KNOWLEDGE OF DENTAL PROFESSIONALS REGARDING TOOTH RESTORABILITY AT A PUBLIC SECTOR TERTIARY CARE HOSPITAL OF KARACHI, PAKISTAN

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Abstract

Background: Panoramic knowledge of dental professionals is required to provide care for patients with any dental problem which ranges from screening, emergency care or referral to alleviation of pain symptoms. Ideally to provide dental care, dental practice should be based on current clinical concepts originating from evidence-based dentistry which clearly demarcates a level between a tooth that is able to be restored so that intervention is done on it for esthetic and functional stability, or ready for extraction. Dental professionals' knowledge regarding tooth restorability is very crucial in restorative and preventive dentistry. The aim of this study was to assess the knowledge of dental professionals regarding tooth restorability.

Methods: Knowledge regarding tooth restorability of dental professionals of Dow University of Health Sciences was assessed through a multi centered cross sectional study. A sample size of 140 participants was calculated using through open Epi version 3, and a convenient non-probability sampling technique was used. The study was conducted in May-June, 2018. An informed consent prior to the study was taken. The dental professionals were evaluated through a self-administered, structured questionnaire in English. The SPSS-23 was used to obtain results. The knowledge of the students was graded as adequate if ≥ 12 and inadequate if < 12 .

Results: Out of 140 study participants, 113 (81%) dental professionals had significantly adequate knowledge (p -value < 0.05); while 27 (19%) had inadequate knowledge. Among the respondents, 56% said that the traumatic dental injury must be treated by dentist whereas the others considered it to be treated by private doctor or by nearest hospital casualty.

Conclusion: The knowledge of dental professionals working at teaching institutes is adequate; and as per their knowledge they might be taking right decisions regarding tooth restorability.

Keywords: Tooth restorability, ferrule, tissue preservation, crown-root ratio, endodontic restorations, dentistry

Introduction

Knowledge of tooth restorability acts as a platform when decision is to be made for prevention, conservation or restoration of teeth from more aggressive prosthetic need. The achievement of best clinical outcomes, along with an excellent oral rehabilitation prognosis is the major goal of any dental therapy.¹ currently, there is no criterion or classification index devised to determine the prognosis of tooth that is restored. All what is done is given professional's own relative prognostic value based on his or her knowledge² besides the skills set and experience of the clinician.³⁻⁵

The average survival rate of teeth endodontically treated by a general dentist is about 90% after 5 years; if the treatment is performed by a specialist, the success rate increases to 98%⁶; highlighting the significance of restorability prognosis by change in knowledge and skills, as well as patients' medical and dental condition and their expectations.⁷

While restoring a compromised tooth structure, the factors taken into account are the tooth-arch periodontal status, vitality and remaining coronal tooth structure in case of non-vital teeth.⁸ It is generally agreed that disease-free sound coronal tooth structure for a ferrule design of at least 2-4 mm above the finish line will increase fracture resistance of root-treated teeth⁹⁻¹³ with the minimum acceptable crown root ratio of 1:1.4,¹⁵ and if not present attempt for surgical crown lengthening or orthodontic extrusion must be done.¹⁶ Newer post and core designs revolutionized conservative dentistry in situations where ferrule amount is inadequate.¹⁷ Whenever post is placed for retaining core 4-5 mm of obturating material is left at apical one third for apical seal.¹⁸ After completion of root canal treatment, full occlusal coverage definitive restorations are provided for maximum restorability and to protect tooth from fracture.¹⁹ Analysis of the reason for all extractions of endodontically treated teeth over a period of one year revealed that almost 60% of these were un-restorable tooth fractures, 32% involved periodontal problems and only 7% were endodontic failures.²⁰ These changes have created a disparity in the quality of care provided by specialists versus general dentists on teeth with complicated anatomy and morphology.²¹

For premature necrotic tooth with open apex, the treatment with apexification and root canal increases the risk of tooth fracture due to thin dentinal walls. Recent approach of regenerative endodontics in the form of either tissue regeneration or tissue engineering represents best treatment modality as it preserves tooth vitality as well as tissue health, uprisng tissue preservation.^{22, 23}

When restoring teeth, harmonious relationship between the teeth, muscles and temporo-mandibular joint with respect to occlusal plane is required for optimum form and function.²⁴ This can only be achieved when tooth is being restored according to preferred restorability knowledge and protocol.

