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Original Research Article

A survey of the knowledge and awareness on intra-canal medicaments in endodontic practice among both the general dental practitioners and non-endodontic specialists of Tamil Nadu

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ABSTRACT

Background: The important requisite of root canal treatment is that root canals should be free of microorganisms, which plays major role in success of treatment. Usage of intracanal medicament inside root canals will help in the reduction of microbes inside the root canal system. Intracanal medicaments also help in reduction of inter-appointment pain.

Materials and Methods: A survey was conducted among dental practitioners and non-endodontic specialists of Tamilnadu to evaluate the knowledge and awareness of intracanal medicaments. The questionnaire had 20 questions related to intracanal medicaments and its usage in endodontic practice. The questionaire was distributed among randomly chosen 100 dental practitioners (both general and other specialists except endodontists.) of Tamilnadu, working in various government or private hospital or clinics. The answers obtained were analysed using descriptive analysis.

Results: In the current study, we observed that the awareness about intracanal medicaments among the practitioners was satisfying. However, they should update the knowledge about the intracanal medicaments.

Conclusion: The results of current study insist more continuing dental education programs are needed; with active participation of practitioners to keep them update about intracanal medicaments.

1. Introduction

The success of root canal treatment (RCT) depends on total removal of microorganisms from the root canal system. This can be achieved by thorough cleaning and shaping of the root canals. Intra-canal medicaments (ICM) play a major role in disinfection of root canals. Due to the complex nature of the root canal system, it is difficult to reach areas such as the lateral canals, isthmuses and dentinal tubules with mechanical instrumentation alone. In such cases, usage of copious irrigation, along with the use of ICMs, is essential. Also Intra canal medications indirectly help in the healing of the affected periapical tissues.[1,2] The ICMs also otherwise used to reduce or prevent inter-appointment pain.[3] Till now so many different Intracanal medications have been utilised to disinfect root canals in between appointments.[4] Different ICMs that are available include calcium hydroxide (CH), chlorhexidine, antibiotics mixtures such as PBSN, triple antibiotic paste, and phenolic compounds and anti-inflammatory agents. But all these medications may have their own disadvantages; for example, formaldehyde- and phenolic compounds are not used recently due to their cytototoxicity and carcinogenic potential.[5–7] Because of its high antimicrobial activity and biocompatability, Calcium Hydroxide is very commonly used among dental

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practitioners to resolve apical periodontitis.[8]

Intracanal medicaments also have been used by many clinicians to reduce post-treatment pain. But studies have shown that the regular usage of intracanal medications for reducing pain has no significant effect on the reduction or prevention of pain.[4,9]

• The aim of the present study was to evaluate the knowledge, and awareness about the choice of intracanal medicaments among general dental practitioners and nonendodontic specialists of tamil Nadu

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2. Materials and Methods

A validated and pre structured questionnaire consists of 20 questions was structured. The questionnaire had questions pertaining to types of intracanal medicaments; usage of ICM for different conditions, advancements in ICM. The questionnaire was randomly distributed to general practitioners and specialists other than endodontist of Tamil Nadu. Questionnaires were sent to the dentists either by e-mail or handed over in personal. The total numbers of 100 questionnaires were distributed among the dentists practicing in Tamil Nadu.

Data were tabulated and analysed using descriptive analysis in SPSS Version 17 (Statistical Program for the Social Sciences software)

3. Result

The current study was conducted among 100 dentists (general practitioner and non-endodontists). The average age of the participants was 30.2 years. Hundred direct contact questionnaires were distributed randomly out of which 62.0%were male and 38.0% were female. Among them 57.0% general dentist (UG) and 43.0% non-endodontist (PG), 59.0% reported that they had worked for 1-6 years, 32.0% reported that they had worked for 7-10 years, 9.0% had worked more than 10 years [Table 1]

Majority of the practitioners 85.0% are not using magnification tools during endodontic practice and 15.0%uses magnification tools out of which 60% of them use loupes and 40%use operating microscopes. [Table 2]

Majority of the practitioner said (86.0%) intracanal medicament can destroy endodontic pathogens and (14.0%) said intracanal medicament cannot destroy the pathogens. [Table 3] Calcium hydroxide is the most commonly medicament of choice 65.0% and however, other medication such as sodium hypochlorite 7.0%, eugenol 8.0% and combination 20.0%.[Table 4] Calcium hydroxide and metapex (calcium hydroxide iodoform) were the most popular medicament which are used in primary tooth [Table 5] About48% of dentist used calcium hydroxide, metapex 40%, chlorexidine 4.0% and sodium hypochlorite8.0%.

