



Knowledge, attitude and perception of dental practitioners about pulp revascularization or regenerative endodontic procedures in children – A web-based questionnaire survey

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Abstract

Aim: To evaluate knowledge, attitude and perception of dental practitioners towards pulp revascularization or regenerative endodontic procedures in children for the management of immature, non-vital teeth using a web-based questionnaire survey.

Materials and Methods: A questionnaire containing ten questions was prepared and was converted to Google forms which was then circulated to all dental practitioners residing in and around Davangere and Chitradurga District, Karnataka State, India using WhatsApp and Email. Filled questionnaires were received and data was collected, tabulated and subjected to statistical analysis using descriptive statistics.

Results: Majority of dental practitioners were not aware of pulp revascularization or regenerative endodontic procedures pertaining to many factors such as in which teeth this procedure is carried out, which medicaments/materials are used in this procedure and which specialist performs the procedure. About 97.9% of practitioners expressed interest in learning information/procedure about pulp revascularization and 92.1% wished to implement this new treatment modality in their clinical practice and to attend educational programmes/workshops regarding this.

Conclusion: There is a need for creating and enhancing the level of knowledge, and awareness among dental practitioners towards pulp revascularization procedures by conducting more and more continuing dental educational programmes by local dental organisations in order to save natural smiles of young children.

Keywords: Awareness, Dental practitioners, Immature non-vital tooth, Regenerative endodontic procedures, Web-based survey.

INTRODUCTION

The prevalence of trauma to the anterior teeth in children is more common which results in suffering of both parents and children because of unesthetic infected anterior teeth. The successful management of such cases with immature necrotic young permanent tooth in these patients is really a great challenge for all dentists. [1,2] Because, there will be a wide-open apex resulting in difficulty with instrumentation and complete obturation of the root canal with hermetic seal. To overcome the draw backs associated with conventional endodontic treatment, various procedures have revolutionized in the field of endodontics. Regenerative endodontic procedure is a new paradigm shift which encroached upon the arena of endodontics constituting the protocol of use of stem cells, scaffolds and growth factors which further facilitates continued growth and closure of the root apex thereby enabling the tooth for final restoration [1-4].

It is evident that such patients immediately visit the near-by dental practitioners seeking immediate treatment. Moreover, majority of the dentists are unaware about the management of these type cases and it is evident that they frequently take opinion from an endodontist or sometimes go for different treatment. Therefore, as enormous number of these cases are seen by dental practitioners, it is highly essential to first creating awareness about these among these people.[5-8] Across the globe, although various survey has evaluated the awareness of general practitioners, but majority have focussed those dentists/endodontists already practicing regenerative endodontics and evaluated mostly on regenerative protocols and on stem cells therapy, scaffolds and tissue engineering used in regenerative dentistry.[9-17] But it is necessary to bring awareness on the basic level of management consisting of inducing bleeding rather than going for advance, or commercially available scaffolds, which requires advanced laboratory-based equipment's and also requires clinical skills and expertise. Therefore, now it is the time and there is need for implementation of this novel, academic/ institution-based concept into day-to-day practice. For this to happen dentist's knowledge of pulp revascularization and training workshops to develop adequate skill is required among these practicing dentists. So that the teeth with open apex will survive instead of going for its sacrifice by an oral surgeons and later replacement by a prosthodontist. This will increase the successful outcomes in treating an immature infected young permanent tooth and in turn saves natural smiles of million young children. [11,12]

Therefore, the present web-based questionnaire survey was formulated to evaluate the current status of knowledge, attitude and perception towards pulp revascularization or regenerative endodontic procedure to be carried out in treating necrotic/infected immature permanent teeth among dental practitioners in their clinical practice.

Materials and Methods

Study design

A web-based questionnaire survey

Inclusion criteria

Only dental practitioners (practicing dentists) who are residing and practicing in and around Davangere, and Chitradurga District, Karnataka State, India.

