

Current Acceptance and Practice of Lesion Sterilization and Tissue Repair Therapy Among Pediatric Dentists

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INTRODUCTION

One of the primary goals of a pediatric dentist is to prevent the premature loss of primary teeth. Premature loss of primary teeth can lead to negative occurrences such as ectopic eruption, changes to eruption sequences, space loss and speech impairments. In addition, the stability and health of the primary dentition plays a substantial role in the development of occlusion. [5] Many times, when a nonvital deciduous tooth is affected by gross decay and periapical pathology, extraction may be the most indicated treatment option. Pulpal therapy may be contraindicated due to a plethora of factors such as substantial root resorption, bone loss, and inadequate periodontal support.[5] There are many challenges to endodontic therapy in primary teeth. One of the primary challenges of endodontic treatment is due to the morphology of primary teeth. The typical primary tooth morphology consists of very tortuous root canals, presence of multiple accessory canals, and medullary bone spaces that allow for easy spread of infection. In addition, there may also be a lack of apical closure of these teeth due to natural physiological root resorption as a result of the proximity of the developing permanent tooth germ to the roots of the primary teeth. This makes it very difficult to obtain a proper hermetic seal.[1,5]

Pediatric dentists throughout the country have begun using new and innovative dental materials to offer different treatment modalities to their patients. This modern perspective strives toward less invasive and less time-consuming procedures. Lesion sterilization and tissue repair (LSTR) presents as an alternative option for patients in which the caries have extended into the pulp and periapical pathology is present. Most often when a tooth is nonvital and symptomatic, the two primary treatment options are extraction and pulpectomy. Extraction is the treatment modality many dentists use when traditional endodontic procedures are not viable. Lesion sterilization and tissue repair has become increasingly more accepted as a technique to use in these clinical situations.

The principle of LSTR stems from the notion that healing of damaged tissues is more likely to happen when disinfection of these lesions occurs.[2] This therapy aims to eliminate bacteria from the root canals by sterilizing the lesion and promoting tissue repair and regeneration by the natural tissue responses of the host.[4] The treatment involves noninstrumentation or minimal instrumentation followed by placement of an antibiotic mixture. Due to the polymicrobial nature of dental bacteria, LSTR involves the use of a combination of three antibiotics (most commonly metronidazole, ciprofloxacin and minocycline) along with solvent macrogol and propylene glycol.[5] This combination is also known as three mix MP paste. The goal of LSTR is for the infected tooth to achieve successful tissue repair.[4] There are many documented cases in which a previously abscessed primary tooth has been treated with LSTR, resulting in periapical bone fill and an absence of symptoms.[2]

When a primary tooth becomes infected, the job of the pediatric dentist is to provide the proper oral health care and to maintain the deciduous tooth for as long as possible. LSTR is an innovative treatment modality for pediatric dentists to offer to their patients as an alternative to extraction. This will maintain the dental health of the patient, as well as maintain the space in the dental arch for the permanent dentition.

OBJECTIVES

The objectives of this study are as follows:

1. To determine the frequency of use of LSTR treatment by practicing pediatric dentists in the US.
2. To determine the acceptance of LSTR practice as a progressive treatment modality among the pediatric dental community.

STUDY DESIGN AND METHODS

This is a cross-sectional study design. Data collection occurred over a period of approximately five months, October 2021 - February 2022. A survey was sent out via email to active American Academy of Pediatric Dentistry (AAPD) members.

The target population of this study included current clinical practicing pediatric dentists throughout the country. Recruitment into the study included an electronic description of the study via email. Recipients of this email had the option to either opt in or out of the study. There was no exclusion criteria on the basis of ethnicity, gender, race, number of years practicing and location of practice. No patient identifiers were included as part of this study.

The study protocol was submitted to the Institutional Review Board of Montefiore Medical Center. After approval, a list of current members of the American Association of Pediatric Dentistry was obtained. These members electronically received notification of this study via an emailed link. Completion of the survey established consent to participate in the study. The survey data collected was then compiled and submitted to the study biostatistician for analysis.

RESULTS

In total, 309 responses were obtained from the survey sent out to active AAPD members, of which 285 met study inclusion criteria. Among the responses, 34.40% were from the Northeastern AAPD regional district, 17.38% from the Southeastern district, 20.21% from the Northcentral district, 12.06% from the Southwestern district and 15.96% from the Western district. A total of 81.56% of respondents practiced in private offices, 11.35% practiced in an academic institution, 4.61% in a corporate office and 2.48% in other practices such as FQHCs.

