

Awareness and Attitude of Patients towards Retaining Teeth and Their Options for Teeth Replacement

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Abstract

It is essential to retain natural teeth as prostheses only replace the missing teeth with inferior physical, biomechanical and sensory properties. This study was carried out to determine the knowledge, attitude and practice of patients towards retaining teeth, their options for teeth replacement and the associated factors. A cross-sectional study was carried out on 222 patients attending Dental Clinic, Hospital Universiti Sains Malaysia using validated questionnaires. Data were analysed using IBM SPSS Statistics Version 24.0. Most of the patients were Malay (94.1%) and female (64.4%). Most of them had knowledge regarding root canal treatment (RCT) (55.4%). 17.6% of the patients had undergone RCT, and 64.0% of them preferred RCT than extraction. 50.9% of the patients chose fixed prosthesis to replace missing teeth. Knowledge of RCT was significantly associated with level of education ($P=0.01$) and monthly income ($P=0.02$). Previous experience of RCT was associated with occupation ($P=0.008$), practice of RCT was associated with race ($P=0.03$) and options for tooth replacement was associated with level of education ($P=0.01$). Moderate level of awareness and positive attitude and practice on RCT indicated a more comprehensive awareness activity is needed to ensure that more teeth can be retained and those that are missing being replaced in our community.

Clinical article (J Int Dent Med Res 2021; 14(1): 321-327)

Keywords: Awareness, attitude, retaining teeth, replacement of the tooth, endodontic treatment.

Received date: 04 October 2020

Accept date: 13 December 2020

Introduction

Dental pain has been the most common reason for the patients to seek help from dental practitioners. Usually, this intolerable pain is caused by irreversible inflamed pulp tissue, which requires proper management to eradicate the pain, including root canal treatment (RCT) and tooth extraction¹. It is always vital to retain natural dentition as they do not regrow after extraction. Previous studies reported that

patients who had their teeth extracted showed negative impact in their quality of life^{2,3}. Moreover, almost all the prostheses can only fill up the empty spaces after extraction and they cannot compete with a natural tooth from the perspective of physical, biomechanical and sensory properties⁴.

RCT involves the removal of the irreversibly inflamed or necrosed pulpal tissue, followed by proper chemical and mechanical cleaning and shaping of the root canal, obturation of the empty space and placement of a final crown to make it a complete treatment. Constant review is needed to study the success of the treatment. However, this treatment was moderately known in public, as evidenced by previous studies^{5,6}. This treatment was only well known in the patients that experienced the pulpal symptoms⁷.

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Extraction is otherwise a well-known treatment option in the public. However, missing teeth requires replacement to preserve oral function and aesthetic, besides preventing occlusal disharmony. Three options of tooth replacement after extraction include dental implant-supported protheses, fixed prosthesis and removable partial dentures⁸. Some of the patients refused to replace the missing teeth, which may cause teeth drifting and overeruption⁹.

Fixed protheses are usually used to replace single or two missing teeth, supported by two abutment teeth with equal or greater root surface area according to Ante's Law¹⁰. This teeth replacement method is high patient's acceptance, with short treatment time¹¹. However, this type of tooth replacement requires significant amount of reduction in the abutment teeth, which may lead to biological complications such as caries, loss of pulp vitality, periodontal disease progression or technical complications such as loss of retention, fracture of protheses or abutment teeth¹². Moreover, fixed protheses require high level of operator's clinical skills and complex laboratory procedures. Removable protheses are used to replace the missing teeth when edentulous space is too large for fixed protheses or when the alveolar bone loss is too extensive. This option is inexpensive solution for prosthetic rehabilitation of patients with functional or aesthetic need for replacement of teeth. Removable protheses are non-invasive to remaining teeth, as no significant reduction is made on the adjacent teeth¹³. However, it may be less aesthetically pleasant as compared to other methods as denture framework or acrylic may be visible when it is in position. Patients may feel dissatisfied due to poor adaptation of removable denture as compared to fixed protheses¹³.

Up to the authors' knowledge, there was lack of study conducted to address the awareness and attitude of patients towards retaining teeth and their options for teeth replacement in our community in Malaysia. Based on the previous studies done regarding this issue worldwide^{5,6,14,15}, a set of questionnaires was developed to determine the knowledge, attitude and practice of patients towards retaining teeth, options for teeth replacement and their associated factors.

