Journal for ReAttach Therapy and Developmental Diversities
eISSN: 2589-7799
2023 April; 6(1): 1839-1844

Evaluation Of Prezi as A Tool to Facilitate Oral Hygiene Education In Orthodontic Patients

Wasil M.[1], Nilgar A.[2], Dhagavkar P.[3*], Angolkar M.[4]

[1]Post Graduate MPH Student, Department of Public Health, Jawaharlal Nehru Medical College, Belagavi, Karnataka, India.
[2]Reader, Department of Orthodontics and Craniofacial Orthopaedics, KLE's Vishwanath Katti Institute of Dental Sciences, Belagavi, Karnataka, India.
[3*]Lecturer, Department of Public Health, Jawaharlal Nehru Medical College, Belagavi, Karnataka, India
[4]Professor & Head, Department of Public Health, Jawaharlal Nehru Medical College, Belagavi, Karnataka, India.

***Corresponding author:** Dr. Pooja S. Dhagavkar
*Department of Public Health, Jawaharlal Nehru Medical College, JNMC campus
Nehru Nagar Belagavi-10 Phone-9886221442 Email- dhagavkar.pooja@gmail.com

Abstract:

Background: Orthodontic treatment has many positive effects on oro-facial complex. Physiological mechanism of tongue and cheeks for self-cleansing are greatly reduced due to fixed orthodontic appliances. Therefore, these appliances are responsible for poor oral hygiene among patients. As the world is changing rapidly in terms of science and technology it becomes utmost important that the health sector too agrees with this trend. Prezi is an audio-visual software which helps in creating and storing digital presentations
Objective: To evaluate the impact of Prezi software as an oral hygiene education tool among orthodontic patients.
Methods and Material: A before and after experimental study was conducted From July 2021- April 2022. Baseline data was collected using questionnaire and a health education was given using Prezi as intervention. The participants were followed up using the same questionnaire and change in their awareness was recorded. Analysis was done using Microsoft excel version 10 and SPSS version 20.
Results: A positive change which is significant was seen in the post-study (p-value = 0.0001) of oral hygiene analysis as the mean scores (pre-test = 27.94 and post-test = 33.59) increased in the test after the Prezi presentation.
Conclusions: Prezi as a presentation software with its ability to zoom into pages is an effective oral hygiene education tool for orthodontic patients. This software can be used as an alternative to traditional methods due to its ability to engage participants by virtual aids.

Keywords: Oral hygiene, Awareness, Orthodontics, Software

Introduction:

"Fixed orthodontic appliance is a device fixed to the teeth either by cementation or by bonding to the etched teeth surface to bring about various types of tooth movement".[1] These appliances are widely used for orthodontic treatment. They help in the correction of masticatory function, facial aesthetics, occlusal and jaw relationship. Fixed appliances are preferred when compared to removable orthodontic appliances because they have a greater range of movement. Correction of tooth and jaw position and indirectly improving the health of the periodontium and durability of the teeth is the basic principle of orthodontic therapy. But these devices are responsible for accumulation of food around the appliance.
Orthodontic patients with fixed appliances are prone to more plaque and debris retention as maintaining oral hygiene becomes a challenge for them. Physiological mechanism of tongue and cheeks for self-cleansing is also greatly reduced due to these appliances. Fixed appliances, according to some writers, can obstruct proper oral hygiene and pose significant cariogenic risks.[2] A study published in 2015 gives information about the prevalence of white spot lesions in orthodontic patients which is around 68.4%.[3] Studies have also shown an association between poor oral health and complications of systemic diseases like diabetes, chronic kidney diseases and liver diseases.[4,5,6]
To avoid the risk of these local and systemic complications education regarding good oral hygiene practices is important in orthodontic patients. This educational component enables patients to assume their share of responsibility for their own oral health. It should be a collective effort from the doctor as well as the patient. Daily preventive procedures like proper brushing, interdental cleaning and using mouthwashes can help minimize the possible complications. Correction of malocclusions are a necessity but the results of this efforts are lost in few years if good oral hygiene is not maintained by the patient.[7]

As the world is changing rapidly in terms of science and technology it becomes utmost important that the health sector too agrees with this trend. There is an urgent need of implementing technological solutions for all the possible sectors of health sector, the most important and effective being the field of health education. Prezi is an audio-visual software which helps in creating and storing digital presentations. A canvas is given instead of slides for creating presentations which helps to see the entire presentation at once. It can also be used for integration of texts, images, animations, audio and video into a single presentation. It helps in communication of information and ideas in both educational and research settings. The ability of Prezi to work online and on local computers gives it an upper hand over any traditional software.[8, 9]

Materials and Methods:

The study was a hospital based before and after experimental study. Patients who visited the outpatient clinic at the department of orthodontics and craniofacial orthopaedics at tertiary dental college during the study period was the source of the data and sample size was scientifically calculated to be 100. Convenience sampling technique was used. Study took place from July 2021 to April 2022.
Patients undergoing fixed orthodontic treatment and patients who gave consent were included in the study while patients using removable appliances, with learning disabilities and some systemic illnesses were excluded from the study.

