

Fixed Appliances vs. Lesion Sterilization and Tissue Repair (LSTR)

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INTRODUCTION

Early loss of primary teeth can cause problems. Therefore, it is beneficial to maintain primary teeth within the dental arch until normal exfoliation as long as the tooth can be restored to function and remain disease free.¹ If there is premature loss of a primary molar, the placement of a space maintainer to prevent undesirable tooth movements has been suggested.² The placement of space maintainers is not without its own drawbacks. Some complications that can occur with space maintenance appliances include irritation of soft tissues from food impaction, plaque accumulation, increased risk of caries, undesirable tooth movement, premature decementation of the appliance, or appliance breakage. Therefore, a patient's natural tooth remains the ideal space maintainer for the permanent tooth.³ A relatively new option over extraction, is lesion sterilization and tissue repair (LSTR).⁴ LSTR involves placing an antibiotic paste on the root canal orifices to disinfect the root canals. Previous teeth that were necrotic and had periapical/furcal infections can now be treated with LSTR as a treatment alternative. The use of this option may benefit the patient in allowing them to avoid or delay the placement of a space maintainer.^{5,6}

PURPOSE

The purpose of this study is to compare the clinical success of treating a primary molar with lesion sterilization and tissue repair (LSTR) versus extraction and placement of a space maintainer.

METHODS

A retrospective chart review of patients seen in the Herman Ostrow School of Dentistry Graduate Pediatric Clinic was completed to compare the treatment of a primary molar with LSTR or extraction and placement of a space maintainer [band and loop (B/L), lower lingual holding arch (LLHA), or Nance (N) appliance]. Two pediatric dentists evaluated radiographs from the subjects before and after treatment was initiated and at subsequent follow-up appointments. The evaluators filled out a questionnaire when reviewing radiographs to determine if there was tipping of adjacent teeth, space loss, sufficient room for the succedaneous tooth, and ultimately the clinical success of the treatment. The independent evaluators were calibrated between each other and themselves to ensure interrater and intrarater reliability and consistency. Descriptive statistics were used to analyze the data.

RESULTS

- Of the forty-three primary molars treated with LSTR, twenty-one molars (48.8%) were scored with adequate patient follow-up. Subjects were determined to have adequate follow-up if they attended a dental recall appointment after their treatment appointment. The end outcomes of the twenty-one scored molars were eight (38.1%) extractions, seven (33.3%) exfoliated naturally, and six (28.6%) are currently retained in the arch (Table 1).
- Of the seventy-seven space maintainers (B/L, LLHA, N) delivered, seventy-two appliances (93.5%) were scored. The end outcomes of the seventy-two scored appliances were twenty-one (29.2%) were removed prematurely due to patient discomfort, the appliance breaking, or the appliance unseating at home. Fifteen (20.8%) were removed by the dentist when the permanent dentition was erupting, and thirty-six (50.0%) are currently retained in the arch (Table 1).

