

**Knowledge, Attitude and Belief of Regenerative Endodontic Procedure among Dentists. The Survey in Western Maharashtra.**

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**Abstract**

**Introduction:** As dentistry is advancing the scope for the newer treatment modalities is increasing. All to preserve the vitality and integrity of the tooth. One such attempt is Regenerative Endodontic Treatment [RETs]. Various studies have shown that the oral tissues are the good source of stem cells and they play a great role in the field of RETs so the dentists play a key role in this regard.

**Objectives:** This study was undertaken to assess the knowledge, views, believes, judgements, and practice regarding the application of stem cells in dentistry among the western Maharashtra practicing dentists in and around Karad city.

**Materials and Methods:** Questionnaire on RETs in dentistry was carried out among 150 dentists in private sector consist of 3 parts regarding

1.] Professional Status. 2.] Believes, views, and judgement. 3.] Current Practices in REPs

The data was analyzed by the no of responses as a percentage of total responses to get the understanding of the majority views of participants.

**Results:** Results showed majority of the dentists (65.33%) require motivation, training, on stem cell therapies, many of them (58.66%) showed interest in attending higher and advanced and frequent training. Most of the dentists prefer recommending RETs (81.33%) and also believed in saving one's own teeth.

**Conclusion:** Dentists are aware of treatments like RETs. They are looking forward for application of the same, continuing education on such topics, hands on courses on the same. They also suggested the newer advances should be including in the UG curriculum on the compulsory basis.

**Keywords:** RET, REP, Cell Printing, Stem Cell.

**Introduction**

If an immature permanent tooth which loses its vitality, the traditional way to treat it, would be apexification. But drawback of that is tissue regeneration can't be achieved. To overcome this, we have RETs modality. RETs are

**Survey results**

1. Are you concerned about any potential health hazards regarding the use of stem cells as part of regenerative dentistry?

a. Yes	37.33	56
b. Not sure	32	48
c. No	30.66	46

2. Do you believe that stem cell clinics will deliver future dental treatments?

a. Yes	58.5	76
b. Not sure	33.8	44
c. No	7.7	10

designed to replace damaged pulp tissue with viable tissue which restores the normal function of pulp-dentin structure. After regenerative endodontic treatment, continued root development and hard tissue deposition on the dentinal wall can occur under ideal circumstances. <sup>1</sup>

There are very limited guidelines related to procedures and as use of stem cells in dental treatment. The matter of concern is the ethical boundaries that should be applied to REPs so it is necessary to survey the practicing dentists about their view over REPs. Regenerative endodontics include root canal revascularization, post-natal stem cell therapy, scaffold implant, 3-d cell printing, injectable scaffold, gene therapy, pulp implant. The recent discoveries providing the scope of isolating stem cells from deciduous and permanent teeth have opened new role for dentists. The stem cells isolated from dental tissues can be processed and can be grown into different tissues. In the coming years, a dentist's clinic could become a "stem cell bank" for patients who may require new bone or teeth in their later life. Dentists can be a key provider of stem cells as they are involved in the extraction, collection and storage of stem cells from their patient's oral cavity<sup>3,4</sup>.

10. Which of the following would most help newly qualified dental professionals to be better able to gain knowledge about stem cells?

a. More hands-on training and short courses	46.6	70
b. Topics related to stem cells in UG curriculum	46.6	70
c. Do not know	6.66	10

11. In your opinion how should dental stem cell research be developed in future?

a. Under Public Sector initiatives	0	0
b. Under Private Sector initiatives	3.33	5
c. Under Public-Private Partnership	0	0

			d. Academic institutions	96.66	145
3 Do you believe that dental professional associations should regulate the use of stem cell and regenerative dentistry?			e. Other Specify:	0	0
a. Yes	81.33	122			
b. Not sure	13.33	20	12. Do you use any type of regenerative procedures in your practice,		
c. No	5.33	8	a. Regularly	4	6
			b. Once in a while	30.66	46
4. Do you have any ethical concerns regarding use of stem cells in dentistry?			c. Do not use	65.33	98
a. Yes	17.33	26			
b. Not sure	23.33	35	13. Which of the following regenerative treatments are the most valuable?		
c. No	59.33	89	a. Healing of peri-radicular bone,	73.33	110
			b. Tooth re-implantation	13.33	20
5. In a clinical practice, will you recommend a patient to store dental stem cells and explain its future prospects?			c. None of the above	13.33	20
a. Yes	65.33	98			
b. Not sure	25.33	38	14. What % of cases in your practice involve necrotic immature teeth monthly?		
c. No	9.33	14	a. 0	18.66	28
			b. 1%	38	57
C. Clinical practice:			c. 2%	13.33	20
6. Which of the following are sources of dental stem cells?			d. 2% or more	16.66	25
a. Dental pulp, Apical papilla, Gingiva	81.33	122			
b. Enamel	0	0	15. What do you consider to be the optimal treatment for necrotic pulp in immature teeth?		
c. Do not know	15.33	23	CaOH apexification	26.66	40
			CaOH followed by MTA Plug and backfilling	13.33	20
7. Can stem cell tissue regenerative technology be applicable to dentistry?			c. MTA apical plug and back-fill with obturation material	20	30
a. Yes	81.33	122	d. Tribiotic paste and pulpal regeneration	40	60

