ORIGINAL ARTICLE

A Survey of Knowledge, Attitude, and Practice of Lesion Sterilization and Tissue Repair Therapy among Pedodontists and Endodontists

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ABSTRACT

Context: The success of the endodontic treatment depends on the microbial suppression in the root canal and periapical region. Residual infection in root canal system has always been an area of penumbra for a treating dentist. Endodontic instrumentation alone cannot achieve a sterile condition. Lesion sterilization and tissue repair (LSTR) therapy aims at eliminating the causative bacteria from the lesion by sterilizing the pathology and promoting tissue repair and regeneration by natural tissue recovery process

Aims: The aim was to present the results of the opinion surveys and report the current status of agreement of the two specialties concerning the major area of interest LSTR therapy in primary tooth.

Materials and Methods: A questionnaire-based cross-sectional survey of targeted dental professionals working in Gujarat was conducted in 2018. A self-administrated and validated questionnaire was used as a survey instrument.

Statistical Analysis Used: The data collected were analyzed using the SPSS version 19. Descriptive statistics were employed, and Chi-square test was used to test the strength of association between two variables with $P \leq 0.05$.

Results: The results shown that 68.4% of pedodontists knew LSTR concept from journals and books while for endodontists, it is about 36%, which is statistically significant ($P < 0.05$). Endodontists (56%) do prefer LSTR therapy over pulpectomies compared to pedodontists (33.3%) and statistically significant ($P < 0.05$).

Conclusion: There is a great variation regarding the LSTR procedure among pedodontists and endodontists. There is a need to be conduct studies on this concept and inclusion of the concept of LSTR in the dental curriculums.

Keywords: Lesion sterilization and tissue repair, Triple antibiotic paste, Lesion sterilization and tissue repair survey, 3Mix paste.

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INTRODUCTION

In 2004, the Cardiology Research Unit of the Niigata University School of Dentistry has developed the concept of "Lesion sterilization and Tissue Repair (LSTR)" therapy that employs the use of antibacterial drugs for disinfection of oral infectious lesions, including dentinal, pulpal, and periapical lesions.[1] Repair of damaged tissues can be expected if lesions are disinfected.

The major purpose of endodontic treatment is to reduce the microbial load in the root canal system. Microbial load diminution is not only important before obturation but also in long run so as to decrease the chances of refractory periapical pathosis.[2]

LSTR therapy is a novel caries, pulpal and root canal treatment system. Using an antibacterial drug combination, the therapy aims to eliminate causative bacteria from lesions, and after sterilization, the lesions are repaired or regenerated by the host's natural tissue recovery process. After sterilization, softened dentin will recalcify, so both softened dentin and carious dentin can be intentionally left. An inflamed pulp, even with spontaneous pain, will recover after LSTR treatment. LSTR therapy is cost effective both to the dentist and to the patient as a number of visits are also reduced.[3]

Pediatric dentistry and endodontics to hear and evaluate the best evidence surrounding the pulpal therapy treatments they commonly perform. This was such endeavor to bring these two specialties together, it was anticipated that there would be a diverse cross section of opinions and attitude toward the LSTR approach. Initiation was beginning for working together to produce the best practice guidelines. Such an outcome would require both disciplines to agree with interpretation of the evidence presented concerning the treatments.

Aim and Objective

The purpose of this article was to present the results of the opinion surveys and report the current status of agreement of the two specialties concerning the major area of interest LSTR therapy in primary tooth.

MATERIALS AND METHODS

A questionnaire-based cross-sectional survey of dental professionals (pedodontists and endodontists) working in Gujarat was conducted in 2018. A self-administrated questionnaire including 17 questions was used as survey instrument. Questionnaire was validated by experienced dentists. A pilot study was carried out by 50 randomly selected pedodontists and endodontists by circulating questionnaire before the final study.

An online questionnaire link (Google Survey) was formed and circulated among 200 target dentists. Informed consent was obtained before the onset of survey, the survey was anonymous, and participation was voluntary. The data collected were analyzed using the SPSS version 19. Descriptive statistics were employed, and Chi-square test was used to test the strength of association between two variables with $P \leq 0.05$.

RESULTS

Amongst 180 circulated e-survey, 107 professionals responded. Twenty-three professionals (10 pedodontists and 13 endodontists) excluded from the study as they did not respond. From 107 professionals, 60 were pediatric dentist and 47 endodontists [Table 1].

DISCUSSION

Modern concept of medicine emphasizes prevention and reversal of diseases. Only when these attempts fail, we would take on the unfavorable approaches, i.e., surgical intervention and restoration with artificial prosthesis.