Table 1: Profile of study participants and Sex distribution across practices

	Percentage
Gender	
Male	62.0
Female	38.0
Experience	
1-7 Years	59.0
7-10 Years	32.0
>10 Years	9.0
Education level	
General dentist (UG)	57.0
Non endodontist(PG)	43.0

Table 2: Means of diagnosis and preferred magnification tools.

	Percentage
Means of diagnosis	
History	6.0
Radiograph	73.0
Electronic pulp tester	2.0
History and radiograph	13.0
All the above	6.0
Do you prefer magnification tools	
Yes	15.0
No	85.0
Preferred magnification tools	
Loupes	60.0
Operating microscope	40.0

Table 3: Action of intracanal medicament (ICM)

	Percentage
ICM can destroy endodontic pathogens	
Yes	86.0
No	14.0
How it destroy	
Partly	47.6
Completely	24.4
Not sure	28.0
Prefer any antibiotcs and analgesics after placing ICM	
Yes	76.0
No	24.0

Table 4: Most commonly used intracanal medicament:

Most commonly used ICM	Percentage
Calcium hydroxide	65.0%
Sodium hypochlorite	7.0%
Eugenol	8.0%
Combination	20.0%

Table 5: Action of intracanal medicament –infected cases:

	Percentage
Pprefered icm for primary tooth with infection	
Calcium hydroxide	48.0
Chlorhexidine	4.0
Sodium hypochlorite	8.0
Calcium hydroxide iodoform	40.0
Prefer icm for non-vital tooth	
Calcium hydroxide	60.0
Antibiotics	29.0
Formoresol	11.0
Prefer icm for periapical abscess	
Calcium hydroxide	31.0
Triple antibiotic	61.0
Chlorhexidine	8.0

Table 6: Duration and frequency for long standing cases-ICM

	Percentage
Frequency of changing ICM in long standing cases	
1week	41.0%
2week	50.0%
3week	9.0%
Preferred medicament for multiple visit endodontic procedure	
Calcium hydroxide	38.0
Triple antibiotic	32.0
Combination	30.0

Table 7: Adverse effect and systemic disease-ICM

	Percentage
Medicament can cause any adverse effect	
Yes	41.0%
No	59.0%
Adverse effect	
Pain	12.1%
Swelling	26.8%
Discoloration	48.7%
Pain and swelling	7.4%
All the above	5.0
Prefer for reduce the interappoinment flare up in diabetic patient	
Calcium hydroxide	36.0%
Triple antibiotic	61.5%
Formocresol	3.0%
Think HIV patient is under endodontic treatment	
Have no effect	15.0%
Have the same effect	39.0%
Not sure	46.0%

Table 8: Requirement of intracanal medicament:

	Percentage
ICM is neeeded in properly cleaned and shaped root canals	
Yes	50.0%
No	50.0%
ICM is needed in vital pulp, which is not infected	
Yes, I prefer	26.0%
No, I won't prefer	74.0%

Majority of dentist preferred calcium hydroxide60.0% for non-vital tooth and some of them preferred antibiotics 29% and formocresol 11.0% for non-vital tooth. For periapical lesion majority is triple antibiotic 61.0 % (metronidazole+ciproflaxin+minocycline) and calcium hydroxide 31.0%, chlorexidine8.0% preferred by dentist. [Table 5] Majority of dentists answered 2 weeks (50.0%) for changing the intracanal medicament in long standing cases, 41.0% and 9.0% of dentist preferred for 1 week and3weeks. 38.0% and 32.0% of dentists mostly used calcium hydroxide and triple antibiotic for multiple visit endodontic procedure.[Table 6]