b. Not sure	17.33	26		
c. No	1.33	2	16. If you can't provide regenerative treatment, would you refer the patient ?	
			a. Yes	80 120
8. Can dental stem cells be used to develop non-dental tissues/organs?			b. Not sure	6.66 10
a. Yes	17.33	26	c. No	13.33 20
b. Not sure	76	114		
c. No	6.66	10	17. What would make you most likely to recommend stem cell and regenerative treatments to your patients?	
			a. If it is the most effective treatment option	88 132
9. Which of the following procedures can benefit by the application of dental stem cells?			b. If it is safe and reliable	6.66 10
a. Continued root formation	48.66	73	c. If it is the most cost-effective option	5.33 8
b. Regeneration of enamel	48.66	73	d. I would not recommend it	1.5 2
c. Pulp/dentin tissue engineering and regeneration	48.66	73		
d. Do not know	18.66	28		

It is important to understand the attitude of dentist community towards this new dimension of treatment. The aim of this survey is to know the opinions of dentists towards REPs and to create the ethical guidelines and to access the acceptance of REPs among dentists in private practice.

### Materials and methods

150 copies of questionnaires on perception of use of REPs in dentistry were examined and modified in compiling the questionnaires used in this study. The validity was evaluated from in depth literature search on surveys conducted on regenerative dentistry<sup>4,5,6</sup>. Questionnaires consist of 3 parts:

1. Dentists professionals status.
2. Dentists views, beliefs and judgment.
3. Current REPs practice.

The data was analyzed by the no of responses as a percentage of total responses to get the understanding of the majority views of participants.

### Results

**Professional status:** Most of the participants were male (74.66 %), the majority (78%) were less than 50 years old and most (40%) of the participants were below 40 year of age. A higher number of dentists were found in the younger age group, more clinically experienced group REPs (67.67%). Most of participants (90.6%) were general practitioners.

**Opinions and awareness:** About half the participants (48%) were aware of the potential therapeutic applications of stem cells in dentistry but 28% reported being unsure of these options. While 58.66% of participants thought that dental stem cell banking will be useful for the regeneration of dental tissue. About 74.66% participants

felt that regenerative therapy will be incorporated the dentistry at undergraduate level. Majority of participants (81.33%) felt to save teeth and dental tissue for future regenerative dental treatment. About 81.33% participants thought that dental treatment will be a better option than tooth implant placement.

**Clinical practice and knowledge:** Most of the participants (73.33%) used RETs in healing of periradicular bone, continued root development in immature teeth and pulp tissue revitalization. In a theoretical case where participants could not provide RETs, almost all participants (80%) were willing to refer the patient to a practitioner who does provide that option. Almost all the participants (88%) would most likely recommend stem cell and RETs to their patients

### Discussion

The use of stem cells of dental origin for tissue engineering is successful possibility after the discovery of stem cells in the pulp of normal and deciduous teeth<sup>7</sup>. Dentistry has changed from the extraction practice to saving the one's own teeth. It is basically the improvement in the materials, techniques and the practitioners curiosity and enthusiasm to learn the new things for the betterment of the mankind<sup>8</sup>.

The stem cells especially pulpal and periodontal origin suggests that those can be successfully used to regenerate dental and periodontal tissues. But the ample amount of knowledge and interest is much needed by the practitioner to improve and implement these procedures into practice<sup>9</sup>. There is a paradigm shift in the treatment of the periapical & the pulpal diseases with the variety of the pulp therapies, microsurgical procedures, post endodontic restorations, bleaching, interdisciplinary treatment options, and recent RETs<sup>10</sup>. The purpose of this survey is to see the view of dental practitioner to RETs and stem cell therapy. Most of the dentist responded Positively for the

survey. There is an urge in younger generation dental practitioner in our survey to learn the RETs treatment, go for the further advanced training programs, CD programs, hands on courses. The private practitioner also suggested to must have dental stem cell bank and if necessary they would refer patient to RETs centers. They showed interest in reading magazines weekly or monthly basis. Some old dentist we surveyed felt need of motivation and knowledge about RETs Lacking. Hence, Best would be incorporating the curriculum at the UG level, preclinical classes, CD programs, hands on courses during the learning Phase itself<sup>11</sup>.

Many articles and pages were published on the RETs and their outcomes and their future, scope and improvements. In our study clinicians showed keen interest about RETs, and stem cell therapies. Almost all the dental practitioner predicted the in near future bioengineering methodology may officially be used to regenerate dental tissues. A day may come when the whole tooth can be regenerated<sup>12,13</sup>.

So, this survey used to quantify awareness, knowledge understanding and clinical scenario about RETs amongst the dental practitioners in western Maharashtra. The assurance about the use of RETs in the dental practice in the coming years as well the regeneration of the whole tooth was amazing. This is probably because of the continued education programmes, hands on courses, scientific journals on stem cell therapy. Most dental practitioner were willing to save teeth through RETs and preferred these treatments over implants as a treatment option<sup>14,15</sup>. At the same time guidelines related to stem cell therapies given by Indian council should be followed. This holds same for independent researcher, institutions, corporate research department etc.

### Conclusion

Results of this survey showed that dentists are keen interested in the awareness of the RETs and stem cells

therapy in dentistry. All were willing to save ones own tooth and store the stem cell in the stem cell bank for further use.

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