

# Preserving Natural Teeth VS Implant Replacement: A Scenario Based Survey

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## ABSTRACT

**OBJECTIVE:** To assess the preference of general dentists and dentists from various specialties regarding preservation of natural teeth vs. replacing it with an implant.

**METHODOLOGY:** A survey in the form of an electronic scenario-based questionnaire was designed and the link was distributed among dentists from different specialties in Saudi Arabia over the duration of two months from the 28<sup>th</sup> July to 28<sup>th</sup> September, 2019. Following the demographic questions, participants were provided results of diagnostic aids for five clinical cases representing varying challenges, and participants were asked to either preserve the tooth or replace it with a dental implant.

**RESULTS:** Total 203 participants completed the survey, 25% preferred implants over preserving the tooth in the first case, while 52% had the same preference in the second case, and 68% preferred extraction in the third case. The choice of extraction for cases 4 and 5 was 17% and 6% respectively.

**CONCLUSION:** Many teeth are being extracted which could have been conserved. Ethically, the patient's benefit and interest should be considered first while presenting various treatment options.

**KEYWORDS:** Preserving Natural Teeth; Dental implant; root canal treatment.

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## INTRODUCTION

As dental decay progresses, more of the tooth structure is lost, which leads in many cases to a situation where the treating dentist and the patient start questioning whether to save the tooth or to replace it with an implant. Many factors play critical roles in the final decision making<sup>1</sup>.

Ethically, the clinician is supposed to provide all possible treatment options that suite the patient needs, with a thorough explanation of the risks and benefits of each treatment plan to the patient<sup>2</sup>. Factors usually taken into consideration when providing treatment options to the patient includes the prognosis of the proposed treatment, the cost<sup>3</sup>, systematic considerations, prosthetic and periodontal status, esthetic demands, and the patient's preference<sup>4</sup>.

As the prognosis of the proposed treatment is considered a critical factor to the patient, the clinician should be well aware of the available literature in order to address the patients' concerns and be able to answer the mostly asked question; "which treatment option is better and would serve me longer?" Fortunately, in the case of single tooth implant replacement and root canal treatment (RCT), the prognosis is quite similar with both having a success rate above 90 percent<sup>5-8</sup>.

The amount and quality of the remaining tooth structure plays a key role in deciding the restorability of the tooth<sup>9-10</sup>. In many other cases, esthetic requirements of the patients are also important before

finalizing a proper treatment plan<sup>11-12</sup>. Several attempts were made to generate a standardized method to assess restorability of the teeth, an example would be a "dental practicality index"<sup>13</sup> that was proposed in 2017. The index takes into account the structural integrity, periodontal status, and the required endodontic treatment, which helps in determining the restorability status of a tooth.

Preserving the natural dentition should always be preferred over prosthetic replacement, however, when a tooth is non restorable, an implant replacement may provide a better treatment outcome; yet, taking the decision may be hard. Therefore, the aim of this study was to investigate the preferred treatment option of dentists from different specialties whether to save a tooth or replace it with an implant using a scenario-based questionnaire.

## METHODOLOGY

A survey in the form of an electronic scenario-based questionnaire was designed and a link to the survey was made using survey monkey (www.surveymonkey.com, San Mateo, CA), the survey link was available and active from the 28<sup>th</sup> July to 28<sup>th</sup> September, 2019. Professional dental associations refused to distribute the survey link, as their policies consider the distribution of surveys as a spam to their members. Therefore, the link was distributed to dentists from different specialties through several social media platforms such as

Twitter, Facebook, and WhatsApp where many practicing dentists in Saudi Arabia are active. Since social media platforms were used in data collection, random sampling was not possible; therefore, convenience sampling was used.

The survey included de-identified demographic data questions regarding the gender, years of experience, highest qualification obtained, region/country of where the highest degree was obtained, whether or not the respondent places implants and if yes, how many per week, and the work place (government/private sector, or both). Following the demographic questions, five clinical scenarios were provided with essential radiographs, mainly a bitewing and a periapical radiograph, and in some cases a cone beam computed tomography (CBCT) in cases where it was needed along with critical findings of clinical tests usually done during examination. The respondents were asked to choose whether they would save the natural tooth or replace it with an implant, considering that all cases were free of any medical conditions that would alter the decision-making.