Materials and methods

Study Design

A cross-sectional study that involved patients attending Dental Clinic, Hospital Universiti Sains Malaysia was carried out for a duration of two months from July to August 2019. Selected 222 patients were among 18 to 60 years old, who were able to communicate in Malay or English and not diagnosed with psychiatric and mental disorder by medical practitioner.

The sample size was calculated using single proportion formula with precision of 5% indicated that a total of 185 respondents were needed to achieve the power of 80% based on the prevalence of respondents that have basic knowledge on RCT among the population in India at 85.9%¹⁴. With the anticipation that around 20% of the respondents would not agree to participate in this study, a total of 222 subjects were needed to participate in this study. The participants were selected by using systematic random sampling.

Questionnaires was adopted from "Patient's Awareness and Knowledge of the Root Canal Treatment in Kashmiri Population: A Survey-based Original Research"¹⁵ and "Survey-based Research On Patients' Knowledge About Endodontic Treatment"⁵ with minor modification to adapt with the community in Malaysia. The questionnaires were made available in English version and translated to *Bahasa Malaysia* version. Part 1 of the questionnaires included patients' demographic profiles such as patient's gender, age, race, marital status, level of education, occupation and monthly income. Part 2 of the questionnaires included information regarding patient's knowledge, attitude and practice on tooth retainment method and views on retaining tooth whereas part 3 included patients' options for teeth replacement. This survey was started initially by conducting the pilot study on 30 patients to ensure the questionnaires were comprehensive. After minor modification, the study was then conducted at the outpatient dental clinic, Hospital Universiti Sains Malaysia.

All the patients who fulfilled the inclusion criteria were invited to join this survey while waiting for their turn to seek treatment. Data collection was done by distributing the consent form and self-administered questionnaires to the patients.

Data Analysis

Data were entered and analysed using

SPSS version 24.0. Descriptive statistics were done, and categorical variables were presented as frequency and percentages while the numerical variables as mean and standard deviation (SD). Chi-square test was used to determine the association between factors (gender, age group, race, marital status, level of education, occupation and monthly income category) and; knowledge, attitude and practice of patients in retaining teeth and their options for teeth replacement. P-value was set at $P < 0.05$.

Results

Demographic Profiles

Table 1 shows demographic profiles of the patients that involved in this study. Out of 222 patients, 64.4% of patients were female, 55.4% were young adults, ranging between 18 – 30 years old. Majority of patients, 94.1% were Malay. For the marital status, among the patients, majority of patients (55.0%) were single. Regarding the level of education, most of them (80.6%) had received tertiary education whereas only 0.9% of patients had only received primary education. Among the patients included in this study, 51.9% of patients were employed. 81.1% monthly income group was B40 category, which was MYR3859 and below per month.

Knowledge, Attitude and Practice

Findings for the knowledge of the patients toward retaining their teeth are shown in table 2. For the knowledge part, the result showed 55.4% of the patients knew about root canal treatment (RCT). From these 123 patients, most of them knew regarding the indication of the RCT (87.8%) and the least known was number of visits of RCT (22.0%). Majority of patients, 69.9% claimed they got this knowledge from dental clinic. However, none of them got this information from the radio.

For the attitude part, only 17.6% of them had undergone RCT previously. The results showed that 97.4% of these patients recalled the RCT as good experience. It was found that 53.8% of patients did not experience pain during or after RCT. Nearly 72% of them got post endodontic restoration and crown placement. The concern of patients associated with RCT in descending order were long treatment time (61.5%), pain (48.7%), high cost (35.9%), the need to remove the tooth despite undertaken treatment (23.1%) and breaking the file in the root canal (7.7%) respectively. Generally, 81.1%

of patients denied that the fee of treatment in government dental clinic influenced their decision about not taking RCT whereas 74.8% of them accepted the fact that the fee of treatment in private dental clinic influenced their decision on declining RCT (Table 3).