Table 1

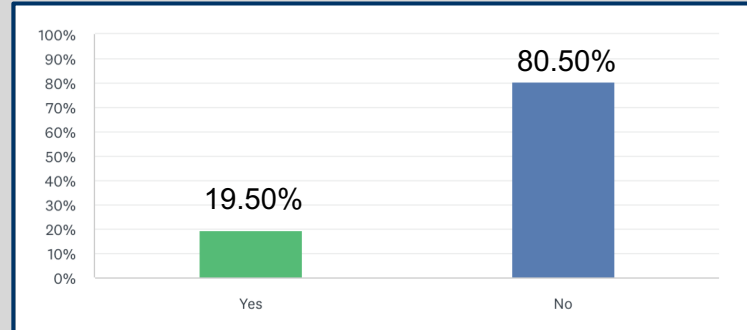


Table 2

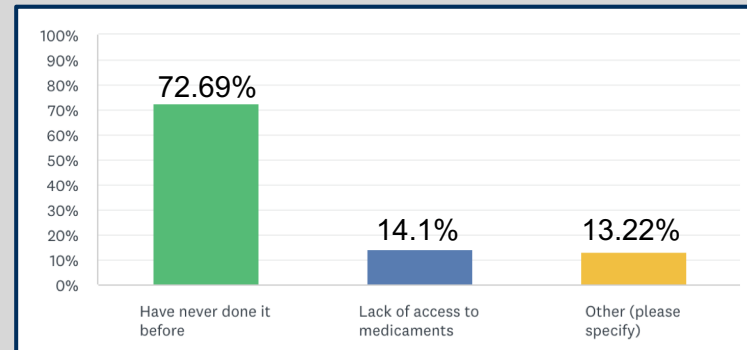


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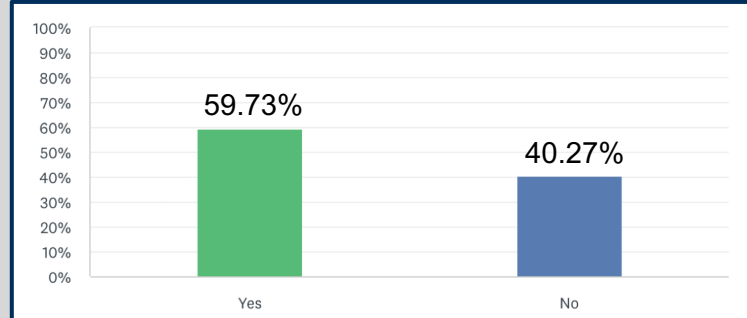
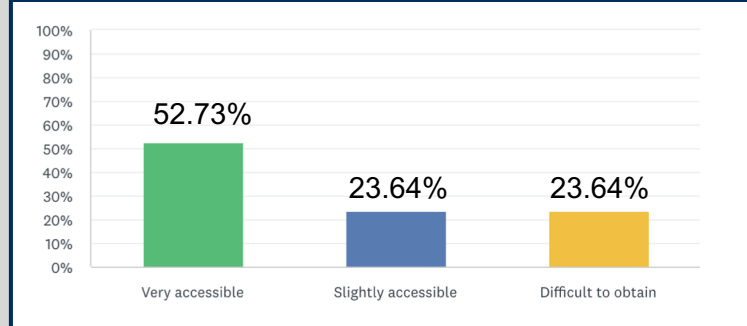


Table 4



How easily accessible are the compounded medicaments for LSTR in your practice?

RESULTS (CONTINUED)

Where were you first introduced to LSTR?