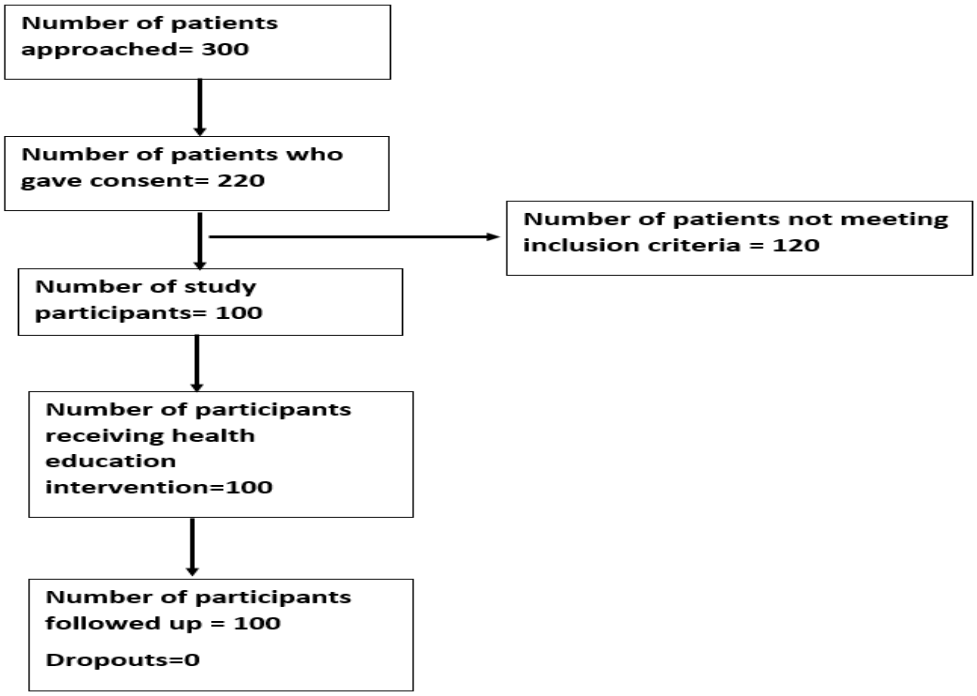

Figure 1 explains the flow of the study.

Written informed consent was obtained from all the study participants and ethical approval was obtained Institutional Ethics Committee (I.E.C.) of the college. All measures were taken to maintain the privacy and confidentiality of the study participants.
The present study was conducted on patients undergoing orthodontic treatment at the department of orthodontics and craniofacial orthopaedics at tertiary dental college. Permissions relevant to the study were obtained from the hospital authorities. After being briefed about the study, informed consent was obtained from all study participants. Data was collected using a pre-designed, pre-tested questionnaire. This questionnaire was divided into two parts namely "socio-demographic information" and "Oral hygiene practices"
Questions on oral hygiene practices were designed in such a way that it will address the following:

- Toothbrushing habits
- Use of interdental cleaning aids.
- Use of mouthwashes
- History of scaling

After taking the baseline data oral hygiene education intervention were given to the patient using Prezi, a zooming editor software. The study participants were followed up after one month and follow-up data were collected using the same questionnaire to evaluate the impact of Prezi software. Data collection and entry was done simultaneously. Data analysis

was done by using the statistical package for social sciences (SPSS) version 20 and Microsoft Excel version 10. Descriptive analysis of the data with all variables were done separately. The Chi square test was employed to determine whether or not there was a correlation. Those cells having values less than five was analyzed using Montecarlo simulation. Wilcoxon signed rank test analysis was done to compare ordinal values of study questions.

Results:

Table 1: Demographic characteristics of the study participants

Participants (N =100).	
Characteristics	**Value (%)**
Age	
Adolescents	36
Young adults	59
Adults	5
Educational status	
High School	10
Higher Secondary	36
Graduates	54
Marital status	
Unmarried	89
Married	11
Gender	
Male	39
Female	61
Religion	
Hindu	78.0
Muslim	15.0
Others	7.0

It is seen that maximum number of study participants undergoing orthodontic treatment (59%) were young adults followed by adolescents (36%). Only 5% of the total were adults. (Table 1)

Table 2: Brushing habits of study participants

Variables	**Test**			
	Groups	Pre-Test count (%)	Post-Test count (%)	**P-value**
Frequency of toothbrushing	Once a day	23.0	00.0	0.0001
	twice a day	72.0	95.0	
	more than 2 times	5.0	5.0	
Type of Bristles Used	Medium	52.0	14.0	0.0001
	Soft	48.0	86.0	
Time Spent on Brushing	< 1 minute	7.0	00.0	0.001
	4-6 minutes	43.0	18.0	
	1-3 minutes	50.0	82.0	