Exclusion criteria

Medical professionals, Endodontists, other dental specialists, dental postgraduate students and other healthcare workers were excluded from the study.

Methodology

This survey was conducted for a period of one week following the guidelines based on the Helsinki Declaration Principle of Studies (HDPS) involving Human subjects by keeping the identity of all participants anonymous except for their gender. A questionnaire consisting of ten questions (Table 1) were framed and prepared by the author in order to include only such questions so that Dental practitioners can understand and fill the forms. Later these were converted to Google forms using 'Google Docs' which were then distributed online using both WhatsApp social media and E-mail to all dental practitioners. The participants were informed to tick the most appropriate answer for all ten questions and incomplete forms were omitted from the study. After one week, filled questionnaires were received, the data was tabulated in MS Excel sheet (Microsoft Corp) and the percentages were calculated using SPSS software (version 20. Chicago Illinois, USA). The Descriptive Statistics (DS) constituting frequency distribution and percentages for obtaining each answer was followed in a statistical analysis.

Table 1: Questionnaire for the assessment of dental practitioner's knowledge about pulp revascularization/regenerative endodontic procedure

1. Do you come across any traumatic injuries in your daily practice?
 - Yes
 - No
2. Have you ever heard about regenerative endodontic procedures or pulp revascularization procedure?
 - Yes
 - No
3. If yes, from where you have got information about the procedure
 - Social media
 - Workshops/CDE programmes/Conferences
 - From colleagues
4. Pulp revascularization procedure is carried out in which teeth?

- Infected Primary teeth
 - Infected Permanent teeth
5. In which type of teeth pulp revascularization is carried out?
 - Non-vital tooth with complete root closure (closed apex)
 - Non-vital tooth with incomplete root closure (open apex)
 6. Would you like to perform/implement this new procedure in your daily practice?
 - Yes
 - No
 7. Who can perform pulp revascularization treatment procedure?
 - Any BDS graduate practitioner
 - An Endodontist
 8. Are you aware of materials and medicaments used for this procedure and how this procedure is done?
 - Yes
 - No
 9. Would you like to learn and know about pulp revascularization procedure?
 - Yes
 - No
 10. Would you like to attend any programmes related to this new concept?
 - Yes
 - No

RESULTS

From the results of the current survey, it was found that only 35% of the dental practitioners get to see patients reported with traumatic injuries occurring to the anterior teeth. Remaining 65% responded that, they don't come across such patients (Figure 1). From this, it is evident that following any trauma to children, their parents in panic consult the general government hospital seeking immediate treatment. For the question of "Have you ever heard about regenerative endodontic procedures or pulp revascularization procedure?" 72.9% of dentists said 'yes' and remaining 27.1% were unaware of such treatment procedure (Figure 2). From this it can be speculated that as general dentists call an endodontist for the complicated root canal treatments in adults, must have got information from them. Otherwise, it was also assumed that recently social media is tremendously gaining popularity in showcasing different oral health related treatment topics with colourful videos. Therefore, it was thought, this might have resulted in little knowledge noticed in dentists. In third question, if they are aware about this treatment modality from which source, they received information was asked. For this, about half the dentists (50%) marked for the social media which was exactly correct with the guessed assumption made in the second question answer. Nowadays, it is a well-known fact that, the usage of mobile phones and social media in form of WhatsApp, Facebook, Twitter is remarkably increased in all age group people. Moreover, this multimedia provides enormous information on dental health related topics. About 31.4% of dentist ticked for the colleagues from whom they got to know about this treatment approach. Hardly 18.6% of dentists had received information about this from either seminar, attending CDE programmes or workshops (Figure 3). When dentists were asked about in which teeth pulp revascularization procedure is carried out? Maximum percentage of dentists (85%) marked for the infected permanent tooth and remaining 15% for the primary teeth (Figure 4). In the next question, it was about in which type of teeth this new treatment modality is carried out. For this 61.4% of dentist ticked for the infected tooth with open apex option (Figure 5). This shows as they received information about pulp revascularization procedure, they have knowledge about this also. The question 6 was about the willingness to implement/perform this new treatment option in their daily practice. For this, maximum percentage of dentists (92.1%) wished to perform/implement in their clinical practice (Figure 6). In the next part, dentists were asked about who can perform this novel procedure? About 79.3% of dentists responded for the endodontist and remaining for the dental practitioner option too (Figure 7). For the question regarding the awareness about which medicaments/materials used and how this procedure is performed, 75.7% of dental graduates said 'no' and only 24.3% of practitioners said 'yes' (Figure 8). In the ninth question it was about 'do you like to know or learn about pulp revascularization procedure,' all most all dentists (97.7%) said 'yes' (Figure 9). Finally, when questioned about would they like to attend any educational programmes regarding this topic, 92.1% of participants showed interest to attend such programmes (Figure 10).