Majority of practitioner 59.0% answered medicament cannot cause any adverse effect some of them 41.0% answered can cause adverse effect. Discoloration48.0% is one of the most common adverse effects. Practitioner 61.5% preferred triple antibiotic as more effective for reduce the intra appointment flare up in diabetic patient.[Table 7] Fifty percent of the practitioner preferred intracanal medicament in properly cleaned and shaped root canal and 50% of the practitioner won't prefer.26.0% of the practitioner preferred medicament in vital pulp, which is not affected and 74.0% of the practitioner won't prefer. [Table 8]

4. Discussion

Proper knowledge about intracanal medicaments would help the practitioners to make correct decision about intracanal medicaments in different clinical conditions. In our current study, calcium hydroxide was reported by participants as commonly used dressing material (65.0%). However, other medications such as sodium hypochlorite (7%) and eugenol (8%) and combination (20%) were also used.

Calcium hydroxide is a medicament that prevents growth of microorganisms in root canals. It can be used in many forms such as a plain calcium hydroxine powder, a powder mixed with vehicles such as water, saline, local anaesthetic or glycerine, or a premixed paste available in a syringe.[10] $Ca(OH)_2$ should be placed inside the root canal with the help of a file or a needle.[11] Material extrusion into the periapical tissues can cause tissue necrosis and inter-appointment pain for the patient.

Ledermix paste was developed by Schroeder and Triadan in 1960, which was made commercially available in the

year 1962 by Lederle Pharmaceuticals.[12] Ledermix paste composed of antibiotic demeclocycline—HCl (3.2%) and a corticosteroid, triamcinolone acetonide (1%), mixed in polyethylene glycol base.[12] The paste uses corticosteroids to reduce pain and acts as anti-inflammatory in pulp and periapical diseases.[12]

The difference in bacteriocidal action amongst the biofilm, planktonic suspension or pellet was significant and dependent upon the agent, except for sodium hypochlorite and calcium hydroxide, in which there was no difference. NaOCl was 100% bacteriocidal for all presentations of E. faecalis after a 2-min contact time and was the most effective bacteriocidal agent. Estrela, et al**.** (2007) evaluated the antimicrobial efficacy of ozonated water, gaseous ozone, sodium hypochlorite and chlorhexidine against E. faecalis biofilm and determined the efficacy of the same.[13]

Endodontic instrumentation alone cannot effectively remove the microflora from root canals of teeth mechanically because of anatomic complexity.[14] Hence, dependence on intra-canal medicament needed for endodontic success. Several medicaments have been tried in root canals system with their own advantages and disadvantages. The most commonly used antibiotic is a combination of three antibiotics, referred to as a triple antibiotic paste. This triple antibiotic paste was first formulated by Sato et al. and it consists of metronidazole, ciprofloxacin, and minocycline. This combination is commercially available as 3-MIX MP.[15] Metronidazole is a nitroimidazole compound. It eradicates anaerobic microorganisms.[16] Minocycline are bacteriostatic in nature. It inhibits collagenases and matrix metalloproteinases and is not cytotoxic. It also increases the level of interleukin-10, an anti-inflammatory cytokine.[17] Ciprofloxacin has a rapid bactericidal action. Most of the anaerobic bacteria are resistant to ciprofloxacin. Hence, it is often combined with metronidazole in treating mixed infections.

The current study showed that the usage of intracanal medicaments cause discoloration as adverse effect (48.7%). The Discoloration was due to presence of medicaments such as minocycline in composition which causes tooth discoloration. According to the present study, the duration and frequency of changing the intracanal medicament for long standing case should be two week (50%) and one week (41%). The present study results showed that the update about the intracanal medicaments among the practitioners have to improved which is consistent with previous study.[18]

5. Conclusion

The participants in the current study may not be truly representative of the general dental population throughout Tamil nadu. However, the authors randomly collected the data on the awareness about intracanal medicaments among general practitioners and nonendodontic specialists. The current study insists the need for more continuing dental education programs are needed; with active participation of practitioners to keep them update about intracanal medicaments.

6. Conflict of Interest

There are no conflicts of interest in this article.

7. Source of Funding

None.