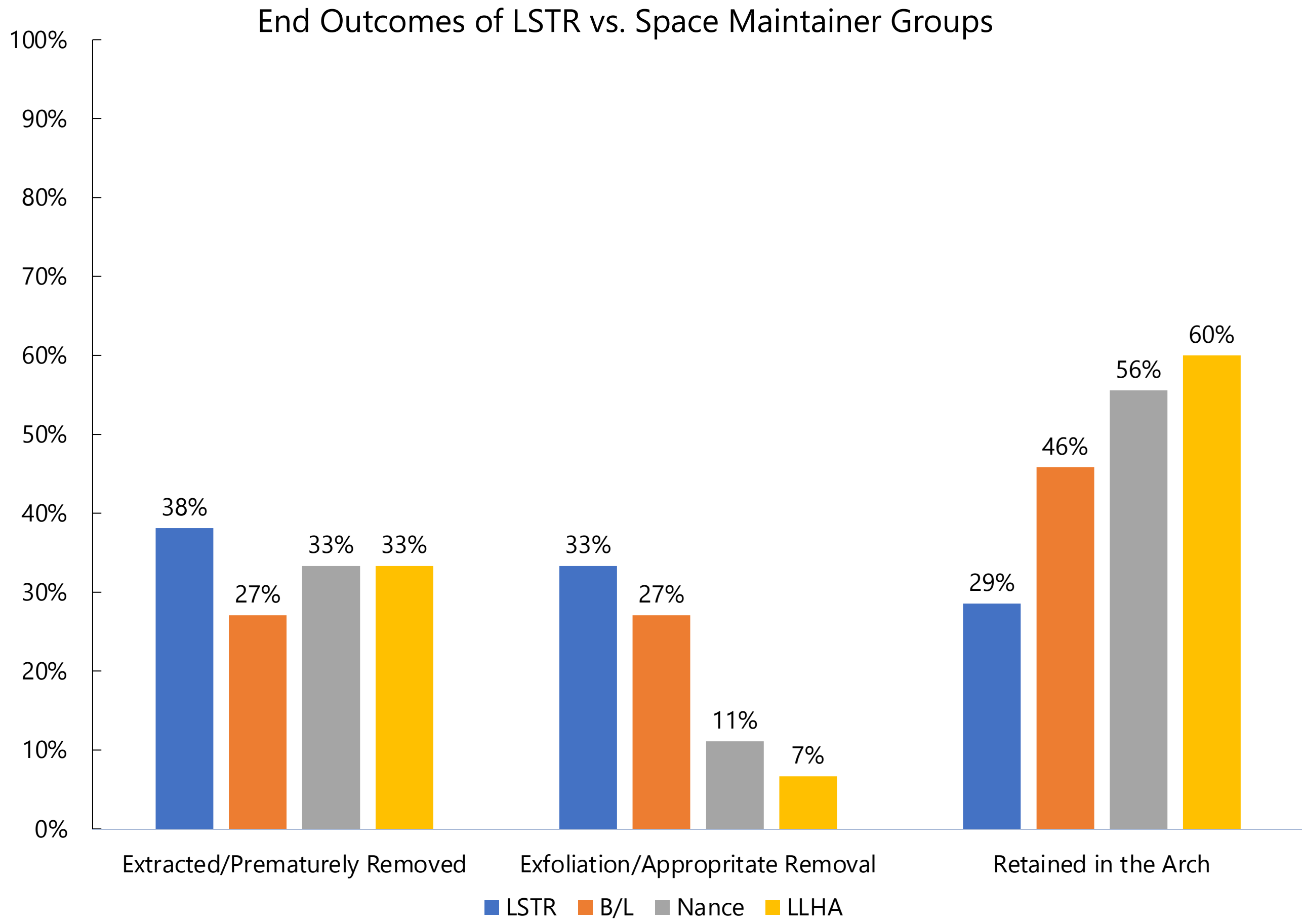


Table 1. Comparison of percentage of LSTR treated teeth, B/L, Nance, and LLHA end outcomes.

- Of the thirty-four primary molars treated with LSTR with follow-up x-rays six months to one year following LSTR treatment, twenty molars (58.8%) were scored with adequate room for the eruption of succedaneous tooth. Fifteen primary molars treated with LSTR had follow-up x-rays at the end of treatment (defined as extraction or exfoliation), ten molars (66.7%) were scored with adequate room for the eruption of succedaneous tooth. Seven LSTR treated molar subjects returned a year after the LSTR treated tooth was extracted or exfoliated, of those, six subjects (85.7%) had room the eruption of the succedaneous tooth (Table 3).