Figure 1: Participants response towards exposure to traumatic injuries

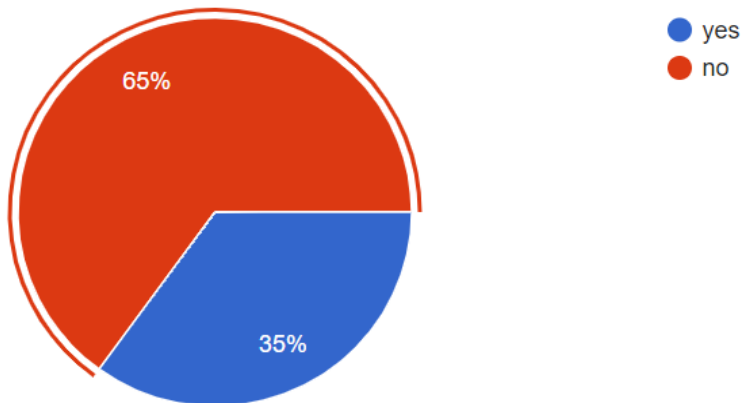


Figure 2: Awareness about pulp revascularization procedure among dental practitioners

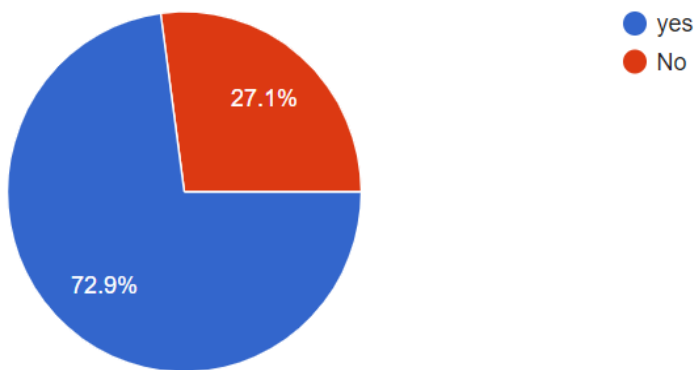


Figure 3: Information obtained from various sources among practicing dentists

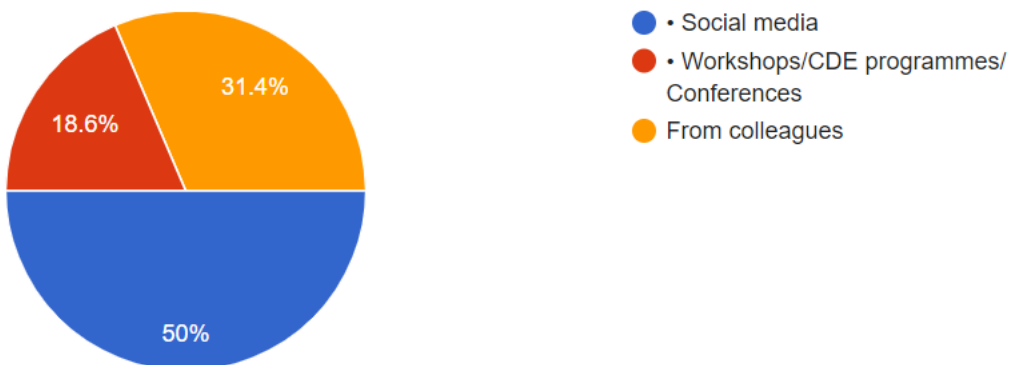


Figure 4: Response on pulp revascularization procedure indications