Endodontic therapy plays an important role in removing bacteria, their by-products and their substrates, by disrupting and destroying the microbial ecosystem. Different drugs and medicaments have also been suggested to accompany these techniques with varying success rate. Metronidazole has a wide spectrum of bactericidal action against oral obligate anaerobes found in carious lesions, infected root dentin, and from non-exposed pulp tissue. However, metronidazole even at higher concentrations could not eradicate all the bacteria from carious lesions, indicating the necessity of some additional drugs to sterilize these lesions.[4]

Tetracycline is known to enhance the growth of host cells on dentin, not by antimicrobial action, but through the exposure of embedded collagen fibers or growth factors. Triple antibiotic paste, on the other hand, contains both bactericidal (metronidazole and ciprofloxacin) and bacteriostatic (minocycline) components.[5] Thus, it was seen that a mixture of antibacterial drugs, i.e., ciprofloxacin, metronidazole, and minocycline can sterilize carious lesions, necrotic pulps, and infected root dentine of deciduous teeth.[6] The commercially

Table 1: Respondents opinions of pedodontists and endodontists on clinical practice of LSTR therapy

Professional status and knowledge about LSTR therapy in clinical practice	*n* (%)
In which conditions do you prefer LSTR the most?	
Necrosed tooth with periapical pathology	48 (44.9)
Abscessed tooth	27 (25.2)
Alternative to extraction	23 (21.5)
Uncooperative children	5 (4.7)
Others	4 (3.7)
Which combination of drugs do you use in tri-mix?	
Metronidazole, ciprofloxacin, and minocycline	83 (77.6)
Penicillin, chloramphenicol, and streptomycin	6 (5.6)
Metronidazole, ciprofloxacin, and cefaclor	17 (15.9)
Other	1 (0.9)
How do you prepare antibiotic mixture?	
Freshly prepare	84 (78.5)
Use stored mixture	8 (7.5)
Commercially available	15 (14)
Do you prefer giving stainless steel crown on the same visit?	
Yes	88 (82.2)
No	19 (17.8)
Do you prefer LSTR therapy over pulpectomy?	
Yes	47 (43.9)
No	60 (56.1)

LSTR: Lesion sterilization and tissue repair

available drugs are powdered and mixed in a ratio of 1:3:3 (3Mix) and mixed either with macrogol-propylene glycol (3Mix-MP) or a canal sealer (3Mix sealer). A 1:1:1 ratio of the drug combination has also been used. A disadvantage of the triple antibiotic paste is tooth discoloration induced by minocycline. Cefaclor and fosfomycin are proposed as possible alternatives for minocycline, in terms of their antibiotic effectiveness.[5] Thus, disadvantages of minocycline are there still 82.5% of pediatric dentists with their residents, and 72.0% of endodontists and their residents are using minocycline in 3Mix antibiotic paste.

The ideal vehicle for delivery of antibiotics in root canal should have ability to facilitate better diffusion of medicament through dentinal tubules for better diffusion of antibiotics. Propylene glycol and macrogol are preferred for delivery of triple antibiotic paste, prepared with equal quantity as powder.[7] Cruz *et al.* investigated the penetration effect of propylene glycol into root dentine. Depth of penetration was high with propylene glycol.[7] The conducted survey showed 56.1% of pedodontists and 50% of endodontists prefer preparing 3Mix paste using equal amount of propylene glycol with statistical significance ($P < 0.01$). According to Goswami, the antibiotic paste should be freshly prepared before use.[6] Hence, the results showed that 86% of pedodontists and 70% of endodontists prefer freshly mix antibiotic paste.

Root canals of primary teeth cannot always be prepared and obturated at the stage of physiological root resorption, but elimination of bacteria from the root canal system is the concern. LSTR therapy designated as a non-instrumentation endodontic treatment (NIET) which does not require long chair time and visits. The previous studies have clearly demonstrated that 3Mix paste is capable of eliminating bacteria from infected dental tissues in both primary and permanent tooth.[1,8-10] Our study showed most of the pedodontists and endodontists (78.9% and 80%, respectively) do believe that LSTR therapy should be adopted as a new treatment modality for a primary tooth.

CONCLUSION

Pediatric patients usually have a short attention span and do not like long treatment duration and repeated visits. Therefore, triple antibiotic paste may be used for the treatment of immature vital tooth. There is a great variation regarding the LSTR procedure among pedodontists and endodontists. There is a need to be conduct studies on this concept and inclusion of the concept of LSTR in the dental curriculums.

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