When choosing the five cases, it was kept in mind to ensure that each one of them had a different challenge. The cases presented were as follows: 1) A maxillary second molar that is a part of a well fitted long span bridge with complete bone loss around the distobuccal root. This case served as one with a localized periodontal defect. 2) A mandibular first molar that is part of a bridge with a substandard root canal treatment and pulp canal obliteration with periapical radiolucency evident around both roots. 3) A maxillary canine with an invasive cervical resorption causing a perforation from the palatal side. 4) A mandibular second molar with a broken instrument in the mesial roots and difficult anatomy in the distal root where a 90° curvature is located in the apical third. 5) A mandibular first molar with a large periapical lesion about 7x7 millimeters. Participation in this survey was voluntary and anonymous, and no financial incentive was offered for survey completion or link distribution.

All the cases were treated endodontically with a minimum of one-year recall, where the tooth was functional, asymptomatic, and no signs of a progressing disease present, however, this was not revealed to the participants in the survey.

The data was gathered and tabulated numerically in to an excel sheet. The tabulated results were then transferred to SPSS for statistical analysis (V.22, SPSS Inc., Chicago, IL). Descriptive analysis was used to analyze and compare the basic findings, and chi-square was used to test for significance that was set at ( $P < .05$ ).

**RESULTS**

A total of 203 respondents completed the questionnaire. The frequency and percentage of the demographic data is presented in (Table I). Responses to whether to preserve the tooth or extract it for all five cases are presented in (Table II). The percentage of the preferred treatment choice for each case considering the participants' work place is presented in (Table III).

No statistically significant difference was found in cases number 1, 2, and 5 ( $P > 0.05$ ) in terms of preference of preserving the tooth or extraction and replacement with implant. However, statistically significant difference was found in case number 3 based on the specialty area of the participant with endodontists showing the least number preferring extraction over preserving the tooth, while 85% of the prosthodontists preferred extracting the tooth over saving it ( $\chi^2 = 15.573$   $P = 0.049$ ), and case number 4 based on whether the participant places dental implants or not; where 43.2% of those placing implants preferred extracting the tooth while only 12% of the participants who do not place dental implants had the same choice ( $\chi^2 = 20.182$ ,  $P = 0.001$ ). No statistical significance was found correlating neither the years of experience nor the place of work with the decision-making.

**TABLE I: FREQUENCY AND PERCENTAGE OF THE DEMOGRAPHIC DATA OF ALL 203 RESPONDENTS**

	Frequency	Percentage
Gender		
Male	155	76.4
Female	48	23.6
Years of experience		
0-5	82	40.4
5-10	66	32.5
10-15	29	14.3
> 15	26	12.8
Specialty		
General dentist	82	40.4
Restorative dentist	33	16.3
Endodontist	23	11.3
Prosthodontist	20	9.9
Periodontist	20	9.9
Orthodontist	10	4.9
Pedodontist	7	3.4
Orofacial pain and oral medicine	5	2.5
Surgeon	3	1.5
Region where the highest qualification was obtained		

Saudi Arabia	131	64.5
North America	43	21.2
Middle East	16	7.9
Europe	10	4.9
Asia	3	1.5
Trained in implant dentistry		
Yes	37	18.2
No	166	81.8
Work place		
Government sector	130	64
Private sector	40	19.7
Both	33	16.3

**TABLE II: THE NUMBER AND PERCENTAGE OF THE PREFERRED TREATMENT OPTION FOR EVERY CASE**

	Preserve the tooth	Replace with implants
Case #1	151 (74.4%)	52 (25.6%)
Case #2	97 (47.8)	106 (52.2%)
Case #3	64 (31.5%)	139 (68.5%)
Case #4	167 (82.3%)	36 (17.7%)
Case #5	190 (93.6%)	13 (6.4%)