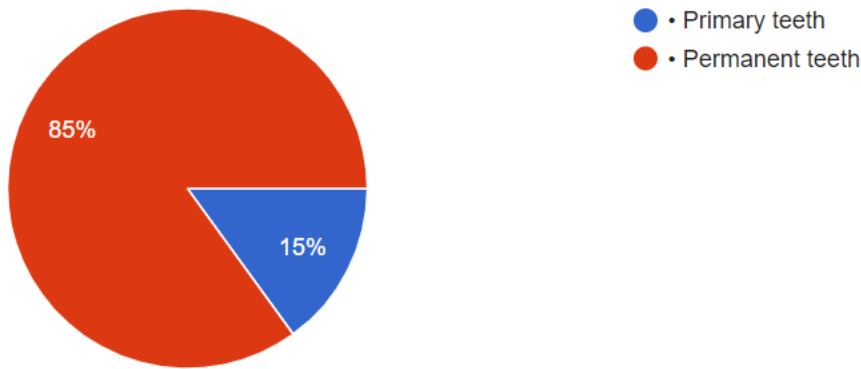


Figure 5: Response on conditions in which pulp revascularization treatment is done

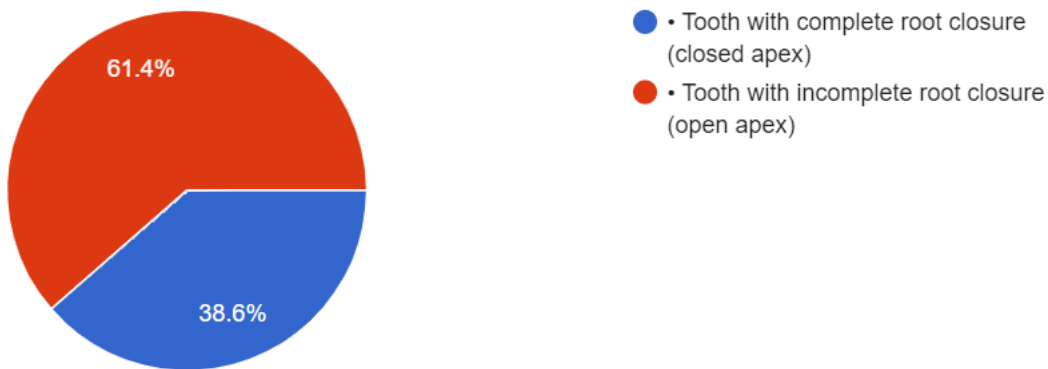


Figure 6: Willingness on implementation of pulp regeneration procedure in daily practice

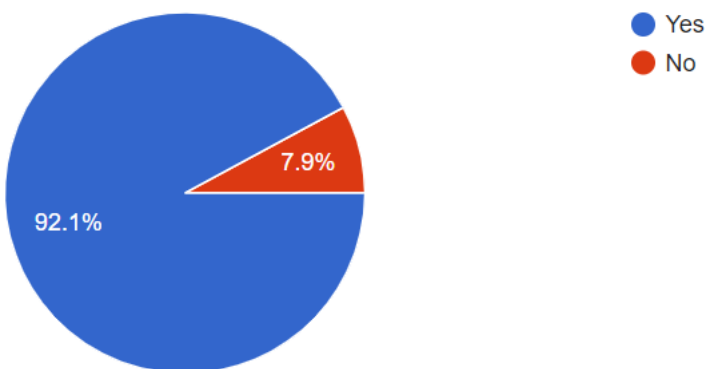


Figure 7: Knowledge on concerned specialist who deal with pulp regeneration procedure