Table 5

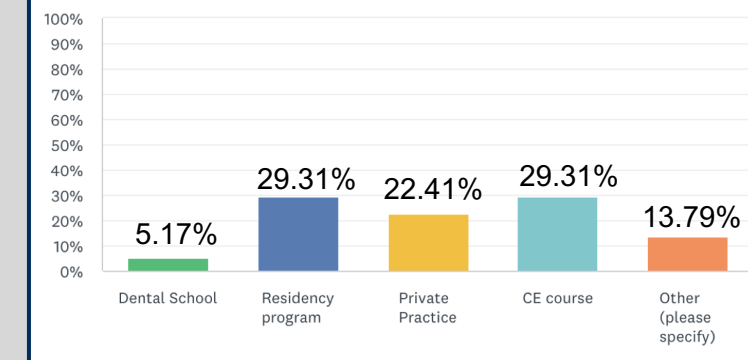
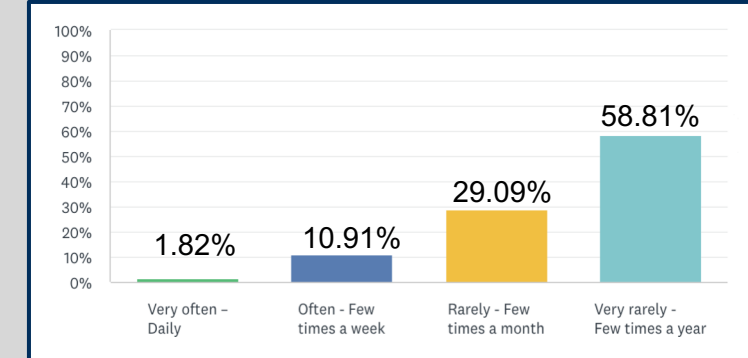
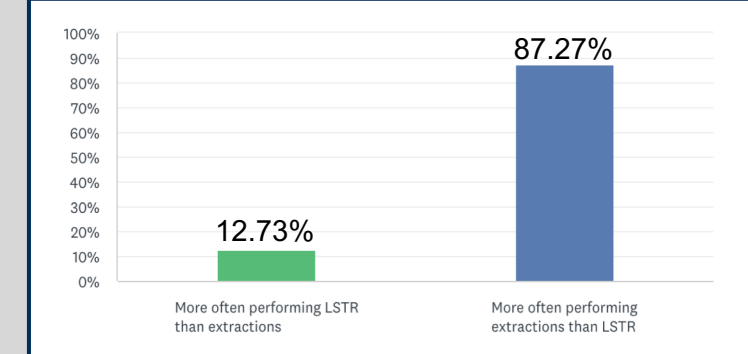


Table 6



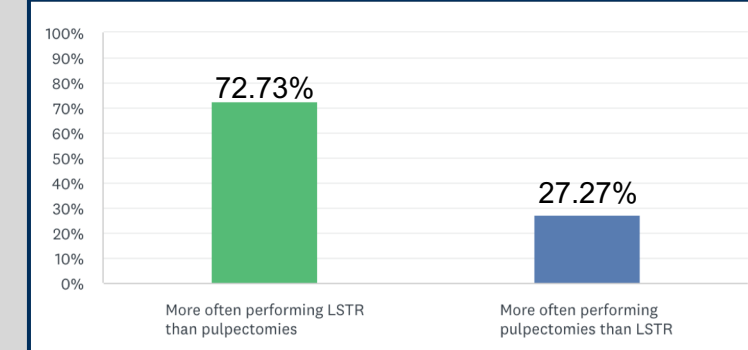
If you are performing LSTR, how often are you performing it?

Table 7



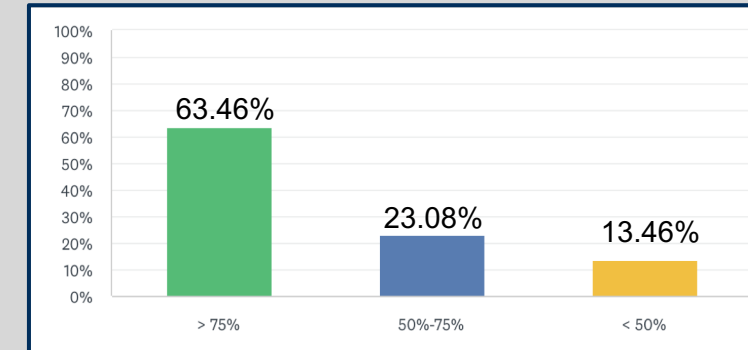
How often are you performing LSTR as opposed to extractions on primary teeth?

Table 8



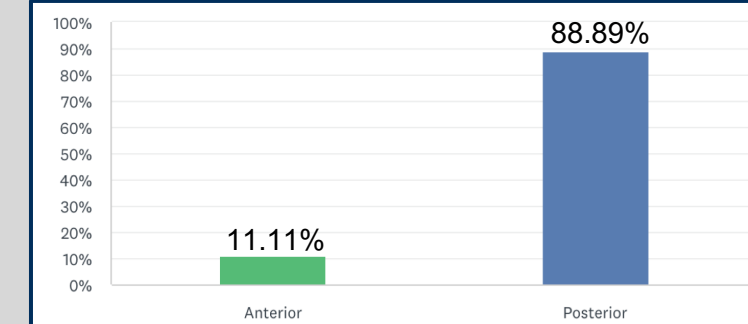
How often are you performing LSTR as opposed to pulpectomies on primary teeth?