72% of participants brushed their teeth two times in a day before intervention but this increased to 95% participants after the intervention indicating that there was a significant increase in the number of people who brushed their tooth two times in a day (p-value0.0001). 52% of the study participants used medium hard bristles for brushing, but after the intervention using Prezi, 86% of the study participants used soft bristles for brushing. A significant difference was observed among the two groups (p-value 0.0001). The study also showed that there is a significant difference between the groups when people were asked about time spent of brushing (p-value 0.001). (Table 2)

Table 3: Use of fluoridated toothpaste and inter dental brushes

Variables	**Test**	**P-value**

	Groups	Pre-Test count (%)	Post-Test count (%)	
Use of Fluoridated Toothpaste	Yes	20.0	78.0	0.0001
	No	32.0	13.0	
	Maybe	48.0	9.0	
Usage of Interdental Cleaning Aids	Yes	10.0	23.0	0.020
	No	90.0	77.0	
Knowledge on how to use inter dental cleaning aids	Yes	25.0	75.0	0.0001
	No	75.0	25.0	

Only 20% of the study participants used fluoridated toothpaste before intervention while the post-test showed 78%. A significant difference was observed from the table among those who used interdental cleaning aid. (p-value 0.020). A significant increase was observed from 25% to 75% in the post-test. (p-value 0.0001), when participants were asked whether they knew how to use an inter dental cleaning aid. (Table 3)

Table: 4 Frequency of Mouth Rinsing

Frequency of Mouth Rinsing	Count (%)		**p-value**
	Pre-Test	Post-Test	
2 Times	63.0	35.0	0.0001 cc
More than 2 Times	37.0	65.0	
Total	100.0	100.0	

It was observed in pre-test that 37% of the study participants rinsed their mouth more than 2 times. This increased to 65% in the post-test which was a significant increase. (Table 4)

Table 5: Descriptive statistics of scores

	Mean	**Std. Deviation**	**p-value**
PRE-SCORE	27.9400	3.01451	0.0001*
POST-SCORE	33.5900	2.43748	

The overall knowledge score increased significantly after the educational intervention using Prezi software. (Table 5)

Discussion:

Majority of the participants in present study brushed their teeth twice a day which showed a similar pattern in other studies. Studies conducted in China and New-Zealand concluded that most of the study participants also brushed their teeth twice daily.[10] This frequency of brushing is similar in most of the studies because brushing twice daily is recommended by dentists globally. It was also seen that in the present study the percentage of those who brushed their teeth twice daily increased from 72% to 95% after oral hygiene education using Prezi.

In the present study, majority of the participants used toothbrushes that have medium thick bristles. Studies conducted in China and New-Zeeland showed that majority of the study participants brushed using toothbrushes with soft bristles which is known as the ideal toothbrush for orthodontic patients.[10] After giving health education using Prezi, there was a significant increase among the participants using soft brushes.

Most of the study participants in the present study brushed their teeth for 1-3 minutes which was in correspondence with the results of a randomized crossover clinical trial conducted in Germany on duration of toothbrushing with fixed appliances.[11] The results were also found to be similar to the study from China and New-Zeeland which reported that 80% of the study population brushed for 1-2 minutes.[10] This trend in duration of brushing is seen globally as it's the ideal duration of brushing and is the one recommended by dentists. It was also found out in the present study that there is a significant increase in the number of participants brushing for 1-3 minutes in the post study.

Most of the study participants in the present study were not aware weather the toothpaste they use contain fluoride in it while on 20% of the participants knew that their toothpaste contain fluoride. This result was contradictory to a study conducted in Turkey which found out that almost 50% of the study participants were aware of the contents of toothpaste and 61% of the participants knew the benefits of fluoride in toothpaste.[12] This difference maybe because of the difference in oral hygiene awareness among the population of India and Turkey. It was noted that there is a significant increase in the post study among the study population who knew that their toothpaste contain fluoride which suggests an improvement of oral hygiene awareness after intervention using Prezi.

In the present study 90% of the study participants did not use any interdental cleaning aids. In a study conducted in Saudi Arabia on perception and knowledge of oral hygiene and oral hygiene aids found out that 64% females and 60% males were aware of dental floss and other interdental aids which was also unsatisfactory.[13] There was a significant increase among the participants using interdental cleaning aids after giving health education but still not satisfactory. Lack of knowledge maybe a reason why interdental cleaning aid is not used regularly among the population.

In the Pre-test of the present study 75% of the participants dint know how to use an interdental cleaning aid while in the Post-test after giving intervention using Prezi there was a significant increase in the number of individuals who knew how to use an inter dental cleaning aid. There was no much literature found to discuss the knowledge of using interdental cleaning aids.