| Group | N | Response | n (%) |
|--------------------|-----|--------------------------------|------------|
| Gender | 222 | Male | 79 (35.6) |
| | | Female | 143 (64.4) |
| Age | 222 | Young Adults (18-30 years old) | 123 (55.4) |
| | | Elder Adults (31-60 years old) | 99 (44.6) |
| Race | 222 | Malay | 209 (94.1) |
| | | Chinese | 10 (4.5) |
| | | Indian | 2 (0.9) |
| | | Others | 1 (0.5) |
| Marital status | 222 | Married | 97 (43.7) |
| | | Single | 122 (55.0) |
| | | Divorced/widowed | 3 (1.4) |
| Level of education | 222 | Primary Education | 2 (0.9) |
| | | Secondary Education | 41 (18.5) |
| | | Tertiary Education | 179 (80.6) |
| Occupation | 222 | Government sector | 57 (25.7) |
| | | Private sector | 21 (9.5) |
| | | Self-employed | 37 (16.7) |
| | | Pensioner/Retiree | 6 (2.7) |
| | | No | 101 (45.5) |
| Monthly income | 222 | B40 (MYR3859 and below) | 180 (81.1) |
| | | M40 (MYR3860-8319) | 37 (16.7) |
| | | T20 (MYR8320 and above) | 5 (2.3) |
| | | | |

Table 1. Sociodemographic profiles.

Most of the patients (73.0%) claimed visiting dentist in the case of toothache to relieve pain, and minority of them (7.7%) used home remedies. For the future practice of RCT, 64.0% of patients preferred RCT as compared to extraction. Results showed that 73.4% of them preferred accepting RCT under dental specialist (Table 4).

Patients' Options for Teeth Replacement

Over 60% of the patients knew about removable dentures, whereas 18.9% of them had no idea regarding teeth replacement (Table 5). It was found that 50.9% of patients preferred fixed prostheses than removable denture (43.7%) to replace missing teeth. Minority of them (5.4%) chose no treatment after missing teeth as 50% of them did not feel the need to replace the missing teeth, the other 50.0% of patients were due to financially constraint and no idea of missing teeth replacement equally. The main reason of teeth

replacement was due to functional reason, as they were unable to bite or chew (56.3%), rather than aesthetic perspective (36.5%). The main reason affecting the options for teeth replacement was according to opinion from dentist(46.6%).

| Variables | N | Response | n (%) |
|--|-----|---|------------|
| Knowledge of RCT | 222 | Yes | 123 (55.4) |
| • Do you know about endodontic/root canal treatment? | | No | 99 (44.6) |
| Information of RCT that patients knew | 123 | Indication of endodontic/root canal treatment | 108 (87.8) |
| • Do you know about: | | Cost of endodontic/root canal treatment | 35 (28.5) |
| | | Number of visits of endodontic/root canal | 27 (22.0) |
| | | Procedures of endodontic/root canal treatment | 60 (48.8) |
| Sources of information of RCT | 123 | Dental Clinic | 86 (69.9) |
| • Where did you come to know about endodontic /root canal treatment? | | Internet | 44 (35.8) |
| | | Television | 2 (1.6) |
| | | Radio | - |
| | | Relatives/Friends | 58 (47.2) |

Table 2. Knowledge of patients towards retaining teeth.

| Variables | N | Response | n (%) |
|--|-----|---|------------|
| Previous experience of RCT | 222 | Yes | 39 (17.6) |
| • Have you been treated endodontically/with root canal treatment? | | No | 183 (82.4) |
| Recall of previous RCT | 39 | Well | 38 (97.4) |
| • How do you recall the endodontic/root canal treatment? | | Badly | 1 (2.6) |
| Previous experience of pain during RCT | 39 | Yes | 18 (46.2) |
| • Have you experienced pain during or after endodontic/root canal treatment? | | No | 21 (53.8) |
| Completion of RCT by crown placement | 39 | Yes | 28 (71.8) |
| • Have you got a post endodontic (root canal treatment) restoration and crown placement done? | | No | 11 (28.2) |
| Concern of patients about RCT | 39 | Pain | 19 (48.7) |
| • What is your concern associated with the endodontic/root canal treatment? | | Long treatment time | 24 (61.5) |
| | | The need to remove the tooth despite undertaken treatment | 9 (23.1) |
| | | Breaking the file in the root canal | 3 (7.7) |
| | | High costs | 3 (7.7) |
| Influence of decision to receive RCT by price in government dental clinic | 222 | Yes | 42 (18.9) |
| • Did the price of treatment in government dental clinic influence your decision about not taking endodontic/root canal treatment? | | No | 180 (81.1) |
| Influence of decision to receive RCT by price in private dental clinic | 222 | Yes | 166 (74.8) |
| • Did the price of treatment in private dental clinic influence your decision about not taking endodontic/root canal treatment? | | No | 56 (25.2) |

Table 3. Attitude of patients towards retaining teeth.