References

1. Kawashima N, Chi RW, Suda H, Yeng T, Parashos P. Root canal medicaments. *Int Dent J*. 2009;59(1):5–11.
2. Law A, Messer H. An evidence-based analysis of the antibacterial effectiveness of intracanal medicaments. *J Endod*. 2004;30(10):689–94. doi:10.1097/01.don.0000129959.20011.ee.
3. Chong B, Ford TP. The role of intracanal medication in root canal treatment. *Int Endod J*. 1992;25(2):97–106. doi:10.1111/j.1365-2591.1992.tb00743.x.
4. Torabinejad M, R HS, Khademi AA, Bakland LK. Clinical implications of the smear layer in endodontics: A review. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2002;94(6):658–66.
5. Sjögren U, Hägglund B, Sundqvist G, Wing K. Factors affecting the long-term results of endodontic treatment. *J Endod*. 1990;16(10):498–504. doi:10.1016/S0099-2399(07)80180-4.
6. Zhao J, Li SH, Zhu ZH. Clinical studies of calcium hydroxide disinfecting infectious root canal of deciduous tooth. *Shanghai Kou Qiang Yi Xue*. 2003;12(2):109–11.
7. Huang T, Ding S, Kao C. Biocompatibility of various formula root filling materials for primary teeth. *J Biomed Mater Res B Appl Biomater*. 2007;80(2):486–90. doi:10.1002/jbm.b.30621.
8. Furusawa M, Hayakawa H, Ida A. Effectiveness of calvital, a calcium hydroxide formulation, on persistent apical periodontitis caused by over-enlargement of apical foramen. *Bull Tokyo Dent Coll*. 2011;52(4):209–13. doi:10.2209/tdcpublication.52.209.
9. Wesselink PR, Van Velzen ST, Van Den Hooff A. Tissue reaction to implantation of unfixed and glutaraldehyde-fixed heterologous tissue. *J Endod*. 1977;3(6):229–35. doi:10.1016/S0099-2399(77)80137-4.
10. Johnson WT, Noblett WC. Cleaning and shaping. In: Endodontics: Principles and Practice. 4th edn,. Philadelphia, PA: Saunders; 2009.
11. Badr AE, Omar N, Badria FA. A laboratory evaluation of the antibacterial and cytotoxic effect of liquorice when used as root canal medicament. *Int Endod J*. 2011;44(1):51–8. doi:10.1111/j.1365-2591.2010.01794.x.
12. Ahmed HM, Abbott PV. Discolouration potential of endodontic procedures and materials - a review. *Int Endod J*. 2012;45(10):883–97. doi:10.1111/j.1365-2591.2012.02071.x.
13. Estrela C, Estrela CRA, Decurcio DA, Hollanda ACB, Silva JA. Antimicrobial efficacy of ozonated water, gaseous ozone, sodium hypochlorite and chlorhexidine in infected human root canals. *Int Endod J*. 2007;40(2):85–93. doi:10.1111/j.1365-2591.2006.01185.x.
14. Bystrom A, Sundqvist G. Bacteriological evaluation of efficacy of mechanical root canal instrumentation in endodontic therapy. *Scand J Dent Res*. 1981;89(4):321–8.
15. Sato I, Ando-Kurihara N, Kota K, Iwaku M, Hoshino E. Sterilization of infected root-canal dentine by topical application of a mixture of ciprofloxacin, metronidazole and minocycline in situ. *Int Endod J*. 1996;29(2):118–24. doi:10.1111/j.1365-2591.1996.tb01172.x.
16. Tripathi KD. Essentials of Medical Pharmacology.5th Edn. New Delhi: Jaypee Brothers Medical publishers (P) LTD; 1985.
17. Ramamurthy NS, Rifkin BR, Greenwald RA, Xu JW, Liu Y, Turner G, et al. Inhibition of matrix metalloproteinase-mediated periodontal bone loss in rats: A comparison of 6 chemically modified tetracycline's. *J Periodontal*. 2002;73(7):726–

34. doi:10.1902/jop.2002.73.7.726.
18. Manohar MP, Sharma S. A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists. *Indian J Dent Res*. 2018;29(6):716–20. doi:10.4103/ijdr.IJDR_716_16.

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