The purpose of this study was to assess the knowledge of dental professionals regarding tooth restorability based on the abovementioned factors.

Methodology

This cross sectional study was conducted at Dow University of Health Sciences, Karachi, Pakistan, in May-June 2018, after the approval from the IRB. The participants included both male and female house officers, postgraduate trainees, and other junior and senior dental practitioners of all dental institutions of DUHS including Dow Dental College, Dow International Dental College and Dr Ishrat-ul-Ebad Khan Institute of Oral Health Sciences. The sample size of 140 was calculated by using OpenEpi tool. The participants were selected through convenient non-probability sampling technique.

After taking informed consent, the data were collected by using a pre-tested (with ten dental professionals), self-administered, structured questionnaire consisting of two sections. The first section included basic information about age, gender and qualifications, etc.; and the second part had a sequence of eighteen questions regarding the basic knowledge of tooth restorability in which the participants were asked about ideal width of supra-bony structure, effect of inadequate ferrule, acceptable level of axial dentinal width, crown-root ratio, apical seal length, correction of coronal tooth structure, tooth restorability index, and also tooth restorability in traumatic cases. The participants filled questionnaire without conferring with one another. Each question was given a correct score for statistical analysis. The total score of each questionnaire reflects the knowledge of participants.

The data were analyzed by Statistical Package for Social Sciences

version 23. The correct response to the questions was scored as 1, while the incorrect answer or no response was scored as 0. The knowledge of the study participants was graded as adequate if ≥ 12 and inadequate if < 12 . The differences in proportions between groups were compared by using Chi-Square and a p-value of less than 0.05 was considered statistically significant.

Results

Out of total 140 participants evaluated, 107 (76%) were female and 33 (24%) male dental professionals; including 92 (66%) house officers, 36 (26%) post graduate trainees, and 12 (8%) lecturers. Among the study participants, 71 (51%) correctly knew that the most critical factor for determining the restorative prognosis of tooth is the bulk of supra-bony structure; while the ideal width of 2-4 mm was only known by 67 (48%), as shown in figure 1.

Figure 1: Knowledge of participants regarding the ideal width of supra-bony structure.

Thirty one (22%) participants heard regarding tooth restorability index for the first time, while 23 (16%) answered the question incorrectly that it predicts implant and prosthetic tooth restorability. Moreover, 65 (46%) dental professionals rightly replied ferrule as the most critical factor for tooth restorability, whereas 36 (26%) wrongly as vitality and 27 (19%) replied periodontal probing grade (Figure 2).

Figure 2: Knowledge of participants regarding tooth restorability index

As for the most appropriate place for the treatment of traumatic dental injury, 78 (56%) respondents replied that it must be treated by dentist, while 31 (22%) considered it to be treated by casualty in the nearest hospital, and 8 (6%) said that the case might go to the nearest private doctor.

The frequency of dental health care providers who correctly knew that pulp capping and pulpotomy as vital therapy procedures to maintain pulp vitality was 132 (94%). Only 22 (16%) of the respondents correctly identified revascularization as the best attempt to restore a necrotic tooth with open apex, while 94 (67%) considered apexification and root canal treatment as a restorative modality, which is insignificant (Figure 3).

Figure 3: Knowledge of participants regarding the restoration of necrotic tooth with open apex

For endodontically treated tooth with adequate coronal structure, 99 (71%) had core knowledge of restorability, while 39 (28%) incorrectly replied post-core and crown as a solution for tooth preservation.