Majority of them used to rinse only two times while a small proportion rinsed their mouth more than two times. Most of the study participants were unaware of the importance of rinsing their mouth often. In the Post-test after providing the participants with education using Prezi, there is a significant increase in the number of people rinsing their mouth more than two times. This result was in correspondence to a study from Indonesia in the year 2020 on effectiveness of Prezi web-based teaching media to improve nursing students' comprehension which found out that Prezi web-based teaching media showed significant results in improving students' knowledge.[14]

The mean score of oral hygiene awareness among participants in the Pre-test was 27.9 and that of Post-test which was 33.5 showed a significant increase in the mean. This is in correspondence with a study from Malaysia which was conducted to evaluate the perception and attitude of students in the effectiveness of using Prezi in learning Islamic subjects.[15] This may be due to the reason that Prezi provide a more interactive platform in giving education

Limitations:

The research was carried out in a hospital. So, the results are not generalizable. Initially it takes time for the operator to get used to Prezi software and understand the operations of the software. This software requires a continuous internet connection. Therefore, providing health education in a community setting using Prezi may become cumbersome in areas without connectivity. Default language of the software being English, local users may find understanding and translation of information in local language to be difficult

Recommendations:

Oral health educators, institutions and health professionals should design better educational strategies to improve oral hygiene practices amongst orthodontic patients.

Prezi as an oral hygiene education tool can be used as an alternative to traditional methods by general dentists and orthodontists as well as dental institutes for improving oral hygiene practices among orthodontic patients and to deliver oral instructions after dental procedures.

References:

1. Proffit WR, Fields HW, Larson BE, Sarver DM. Contemporary orthodontics 6th edition William proffit. 2019. 278, 31.
2. Brêtas SM, Macari S, Elias AM, Ito IY, Matsumoto MA. Effect of 0.4% stannous fluoride gel on Streptococci mutans in relation to elastomeric rings and steel ligatures in orthodontic patients. American journal of orthodontics and dentofacial orthopedics. 2005 Apr 1;127(4):428-33.
3. Sundararaj D, Venkatachalapathy S, Tandon A, Pereira A. Critical evaluation of incidence and prevalence of white spot lesions during fixed orthodontic appliance treatment: A meta-analysis. Journal of International Society of Preventive & Community Dentistry. 2015 Nov;5(6):433.
4. Bui FQ, Almeida-da-Silva CL, Huynh B, Trinh A, Liu J, Woodward J, Asadi H, Ojcius DM. Association between periodontal pathogens and systemic disease. Biomedical journal. 2019 Feb 1;42(1):27-35.
5. Ghezzi EM, Ship JA. Systemic diseases and their treatments in the elderly: impact on oral health. Journal of public health dentistry. 2000 Dec;60(4):289-96.

6. Han P, Sun D, Yang J. Interaction between periodontitis and liver diseases. Biomedical reports. 2016 Sep 1;5(3):267-76.
7. Schwaninger B, Vickers-Schwaninger N. Developing an effective oral hygiene program for the orthodontic patient: review, rationale, and recommendations. American journal of orthodontics. 1979 Apr 1;75(4):447-52.
8. Perron B, Stearns A. A review of a presentation technology: Prezi.
9. Strasser N. Using Prezi in higher education. Journal of College Teaching & Learning (TLC). 2014 Apr 23;11(2):95-8.
10. Oral health knowledge and practice among orthodontic clients in China and New Zealand
11. Koretsi V, Klinke R, Herreiner P, Proff P, Kirschneck C. Duration of toothbrushing with fixed appliances: a randomized crossover clinical trial. European Journal of Orthodontics. 2021 Nov 24.
12. Birant S, Koruyucu M, Ozcan H, Ilisulu C, Kasimoglu Y, Ustun N, Kocaaydin S, Bektas D, Usta G, Tekin CA, Bekiroglu N. Investigating the level of knowledge of the community about oral and dental health. European Journal of Dentistry. 2021 Feb;15(01):145-51.
13. Alshahrani S, Alshuaibi A, Alkhaldi M, Koppolu P. Perception and Knowledge of Patients from Different Regions in the Kingdom of Saudi Arabia towards Oral Hygiene and Oral Hygiene Aids. InHealthcare 2021 May (Vol. 9, No. 5, p. 592). Multidisciplinary Digital Publishing Institute.
14. Yanto A, Warsono W. The effectiveness of prezi web-based teaching media to improve nursing students' comprehension. South East Asia Nurs. Res.. 2020 Mar 31;2:16.
15. Mustaffa A, Najid NE, Sawari SS. Students' Perceptions and Attitude towards the effectiveness of Prezi Uses in learning Islamic Subject. arXiv preprint arXiv:1312.5481. 2013 Dec 19.