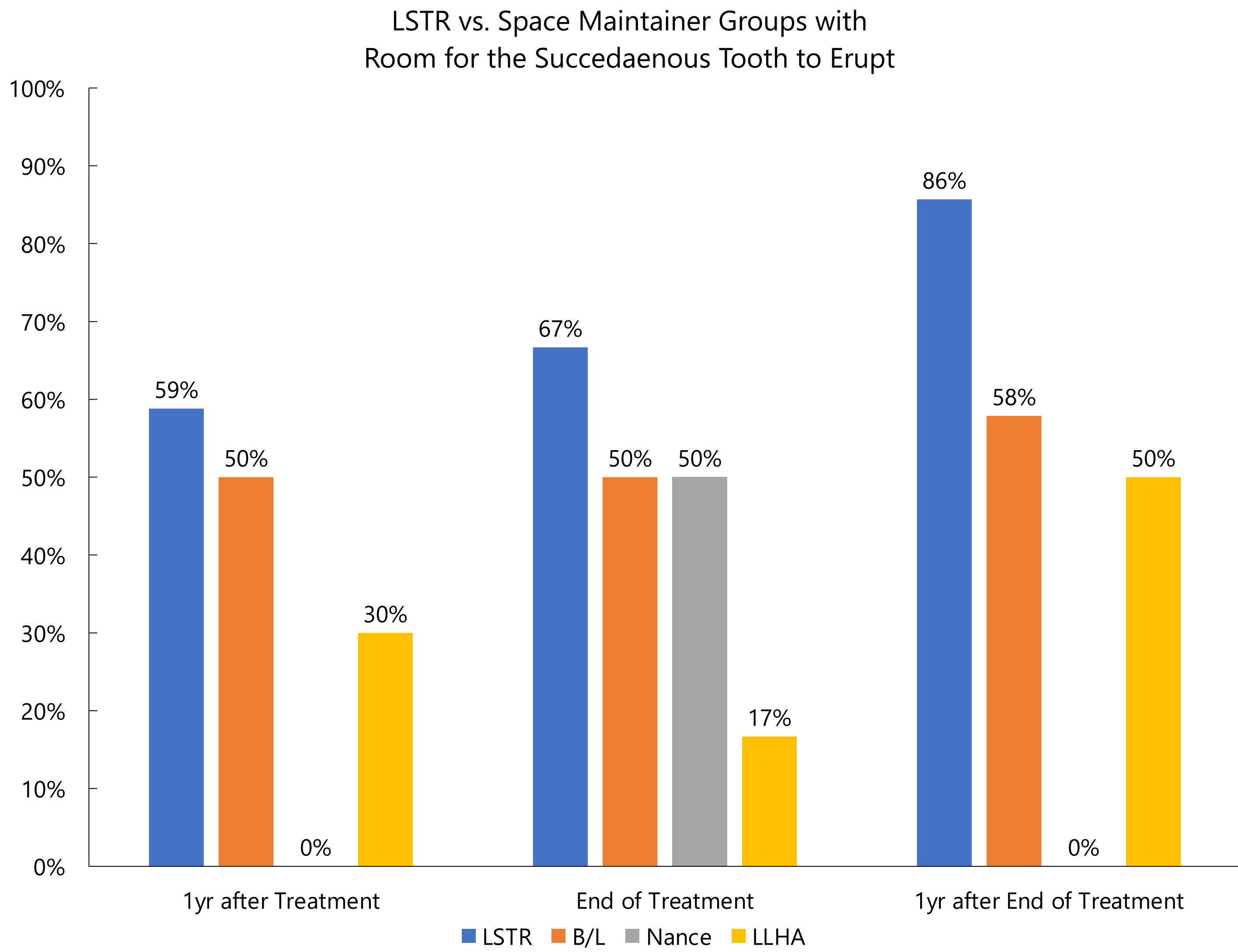


Table 3. Comparison of percentage of LSTR treated teeth, B/L, Nance, and LLHA with room for the succedaneous tooth to erupt from pediatric dentist's evaluations of radiographs.

- Of the fifty-nine space maintainers (B/L, LLHA, N) delivered with follow-up x-rays six months to one year following delivery of a space maintainer, twenty-three appliances (38.9%) were scored with adequate room for the eruption of succedaneous tooth. Of the thirty-two space maintainers with follow-up x-rays at the end of treatment (defined as removal of the appliance), fourteen (43.74%) were scored with adequate room for the eruption of succedaneous tooth. Twenty-two space maintainer subjects returned a year following the end of treatment, of those twelve subjects (54.5%) had room the eruption of the succedaneous tooth (Table 3).
- Cohen's Kappa was used to calculate inter-rater and intra-rater reliability. Interrater reliability was satisfactory (K=0.76), intrarater reliability for one of the evaluators was satisfactory (K=0.85), and not satisfactory for the second evaluator (K=0.63).

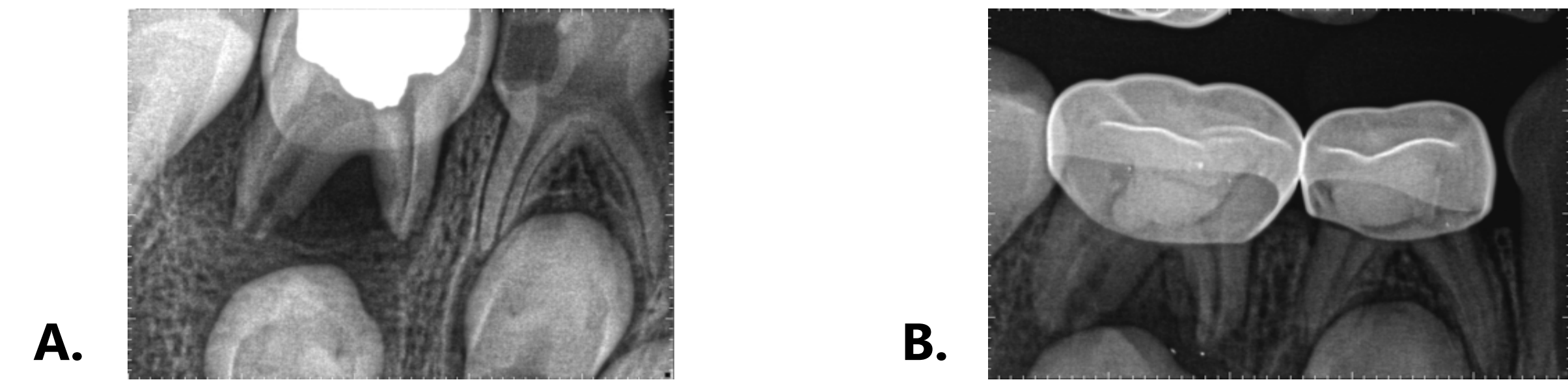


Figure 1. Radiographs of a subject who received LSTR treatment on teeth #T. Figure 1A is a radiograph prior to LSTR treatment. Figures 1B is a radiograph taken 6 months after treatment demonstrating osseous formation in the furcation of tooth #T and maintenance of space for succedaneous tooth.

CONCLUSIONS

Although more LSTR treated molars were removed prematurely in comparison to space maintainers, evaluation of radiographs demonstrate the subjects with LSTR treated molars had the most subjects presenting with adequate room for the eruption of the succedaneous permanent tooth. These results show a trend supporting higher clinical success of LSTR treated molars when compared to space maintainers when it comes to maintenance of space for succedaneous tooth. The majority of the patient's who received LSTR treatment benefited from the treatment.

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