Table 1 shows the restorability knowledge with regard to gender and qualification of the study population, where 113 (81%) dental professionals had significantly adequate knowledge (p -value < 0.05), while 27 (19%) had inadequate knowledge.

Table 1: Knowledge of tooth restorability of study participants

Gender	Qualification	Knowledge N (%)
Female=107	House officers=92	Adequate=75 (70%) Inadequate=17 (15%)
Male =33	Postgraduate trainees=36	Adequate=31(93%) Inadequate=5 (15%)
N=140	Lecturers =12	Adequate=7 (5%) Inadequate=5(3%)

Discussion

Tooth restorability is a crucial concern of an aesthetic and once it is restored, that means smile has been restored; but to decide for restoration is an evidence based course. A study conducted on Mongolian dentists, observed that female to male ratio is more in the dental profession and they exhibit more positive response in tooth restorability and dental preventive care than male.²⁵ This study also supports the literature and imparted that among 140 participants, females were 76% (107), and it has shown that they had responded almost correctly to questions asked regarding tooth restorability. Thus it highlights that females constitute the majority of dental professionals and have sound clinical knowledge.

A question was asked regarding the emergency management of dental trauma and a proposed criterion for restored tooth prognostic value. A survey conducted in Hong Kong revealed that out of 571 participants

only 36.6% knew about the appropriate placement of dental trauma management²⁶; where as in this study 56%(78) professionals knew that it must be treated by dentist while 22% (31) considered it to be treated by casualty in the nearest hospital, and 6%(8) answered it to go to the nearest private doctor. The most appropriate place for the treatment of traumatic dental injury is dentist.

To predict an exact diagnosis and provide an accurate intervention, and to generate an efficient and effective treatment plan having good prognosis is a multi-step procedure which solely does not rely on clinician but on patient as well, who further look every aspect of the disease or condition.²⁷⁻³² It has been found that the decision making for tooth extraction and generating an absolute prognosis depend upon subjective and objective factors of evidence based practice.³³

Morgano et al. had stated: "Although there are many new materials available for the restoration of pulpless teeth, the prognosis of these teeth relies primarily on the application of sound biomechanical principles rather than on the materials used for restorations".³⁴

The most important factor in restoring a vital tooth is periodontal health, and for non-vital tooth is tooth tissue preservation i.e. ferrule.³⁵ The importance of ferrule can never be neglected as it not only increases the fracture resistance of the tooth but also act as foundation for restoration. In a research, it was found that 72% of the participants believe that in endodontically treated teeth (ETT) ferrule effect is a major factor that causes a fracture resistance, while 54% conclude that tooth tissue preservative and post reinforces declines the chances of a fracture. Among the respondents, 41% knew that for the restoration of ETT 1-2 mm of ferrule length along with core material is recommended.³⁶ However, conversely following research results divulge that less than half of the professionals (46%) were aware of the fact that supra bony structure is a critical factor for tooth restorability, while 26% (36) erroneously replied tooth vitality and 19% (27) replied periodontal probing grade; and only 48% of the participants knew the ideal width of the supra bony structure as 2-4 mm.

Regarding the restoration of necrotic pulp of immature permanent teeth with open apex, majority of the responses were wrong and they considered apexification as a treatment modality. The recent guidelines recommend that tissue regeneration by revascularization is the best and preferred treatment protocol due to the disadvantages associated with apexification procedures, such as thin canal walls, arrested root development, and increase susceptibility to fracture.³⁷

Conclusion

The knowledge of dental professionals regarding tooth restorability seems to be adequate; however there is a need to conduct more studies at other dental institutes in city and country to assess other dental professionals' knowledge. More experience and higher qualification has a direct association with the knowledge of tooth restorability.

Limitation

This was an institute based study; therefore, the results cannot be generalized.

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There is no conflict of interest.

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