| Variables | N | Response | n (%) |
|---|-----|--|------------|
| Practice of patients while having toothache | 222 | I used home remedies to relieve toothache | 17 (7.7) |
| • What did you do to relieve pain in case of toothache? | | I used self-prescribed antibiotics and pain killers. | 43 (19.4) |
| | | I visited the dentist. | 162 (73.0) |
| Practice of patients in the future between RCT and extraction | 222 | Endodontic/root canal treatment | 163 (73.4) |
| • Do you prefer endodontic/ root canal treatment or extraction? | | General practitioner | 52 (23.4) |
| | | Dental student | 7 (3.2) |

Table 4. Practice of patients towards retaining teeth.

| Variables | N | Response | n (%) |
|---|-----|--|------------|
| Knowledge of patients towards teeth replacement choices | 222 | Bridge/Crown | 98 (44.1) |
| • Which of the followings can be used to replace missing teeth? | | Removable denture | 135 (60.8) |
| | | No idea | 42 (18.9) |
| Options of patients for teeth replacement | 222 | Bridge/Crown | 113 (50.9) |
| • Which one will you choose to replace your missing teeth? | | Removable denture | 97 (43.7) |
| | | No treatment | 12 (5.4) |
| Reason for no treatment after teeth missing | 222 | Financial constraint | 3 (25.0) |
| • If no treatment, why? | | Did not feel the need | 6 (50.0) |
| | | No time | - |
| | | No idea of missing teeth can be replaced | 3 (25.0) |
| Reason for teeth replacement after extraction | 222 | I was told to do so | 16 (7.2) |
| • What is the reason for teeth replacement after extraction? | | It does not look nice | 81 (36.5) |
| | | I cannot bite/chew | 125 (56.3) |
| Reason for teeth replacement after extraction | 222 | Cost | 78 (35.1) |
| • What is the reason that affects the options for teeth replacement after extraction? | | Duration of treatment | 41 (18.5) |
| | | Opinion from dentist | 103 (46.4) |

Table 5. Patients' options for teeth replacement.

| Variables | Knowledge of patients towards RCT n (%) | | P-value ^a |
|-----------------------|---|------------|----------------------|
| | Yes | No | |
| Level of education | | | |
| • Primary Education | - | 2 (0.9) | 0.01* |
| • Secondary Education | 16 (7.2) | 25 (11.3) | |
| • Tertiary Education | 107 (48.2) | 72 (32.4) | |
| Monthly Income Group | | | |
| • B40 | 92 (41.4) | 88 (39.6) | 0.02* |
| • M20 | 27 (12.2) | 10 (4.5) | |
| • T20 | 4 (1.8) | 1 (0.5) | |
| Variables | Attitude (Previous Experience) n (%) | | P-value ^a |
| | Yes | No | |
| Occupation | | | |
| • Government Sector | 10 (4.5) | 47 (21.2) | 0.008* |
| • Private Sector | - | 21 (9.5) | |
| • Self-employed | 6 (2.7) | 31 (14.0) | |
| • Pensioner/Retiree | 4 (1.8) | 2 (0.9) | |
| • Not working | 19 (8.6) | 82 (36.9) | |
| Variables | Practice of RCT n (%) | | P-value ^a |
| | Endodontic/RCT | Extraction | |
| Race Group | | | |
| • Malay | 132 (59.5) | 77 (34.7) | 0.03* |
| • Chinese | 9 (4.1) | 1 (0.5) | |
| • Indian | - | 2 (0.9) | |
| • Others | 1 (0.5) | - | |

Table 6. Factors associated with knowledge, attitude and practice of patients in retaining teeth. ^aP-value for Chi-square statistics.

Factors associated with Knowledge, Attitude and Practice of Patients in Retaining Teeth and Their Options for Teeth Replacement

After running the Chi-square test, it was found that the knowledge of patients towards RCT was significantly associated with level of education ($P=0.01$) and monthly income group ($P=0.02$). The attitude (previous experience) and practice of patients towards RCT were significantly associated with occupation ($P=0.008$) and race group ($P=0.03$) (Table 6). The options for teeth replacement was significantly associated with level of education ($P= 0.01$) (Table 7). Other factors were not significantly

associated with knowledge, attitude and practice of patients in retaining teeth and options for teeth replacement ($P > 0.05$).

| Variables | Options for Teeth Replacement n (%) | | | P-value ^a |
|-----------------------|-------------------------------------|-------------------|----------------|----------------------|
| | Bridge/Crown | Removable denture | No Replacement | |
| Level of Education | | | | |
| • Primary Education | - | 2 (0.9) | - | 0.01* |
| • Secondary Education | 13 (5.9) | 24 (10.8) | 4 (1.8) | |
| • Tertiary Education | 100 (45.0) | 71 (32.0) | 8 (3.6) | |

Table 7. Association Between Options for Teeth Replacement and Level of Education.