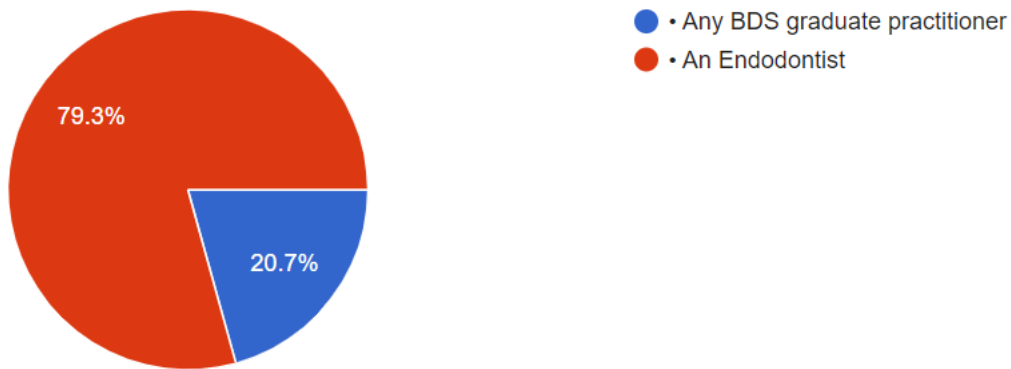


Figure 8: Knowledge about medicaments/materials used in pulp revascularization procedure

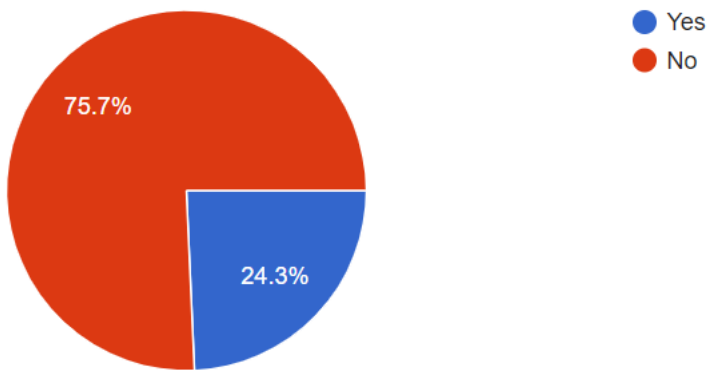


Figure 9: Dental Practitioner's interest in learning about regenerative endodontic procedures

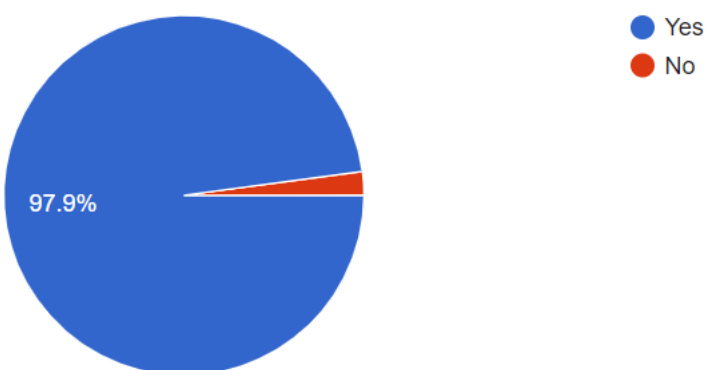
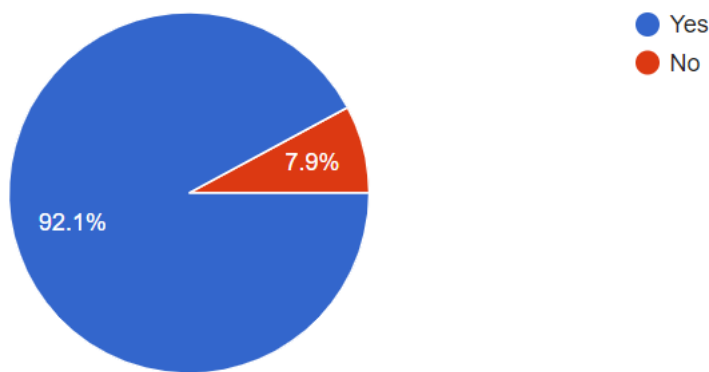


Figure 10: Response of Dental Practitioners in attending educational programmes/workshops on regenerative endodontic procedures.