Table 9



What have you found to be your estimated overall success rate for primary teeth treated with PST?

Table 10



Do you practice LSTR more frequently in anterior or posterior primary dentition?

RESULTS (CONTINUED)

Table 11: LSTR by years since completing residency

	YEARS			
	<=10 N = 119 ¹	95% CI ²	>10 N = 158	95% CI
LSTR				0.3
Yes	26 (22%)	(15%, 31%)	27 (17%)	(12%, 24%)
No	93 (78%)	(69%, 85%)	131 (83%)	(76%, 88%)

Table 12: LSTR by district

	LSTR			
	Yes N = 55 ¹	95% CI ²	No N = 227	95% CI
DISTRICT				0.3
Northeastern	20 (26%)	(17%, 38%)	56 (74%)	(62%, 83%)
Southeastern	8 (17%)	(8.1%, 31%)	39 (83%)	(69%, 92%)
Northcentral	4 (10%)	(3.3%, 25%)	36 (90%)	(75%, 97%)
Southwestern	9 (17%)	(8.5%, 30%)	44 (83%)	(70%, 91%)
Western	14 (21%)	(12%, 33%)	52 (79%)	(67%, 88%)

¹n (%)

²CI = Confidence Interval

³Fisher's exact test

Table 13: LSTR by practice type

	LSTR			
	Yes N = 55 ¹	95% CI ²	No N = 227	95% CI
PRACTICE				0.8
Private	43 (19%)	(14%, 24%)	187 (81%)	(76%, 86%)
Institution	8 (25%)	(12%, 44%)	24 (75%)	(56%, 88%)
Corporate	3 (23%)	(6.2%, 54%)	10 (77%)	(46%, 94%)
Other	1 (14%)	(0.75%, 58%)	6 (86%)	(42%, 99%)

DISCUSSION AND CONCLUSIONS

Of the responded participants, only 20% currently offer LSTR as a treatment option in their practice (Table 1). The results of this study suggest that the primary reason pediatric dentists are not practicing with LSTR is due to lack of experiences using the material (Table 2). Furthermore, according to Table 3, only about 60% of respondents are interested in introducing this procedure to their patients. This potentially indicates that more evidence based research and training in LSTR is necessary for increased use. In terms of availability of medicaments, only a slim majority (52.7%) have found the compounded medicaments to be easily accessible (Table 4). Further research could determine if increased access to the LSTR medicaments would increase use of LSTR by pediatric dentists. Our results in Table 5 demonstrate that pediatric dentists are introduced to LSTR during residency programs, in private practice, through CE courses, and through online pediatric dental social media groups. Table 7 and 8 illustrate that of the pediatric dentists who do offer LSTR, about 87% report that they are performing extractions more often than LSTR, and about 73% are performing LSTR more often than pulpectomies. Additionally, the majority of these pediatric dentists perform LSTR only a few times per year (Table 6). The results from Table 9 show that approximately 63% of pediatric dentists practicing LSTR estimate the overall success rate to be >75%. A large majority of LSTR procedures are being performed on the posterior dentition as opposed to the anterior (Table 10). One limitation to this study includes a low sample size and survey response rate from AAPD members.

From the results of this study, we can conclude that the majority of pediatric dentists currently do not offer LSTR as a treatment modality in their practice. LSTR does not currently appear to be the treatment modality of choice for a necrotic primary tooth. Our statistical analysis displayed in Tables 11, 12 and 13 illustrate that the use of LSTR does not seem to be associated with years since residency, type and region of practice. Comparison between these groups was carried out using Pearson's Chi-squared test and Fisher's exact test. These results illustrate that none of the comparisons in Tables 11, 12 and 13 showed a statistically significant association. The goal of this study was not to assess precise associations, but rather to determine reasonable estimations regarding the overall extent of use of LSTR by practitioners. More knowledge and evidence on the use of LSTR is necessary for practitioners to use this very beneficial treatment with confidence and success.

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