfly effect(Figure 1). 100% of participants responded that sclerotic dentine is more transparent (Figure 2). 95% of the participants think that dental sclerosis makes the tooth harder, whereas 5% of the participants don't think that dental sclerosis makes the tooth harder, implying that the majority of the participants had responded that dental sclerosis makes the tooth harder. (Figure 3). 99% of the participants responded that the shape of dentinal tubules is S shaped whereas 1% of the participants responded the shape of dentinal tubules is hour-glass. The majority of the participants had responded that the shape of the dentinal tubules is S shaped.(Figure 4). 54% of males and 45% of females responded that the shape of dentinal tubules is S shaped whereas 1% of females considered that shape of dentinal

tubules to be hour-glass. Pearson chi square test was done and p-value wass 0.276,(p value>0.05). Hence, it is statistically not significant (Figure 5). 54% of males and 42% of females responded that they knew about the butterfly effect whereas 4% of females didn't know about the butterfly effect. Pearson chi square test was done and p value wass 0.027. (p value <0.05). Hence, it is statistically significant.(Figure 6). 53% of males and 46% of females considered that teeth with butterfly effect are more prone to vertical fracture in buccolingual direction whereas 1% of male considered that teeth with butterfly effect are more prone to vertical fracture in mesiodistal direction. Pearson chi square test shows p value as 0.354(p value>0.05). Hence, it is statistically not significant.(Figure 7). 54% of males and 45% of females responded that sclerotic dentin is seen in apical third of root whereas 1% of female responded that sclerotic dentin is seen in both coronal and apical third of root. Pearson chi square test was done and p value was 0.2 (p>0.05) Hence, it is statistically not significant.(Figure 8).

DISCUSSION

In our study, 95% of students said that dental sclerosis makes the tooth harder and 1% of students said that dental sclerosis does not make the tooth harder. In the study done by (3), the author concluded that root sections with the butterfly effect have a lower density of dentinal tubules mesiodistally corresponding to the wings of the butterfly. Whereas in another study(26) the root sections with the butterfly effect are harder mesiodistally. This might explain the higher prevalence of vertical root fractures that run buccolingually. There was limited literature on the butterfly effect of teeth.

The present study gives a result about people's knowledge and perspective regarding the butterfly effect whereas in another study done, the author concludes that root sections with the butterfly effect have a lower density of dentinal tubules mesiodistally corresponding to the wings of the butterfly. The pattern was observed in teeth from all groups and was absent in controls. The study done by Manocci says that values of tensile strength of the dentine are associated with low densities of dentinal tubules and that apical areas of root dentin are more resistant to tension than coronal ones. The present study states that 96% of the students know about the butterfly effect and 4% of the students do not know about the butterfly effect. Since only a few studies are done on the butterfly effect it is difficult to do the comparison with other studies.

Insufficient report of google forms, lack of previous research on this topic, and time constraints are the limitations of this study, since the study population was only with dental students, it was limited with specific surroundings. In the future, if more no of people were analyzed, we could get many responses and could be analyzed. It can be done in a better manner by using or collecting further information.

CONCLUSION

About knowledge and perspective on butterfly effect in teeth, the following conclusion can be drawn. Undergraduate students have vast knowledge and perspective on the butterfly effect in teeth, and most of the students have positive attitudes towards this study. But they do not carry out most of the practices involved in preventive dentistry regarding the butterfly effect in teeth and this needs to be improved.

AUTHOR CONTRIBUTION

Rupa Devi R: Literature search, data collection analysis, manuscript drafting.

Dr.Sinduja: Aided in the conception of the topic, has participated in the study design, statistical

analysis, and has supervised the preparation and final corrections of the manuscript.
Dr.Lakshmi: Data verification, manuscript drafting, preparation of the manuscript.

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CONFLICT OF INTEREST

The authors reported the conflict of interest while performing this study to be nil

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