^aP-value for Chi-square statistics.

Discussion

RCT is an important treatment as it helps to retain the natural dentition in the oral cavity. The awareness of patients towards RCT is important as more knowledge provides more treatment options to the patients as the patients will be the decision maker about the retainment or removal of the teeth. This study can help the clinicians to understand the patients' awareness, attitude and practice towards retaining the tooth, where the clinicians can find out the proper way to increase their patients' awareness towards retaining the tooth and replace the missing teeth.

Some aspects of patients' demographic profiles in our study were in agreement with the study by Janczarek et al.⁵, where the study comprised of 62% females, with the findings of least percentage of patients had only primary education (9%), and 47% of patients were employed.

Our study revealed that our community were not adequately exposed to information regarding RCT, evidenced by lower percentage of patients with knowledge (55.4%). This finding was in agreement to previous study¹⁶ who found 53% of the patients had knowledge on RCT. However, our finding was in contrast with previous result from a study conducted by Iyer et al.¹⁴, in which 85.59% patients had basic knowledge about RCT. Another study carried out by Sisodia et al.⁶ found that 52% of patients were knowledgeable regarding RCT. Doumani et al.¹⁷ claimed 29% of the subjects responded as did not have knowledge of RCT whereas 27% of the subjects responded as knew a lot of details regarding RCT. Janczarek et al.⁵ and Purra et al.¹⁵ reported most of the patients defined their state of knowledge of RCT as an average, 33% and 39% respectively. The latter study by Purra

et al.¹⁵ also reported these patients were willing to learn regarding details of RCT. Our study also reported most of the patients knew about the indication of the treatment, followed by procedures and cost of RCT, the least known was the duration of the treatment. The information was important as it they might influence the decision of the patients to accept or refuse the treatment. In this study, we found that 69.9% of the patients had basic knowledge of RCT. They claimed that they received this knowledge from dental clinic, rather than from friends or relatives, internet and television. This finding was in agreement with the study done by Iyer et al.¹⁴, except no patients gained the information from television and radio. A study by Janczarek et al.⁵ was conducted among the patients of the Medical University of Lublin in Poland. They reported that patients' knowledge on RCT has improved significantly over the years due to the development in facilities such as school education, mass media, television, internet and newspapers. Future education regarding RCT shall be available in various form, thus the entire community can equip themselves with the basic knowledge. The above findings can be justified by the fact that the community is made up of different financial background, as stated in the monthly income group in the results above. Therefore, the community has different methods to access to basic knowledge of RCT.

Our study showed only 17.6% of the patients had undergone RCT previously, which was much lower as compared to other studies; 89.0% and 69.0% of the patients as reported by Purra et al.¹⁵ and Janczarek et al.⁵ respectively. Among these patients with experience of RCT, 97.4% recalled it as a good one, evidenced by over half of them did not experience pain during or after RCT, which was much higher as compared to the previous studies; only 65% of patients by Karabulut et al.¹⁶ and 59% of patients by Purra et al.¹⁵, followed by 52% of patients by Janczarek et al.⁵ recalled it as a good one. In this study, most patients' concern was related to long duration of treatment followed by pain, whereas in previous studies^{5,15}, majority of the patients reported pain as the greatest concern. Purra et al.¹⁵ also reported patients were greatly benefited from varied forms of local anesthesia to help eliminate procedural pain. Our study showed nearly 72% of the patients had post-endodontic restoration and crown placement. Proper post-

endodontic restoration and crown placement contributed to a better result of the success of RCT, otherwise reinfection of the root canal may occur and cause failure of RCT¹⁴. Another study conducted by Sorensen et al.¹⁸ reported a failure rate of 24.2% for endodontically treated teeth without final crown placement. It is vital for the endodontically treated teeth to receive crown placement to ensure the coronal sealing is adequate and the teeth can withstand the heavy masticatory force and reduce the occurrence of marginal leakage¹⁹. Good restoration and good endodontic treatment were observed as the main factor contributed to the absence of periapical inflammation in 91.4% of endodontically treated teeth²⁰.

