

## Knowledge, Attitude, and Perception among Dentist's Toward Regenerative Endodontics: A Cross-sectional Survey

M Zakirulla<sup>1\*</sup>, Ahmad S Shafloot<sup>2</sup>, Adnan S Alasiri<sup>2</sup>, Mohammed S Alamri<sup>2</sup>, Kholood S Algarni<sup>3</sup>, Aisha Ali M Alammari<sup>2</sup>, Hadeel A Al Manea<sup>2</sup>, Razan M Al Hajari<sup>2</sup>, Abdulrahman J Alwadei<sup>2</sup>, Deena Ali O Alqahtani<sup>2</sup>, Atheer Ali M Alhassan<sup>2</sup>, Ohoud I Alqarni<sup>3</sup>, Najla M Alshahrani<sup>4</sup>, Noof A Assiri<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Pediatric Dentistry and Orthodontic Sciences, College of Dentistry, King Khalid University, Abha, Saudi Arabia

<sup>2</sup>Intern, College of Dentistry, King Khalid University, Abha, Saudi Arabia

<sup>3</sup>General Dentist, Armed Forces Hospital in Southern Region, Khamis Mushait, Saudi Arabia

<sup>4</sup>General Dentist, Private Dental Clinic, Khamis Mushait, Saudi Arabia

### ABSTRACT

**Background:** This study aims to assess the knowledge, attitude, and perception among dentists toward regenerative endodontics.

**Materials & Methods:** A cross-sectional study was carried out on a total number of 300 dental surgeons (Male=150; Female=150) participated in this study with age ranges from 20- to 55-year-old to know the knowledge, attitude, and perception among dentist's toward regenerative endodontics. Written informed consent was obtained from the participants after explaining to them the purpose of the study. The sampling method included in the study is a simple random sampling method. A self-administered structured questionnaire was developed, and the data was collected. Both descriptive and analytical statistical measurements were done.

**Results:** The majority of participants, 189 (63%) were said that they have come across the term regenerative endodontics. 42% and 31% agreed that scaffolds and growth factors were used and included in the regenerative endodontics respectively. When asked about the participant's source of knowledge gathered information about regenerative endodontics, the primary source of information is from by attending conferences and CDE programs (38%), followed by academic teaching (26%).

**Conclusions:** Regenerative Endodontic Procedures have emerged as good choice for the treatment of pulpal necrosis of immature teeth. There was a positive attitude towards regenerative procedures including stem cells and regenerative endodontics was observed among dentists. A regular training about regenerative endodontics was suggested for dentists.

**Key words:** Regenerative endodontics, Knowledge, Stem cells, Dental pulp, Dentists

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**Corresponding author:** M Zakirulla

**e-mail** ✉: drzak786@gmail.com

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### INTRODUCTION

Regenerative endodontic techniques could be recognized as organically based systems designed to structures,

including dentin and root structures, and also cells of the mash dentin complex. The objectives of regenerative endodontic technique are to recuperate mash like tissue, ideally, the mash dentin complicated; restore harmed coronal dentin, for instance, carrying out a carious introduction; and restore resorbed root, cervical or apical dentin. The evidence-dependent application of the regenerative procedures in clinical dentistry justifies serious considered to consist of this new treatment approach for fulfilling numerous patient needs.

In recent years, stem cell studies have dramatically increased. The potential applications of stem cells have

captured the eye of clinicians and researchers equally [1]. The current development in tissue engineering and regenerative medicine offers paved just how for regenerative endodontic research. With modern therapeutic modalities and regenerative capabilities of stem cells, it really is deemed that regeneration of the dental cells will never be a far future [2,3]. Dental stem cells (DSCs) are like adult stem cells which possess the ability to create into arrays of cell and tissue types in vitro [4]. They provide an extremely encourage therapeutic solution to reinstate structural defects, which principle is considerably investigated by various researchers, that is evident by the rapidly growing literature in this field [5]. Regenerative endodontics can become defined as "biologically based procedures developed to replace damaged tooth structures, which includes dentine and root structures, along with cells of the pulp-dentine complex" [6]. Hence, regenerative endodontics aims to regenerate the pulp-dentine complex that was damaged by infection, trauma or developmental anomaly of immature permanent teeth with necrotic pulp. Adequate understanding of each scaffold, their clinical applications and benefits are crucial for medical success in regenerative endodontic methods. Therefore, the aim of this study is to assess the knowledge, attitude, and perception among dentists toward regenerative endodontics.