DISCUSSION

From the previous studies, it is evident that, there is an absence of homogeneity in protocols to be followed in regenerative endodontic procedures/pulp revascularization procedures because it is still in an evolving science. It is time to formulate a uniformity in practices, with appropriate protocols consisting of guidelines to increase evidence to support its hypothesis. [18-21] It should start from the roots which involve practicing dentists as they come across numerous such cases in their daily clinical practice. [5-8] Therefore, the present web-based survey was formulated and conducted upon dental graduates to evaluate their current knowledge, attitude and perception towards pulp revascularization procedure for young permanent tooth. Similar studies have been carried out across globe on regenerative endodontics mainly focusing stem cell research. [9-17] Although stem cells and scaffolds are integral part of regenerative endodontic therapy, [18-21] by performing conventional therapy which consists of inducing bleeding have also shown excellent results. [22,23] This technique does not require any laboratory based high equipment and any one performs when he/she practice the skill behind performing this procedure. [22-30]

In the current survey, 65% of the respondents did not come across children coming with traumatic injuries. In another Indian study [16], almost half the participants (48.5%) reported that they come across necrotic immature teeth in 11-25% of their cases. 22% participants stated that necrotic immature permanent teeth accounted for less than 10% of cases in their Out-Patient Department (OPD). 20% of respondents indicated that 25-50% of their cases involved necrotic immature teeth and 15 of them reported to have more than 50% of such cases in their OPD. 54% of participants reported that avulsed or traumatized teeth account for less than 10% of their OPD cases. One third participants (38.6%) reported that periradicular lesion accounted for between 26% and 50% of cases seen in their OPD. (28.6%) participants indicated that even more than 50% of cases in their OPD involved periradicular lesions.

In this survey, most of the dental practitioners (65%) were aware of the regenerative endodontic procedures or pulp revascularization procedure. This finding was found similar to another Indian study [7] conducted in Mangaluru, which showed that 97% of the correspondents were aware of this term and also a Nigerian study [6] reported 91.2% of the participants in their study were familiar with this term. For the second question, about half of the respondents were aware of this procedure because of information obtained/learned from social media and few got it from colleagues like visiting endodontists. Although endodontist prefer and well trained in this field, because of lack of awareness among dental practitioners, the dental graduates most of the time, fail in convincing the patients to opt for pulp revascularization procedure. It is a known fact that this treatment procedure is very long process, so that patient and parent both has to visit the clinic regularly which requires lot of patience, compliance and even have to spend more money for that. As a result, in the Indian scenario, in small cities, most of the dentist in the fear of losing patients do not like to implement any new treatment modality in their clinical practice.[26-30] Even in Delhi (India) based study, [16] two third of participants (74.6%) thought the greatest obstacle to a patient accepting pulp revascularization treatment would be higher cost of treatment, (12%) thought it would be fear of stem cell therapy and the remaining (13.3%) thought it would be due to other reasons.[31-33]

Awareness regarding type of dentition in which pulp revascularization procedure is performed revealed, majority of participants (85%) opted for permanent teeth. The negative response towards primary teeth indicates the thinking nature of the dental graduates that, primary teeth usually exfoliate early so if at all any trauma occurs it does not require any treatment is the old notation still existing in many parts of the globe. For the next question, only 61.4% of the participants had a knowledge about this treatment is carried out in non-vital tooth with immature apex (open apex) and remaining