Our study showed the second most concern of patients associated with RCT was pain (48.7%). This was relevant to previous studies^{5,16} where 44.0% of the respondents agreed pain was their main concern associated with RCT. Regarding the cost of the treatment, 81.1% of the patients denied price of treatment in government dental clinic influenced their decision on RCT. Most of the patients in our study were concerned about the fee of the treatment as evidenced by 74.8% of the patients accepted the fact that cost of treatment in private dental clinic influenced their decision on declining RCT. High cost of private dental service may influence their decision to accept the treatment, which was similar to the finding in a study by Chandraweera et al.²¹. In contrast, studies by Janczarek et al.³ and Purra et al.¹² showed 52% and 80% of patients claimed that their decision for receiving RCT was not dependent on the cost of endodontic treatment.

Our study showed that 73% of the patients visited dentist when they had toothache, which was in congruent with the study by Karabulut et al.¹⁶. This finding can be explained by the fact that most of the patients were well informed and convinced that dentist was the person to seek treatment whenever they had toothache as opposed to using the home remedies. Regarding future practice of RCT, 64.0% of patients preferred RCT as compared to extraction, which reported a positive practice of the patients towards RCT, slightly lower findings as compared to previous study⁵. Our study also found out that the experienced patients understood most of the procedures as compared to unexperienced patients, thus they also

realised the advantages of the RCT.

The idea on tooth replacement options is essential to help the patients to meet their need and expectation, in addition to maintain the occlusal harmony. For the teeth replacement part, we observed that 18.9% of the patients had no idea regarding teeth replacement. Among these patients, 50.9% of them preferred fixed prostheses as compared to those preferred removable denture (43.7%) to replace missing teeth. Fixed prostheses provide better masticatory function and showed high success rate of treatment as compared to removable prostheses^{22,23}. In this study, we found that 56.6% of the patients reported replacing their teeth due to incapable to chew or bite. This finding could be due to patients realised the need for teeth replacement was not mainly due to aesthetic perspective, but more importantly 63.49% of the respondents opined that it was imperative to go for teeth replacement in all cases²⁴. This might be due to the masticatory function for daily life was more significant for majority of the patients to improve their diet intake.

In this study, the knowledge of patients towards RCT was associated with the level of education and monthly income group. This might suggest patients with higher level of education and monthly income group were more aware of dental knowledge. For the teeth replacement, patients with higher level of education tend to replace missing teeth, which was suggestive of better awareness of dental prosthesis, and this finding was corresponded with a study by Hussain et al.²⁵. The above findings could be explained by the fact that this group of patients had good level of awareness on the oral function.

Due to limitation of time and manpower, this study was carried out based on non-probability sampling, where all the patients attended during this study time frame were included in this study. Thus, it might not be representable as the general population of the community. It is suggested that similar study in the future shall be representable of the community.

Conclusions

Within the limitations of this study, it can be concluded that our community was not having adequate awareness and experience towards the

endodontic treatment despite their positive practice towards future similar treatment. This may cause the patients to encounter loss of natural dentition due to clueless regarding the varied methods to eradicate the toothache. More study shall be conducted to determine the experience of the patients regarding RCT to enable the clinicians to educate the patients regarding the advantages and disadvantages of each treatment.

Minority of the patients were having no idea towards teeth replacement method. Even though this was only minor part of the research, it may suggest that many more uninvolved patients were clueless too. It is very important that adequate awareness towards teeth replacement method is inculcated in the community as this can reduce more complications due to loss of natural teeth.

Thus, a more comprehensive awareness activity is needed to ensure that more teeth can be retained and those that are missing being replaced in our community. This is important as more awareness can provide more treatment options to the patients in the future.

Acknowledgements

We would like to express our utmost gratitude to all the clinical staffs of Dental Clinic, Hospital Universiti Sains Malaysia for the help and the entire patients for the involvement in the study voluntarily. This research work has been funded by the Universiti Sains Malaysia research grant (Bridging Insentif Grant 304.PPSG.6316454).

Ethical approval

Ethical approval was obtained from the ethics committee of Universiti Sains Malaysia. (JEPeM code USM/JEPeM/19010018).

Declaration of Interest

The authors declared no conflicts of interest.

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