## MATERIALS AND METHODS

A cross-sectional study was carried out on a total number of 300 dental surgeons (Male=150; Female=150) participated in this study with age ranges from 20- to 55-year-old to know the knowledge, attitude, and perception among dentist's toward regenerative endodontics. Written informed consent was obtained from the participants after explaining to them the purpose of the study. The sampling method included in this study was a simple random sampling method. Ethical approval for performing the survey was obtained from the Institutional review board (IRB/KKUCOD/ETC/2021-22/047) of College of Dentistry King Khalid University.

The questions were designed and circulated through online google forms among dental surgeons practicing in the Abha region of Saudi Arabia. The questionnaire was formulated, which comprised of two parts: The first portion included the questions related to the demographic information of participants, such as age, gender, year of experience, and level of education. The other part of the questionnaire comprised of 10 questions with 'yes' and 'no' pattern, and the multiple-choice question was prepared, and piloting was done. Questionnaire was tested for reliability and validity.

A self-administered structured questionnaire originated and was tested among a comfort sample of 20 dental surgeons. These were interviewed to get feedback on the entire acceptability of the study when it comes to length and language clearness; in accordance with their

feedback, the queries were corrected. Encounter validity was furthermore assessed before the start of research. Both descriptive and analytical statistical dimensions were used to describe the primary variables by SPSS 18 (IBM Corporation, Armonk, NY, USA) software.

## RESULTS

A total of 300 (150 males and 150 females) dental students, general dentists, and specialists responded to the questionnaire. 88% of study subjects were of 20-30 years, 7% were of 31-40 years, 5% were of 41-50 years, and 0% were >50 years (Table 1). The distribution of study samples according to a level of education was shown in Table 1. Knowledge and attitude among dentists towards toward regenerative endodontics were shown in Table 2.

The majority of participants, 189 (63%) were said that

**Table 1: Distribution of study sample according to Age, Gender and Level of education.**

Gender	n (300)	%
Male	150	50%
Female	150	50%
Age		
20-30 years	264	88%
30-40 years	21	7%
40-50 years	15	5%
>50 years	0	0%
Educational level		
Undergraduate student	186	62%
General Dentist	93	31%
Specialist	21	7%
n=Number; %=Percentage		

**Table 2: Knowledge of dentists towards regenerative endodontics.**

Questionnaire	Total (n)-300	%
Q1. Have you ever come across the term regenerative endodontics?		
Yes	189	63%
No	111	37%
Q2. Which of the following are included in regenerative endodontic procedures?		
Scaffolds	126	42%
Growth factors	93	31%
Stem cells	42	14%
All of the above	39	13%
Q3. How did you gather information about regenerative endodontics?		
By reading articles	42	14%
By attending seminars	66	22%
By attending conferences and CDE programs	114	38%
Part of dental course curriculum	78	26%
Q4. How often do you treat necrotic immature permanent teeth?		
Very often	168	56%
Sometimes	81	27%
Rarely	30	10%
Never	21	7%
Q5. Would you recommend tissue regeneration as a treatment to your patients?		
Yes	255	85%
No	45	15%