**TABLE III: PERCENTAGE OF PREFERRED CHOICE FOR EACH CASE CONSIDERING THE PARTICIPANTS' WORK PLACE**

	Government	Private	Both
Case 1			
Preserve the tooth	72.3	72.5	84.8
Replace with implant	27.7	27.5	15.2
Case 2			
Preserve the tooth	47.7	47.5	48.5
Replace with implant	52.3	52.5	51.5
Case 3			
Preserve the tooth	33.1	35	21.2
Replace with implant	66.9	65	78.8
Case 4			
Preserve the tooth	83.8	77.5	81.8
Replace with implant	16.2	22.5	18.2
Case 5			
Preserve the tooth	94.6	90	93.9
Replace with implant	5.4	10	6.1

## DISCUSSION

Refusal of the dental association to help distribute the survey amongst the registered members have resulted in a low response rate, however, the sample collected provides a general idea of the dentists'

choice preference when it comes to treatment planning, which serves the purpose of the study.

From the results of this study, it appears that there is limited knowledge among dentists from different specialties regarding the procedures an endodontist can perform, especially with the new materials available<sup>14</sup> and advanced armamentarium at the endodontists' disposal<sup>15,16</sup>.

In the first case with the localized periodontal defect, the case was treated with root canal treatment followed by a distobuccal root amputation. The patient benefitted from preserving her bridge, did not lose function during the treatment process, and the overall cost was less compared to the alternative treatment option. In a retrospective study with a 15 years recall, the cumulative success rate of molars with resected-roots that were still in function for more than 15 years was 94.9%<sup>17</sup>. In this study, 25% of the participants preferred extracting the tooth instead of preserving it.

The second case was a mandibular molar that was a part of a bridge that was done recently, and the endodontic treatment was substandard as the canals were obliterated, 52% of the participants decided to extract the tooth. Nowadays, with the advanced imaging technologies such as cone beam computed tomography (CBCT)<sup>18</sup>, the use of operating microscopes, and ultrasonic devices, finding the path and treating these teeth endodontically has become feasible<sup>19</sup>.

Results from the third case were more drastic, where 68% chose implant replacement over preserving the tooth. The case was of a maxillary canine, a CBCT was provided showing that the tooth had an invasive cervical resorption palatally and that the bone resorption was following the margins of the resorptive defect providing a direct access repair. The tooth was treated endodontically and surgical repair was done. The microsurgical techniques, bioceramic materials, membranes, all made it possible to salvage such teeth<sup>20</sup>.

As for the fourth and fifth cases, it can be assumed that in general, broken instruments and large periapical lesions did not considerably affect the dentists' decision, as the majority preferred preserving the teeth rather than extracting them.

Dental implants are for sure the best option to replace missing teeth, and in many cases, replace non-restorable teeth, however; it seems that there is no consistency in the decision making when evaluating tooth restorability, which have led to favoring of the implant replacement as a treatment option. Because of that, several studies have focused on ethics to be considered when treatment planning and providing the patient with different treatment options<sup>12,21,22</sup>, and

several attempts have been made to provide a systematic approach to assess teeth restorability<sup>4,9,10,13,23</sup>. One factor that many clinicians oversee is the reposting of success rates in implant dentistry, a recent review of the survival rates of natural teeth compared to dental implants showed no significant difference<sup>24</sup>, moreover, the author discussed challenges after the implant placement in terms of biologic failures, and when reviewing the literature, the management of peri-implantitis remains unpredictable compared to the management of periodontitis<sup>24-26</sup>. In another study, the authors concluded that the success rate is identical; they even reported that implants required additional procedures to maintain them<sup>7</sup>, moreover, teeth being preserved by endodontic treatment required less number of procedures to complete the treatment and were readily in function compared to those that were replaced with implants<sup>27</sup>.

### CONCLUSION

Within the limitations of this study, it was found that many teeth are being extracted where a more conservative treatment approach could be followed. Raising the awareness among dentists and patients regarding the importance of preserving natural teeth is essential, more importantly, ethical considerations should be taken more seriously when presenting different treatment options to the patients.

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