respondents were not aware of this. However, in a study done by Utneja et al, [16] only one eighth respondents (endodontic residents) have found regenerative techniques valuable in treating necrotic immature teeth which constituted 20% of patients reporting to them. More than half of the participants still considered the application of calcium hydroxide followed by mineral trioxide aggregate (MTA) apical plug and backfilling with obturation material to be the easy treatment for necrotic immature permanent teeth. This gives an insight to the fact that the residents are not trained in performing advanced regenerative endodontic techniques. Therefore, there is a need for continuing education and training programs related to all treatments that accomplish pulp-dentin regeneration from the simplest blood clot revascularization method to the most complex treatment, which involves creating tissue-engineered dental pulp structures in the laboratory and implanting them into root canals following cleaning and shaping. [33-36]

In the present survey, response on willingness in performing this new treatment in their clinical practice exhibited maximum positive response (92%). This was found similar to another study in that most residents were willing to save the teeth and dental tissues through pulp regeneration and preferred it over implants as a treatment option. Epelman in 2009, [11] stated that the success of regenerative endodontic procedures requires endodontic practitioner's acceptance first then followed by other dentists. Therefore, he conducted a survey to collect the opinions of attendees of the 2008 Endodontic Board of Diplomates in 2008 Summer Conference on the issue of regenerative endodontic procedures. The survey found that 96% of participants thought that more regenerative treatment procedures should be incorporated into routine dental treatments.

Knowledge about which specialist can perform this treatment procedure showed that half the dentist (50%) would know about endodontist and remaining towards dental practitioners. In a Mangaluru study [7], the participants (dental interns, dental practitioners and dental post-graduate students) expressed that endodontist is the specialist who deal with teeth which requires those therapies such as apexification, apexogenesis, MTA usage and direct pulp capping and all these come under the umbrella of regenerative endodontics. Therefore, all these procedures are managed by an endodontist rather than other specialist or only dental graduates. Another Indian study [14] revealed that 33.1% of pedodontists, 40.4% of endodontists and 35.3% of general dentists did not have knowledge about the primary goals of regenerative endodontics like elimination of symptoms and evidence of bone healing, and also secondary goals like increased root canal thickness and root length.

In our survey, majority of the participants (75.5%) responded 'no' to the information about which materials/medicaments are used in regenerative endodontic procedures. In the present survey, in the options for this particular question, did not include the specific medicament/ materials name. In other previous surveys [7, 14,16,17], the different medicaments, irrigation solutions and tissue engineering materials like stem cells, scaffolds have been assessed. In a survey performed by Ariwala, [7] it was found that sodium hypochlorite was the most recognized irrigant and the triple antibiotic paste was the most recognised intracanal medicament to be used during regenerative endodontic procedures.

The response observed in this survey towards the interest of dentists in learning about revascularization procedure was maximum (97.9%). And about 92.1% of participants expressed positive attitude to attend educational programmes pertaining to this new concept in the near future reflecting an underlying lack of knowledge. In Epelman study [11] too, almost all residents felt to attend training in this area. In the same study, majority of respondent's prerequisite to carry out pulp revascularization procedure in their clinical practice was absence of proper ethical regulation by the respective professional body. Therefore, author also stressed on the importance of such regulations to take further steps in this domain. Whereas in another survey, half the endodontists participants (50.6%) had received continued education in stem cells and/or regenerative dental treatments. The majority of participants (86.6%) expressed that regenerative therapy should be incorporated into dentistry. These results suggest that endodontic practitioners were supportive and optimistic about the future use of regenerative endodontic procedures and most of them (88%) were willing to acquire training in learning this new treatment strategy. [37-40]

CONCLUSION

Based on the results obtained from the current survey and previous surveys, it was noticed that there is lack of knowledge and awareness about pulp revascularization procedure in immature necrotic permanent teeth among dental practitioners. The attitude and perception of practicing dentists was positive towards in learning this new treatment approach. Therefore, this suggest that the local representative bodies like Indian dental Association should take some serious action in conducting numerous education as well as training programmes related to pulp revascularization procedures which in turn will save thousands of natural smiles in the young children.

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