Q6. What would you think would be the attitude of the patient towards tissue regenerative treatment using scaffolds?		
Positive	195	65%
Negative	69	23%
Unsure	36	12%
Q7. Would you recommend regenerative procedures over dental implant therapy to your patients?		
Yes	285	95%
No	15	5%
Q8. Which advantage of scaffolds would make it more likely for you to recommend this procedure to your patients?		
Treatment effectiveness	219	73%
Safety and reliability	66	22%
Would not recommend	15	5%
Q9. Are you aware that scaffold, stem cells and growth factors are included in regenerative endodontic procedure?		
Yes	267	89%
No	33	11%
Q10. What should be the cost for regenerative dentistry?		
Equal to current treatment	123	41%
Less than current treatment	54	18%
More than current treatment	96	32%
Unsure	27	9%
n=Number; %=Percentage		

they have come across the term regenerative endodontics. 42% and 31% agreed that scaffolds and growth factors were used and included in the regenerative endodontics respectively. When asked about the participant's source of knowledge gathered information about regenerative endodontics, the primary source of information is from by attending conferences and CDE programs (38%), followed by academic teaching (26%). However, the majority of participants (56%) agreed that they often use this technique to treat necrotic immature permanent teeth. When asked about the advantage of scaffolds would make it more likely for recommend this procedure to the patients, majority (73%) of the participants said this is due to treatment effectiveness. Nearly half of the participants agreed (41%) that the cost of the regenerative treatment should be equal to the current treatment.

## DISCUSSION

The present study is really a survey of undergraduate dental students, general dentists and specialists towards regenerative endodontic treatments. It has provided much better understanding concerning the delivery of regenerative endodontic therapies to dental patients. The marvel of regenerative endodontic procedures is that immature teeth can be treated clinically and simultaneously helps in root development. It will be very important and crucial for dentists these days are knowledgeable and up-to-date regarding regenerative endodontics and facilitate diagnosis and treatment for dental patients. The increasing number of Regenerative Endodontic Procedures (REPs), stem cell therapies, and tissue engineering articles documented in scientific journals [7], discussed at conferences, and research findings disseminated in press was likely a key element

in the study participants' strong general enthusiasm for the potential usage of scaffolds in clinical practice. Nearly all dentists believed that regenerative dental treatments will be a much better treatment option than dental implant therapy, and they can save teeth and dental tissues for used in regenerative dental treatments.

There are several sources of stem cells in the oral cavity with some researchers implicating stem cells of the apical papilla (SCAP) as having a significant role in RET [8]. Lovelace, et al. reported a 400-600-fold increase in mesenchymal stem cell markers in blood collected from the root canal [9]. In tissue engineering, a scaffold can be an endogenous or transplanted material that provides a three - dimensional microenvironment promoting cell growth, differentiation, adhesion and migration [10]. It had been determined that 41% of dentists concur that the costs of regenerative procedures ought to be similar with current treatments. It was also found that 85% of dentists recommend cells regeneration as cure of choice to their patients. In another survey, carried out by British Society of Paediatric Dentistry, the known reasons for not using regenerative endodontic procedure has been lack of training 45%, materials 26%, evidence 16% and suitable cases 6% [11]. In today's study, nearly all study individuals were having poor knowledge regarding the regenerative endodontics. Different results had been seen in the study by Utneja, et al. [12] where most of study individuals had good knowledge with regards to regenerative endodontics.

The vast majority of students were willing to provide regenerative therapies. The lack of enough materials to carry out the procedure may also be a significant reason for not practicing. The current study outcomes were similar to study done by [13,14], which reflected the willingness of dentists to undergo training to apply regenerative endodontic procedures. Hence, training programs regarding the usage of scaffolds in different clinical procedures would be efficient to encourage its use by students. The support for regenerative endodontic procedures by respondents and the willingness to get coaching in the discipline including their positive attitude usually towards stem cell banking, has a greater effect, as the patient may be gained with new treatment option other than implants. Participants of the current research had been from only one city. Hence, the outcomes of the study cannot really be extrapolated to the overall dental student population.

## CONCLUSION

Regenerative Endodontic Procedures have emerged as good choice for the treatment of pulpal necrosis of immature teeth. Regenerative endodontic therapy is biologically based and intended to facilitate the host's natural wound healing process to restore vitality, immunity, and sensitivity of tissue in the canal space that was destroyed by infection or trauma. There was a positive attitude towards regenerative procedures including stem cells and regenerative endodontics

was observed among dentists. A need for regular training about regenerative endodontics was required among undergraduate dental students. The more the experience, the better the practice regarding the regenerative endodontics.

#### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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