## **Evaluation of Space Maintainers and How Practitioners Utilize these Appliances**

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#### BACKGROUND

- Space maintainers are used in pediatric patients with mixed dentition to preserve space after premature primary tooth loss.
- Common examples of space maintenance appliances are band and loop space maintainers, crown and loop space maintainers, distal shoe space maintainers, lower lingual holding arch appliances, maxillary nance appliances, transpalatal arch appliances (TPA) and removable space maintainers.
- Without space maintenance, complications such as crowding, tipping, mesial drift of permanent molars, or ectopic eruption may occur.
- The primary goal is to prevent loss of arch length, width, and perimeter by maintaining the relative position of existing dentition.<sup>2</sup>
- Existing research explores causes of failure and success factors for space maintainers but lacks consideration of patient factors like recall status, oral hygiene, and social history.
- Research discusses types of space maintainers but does not assess which are commonly used in practice or taught in CODA-accredited pediatric dental residency programs.

#### PURPOSE

- Evaluate common methods of space maintenance used by pediatric dental residents in their training programs and to evaluate the types of appliances practitioners are utilizing in practice.
- The purpose is to determine what patients are ideal candidates for space maintenance appliances and to compare learning experiences among different residency programs.

#### METHODS

•This study was approved by the University of Nebraska Medical Center Institutional Review Board (IRB).

•Contact information for American Academy of Pediatric Dentistry (AAPD) members was obtained through the AAPD.

•A 21-question survey was distributed via email to AAPD members, including current pediatric dental residents and practicing pediatric dentists.

•Participation was voluntary, with no financial compensation, and all responses remained anonymous.

•Participants received an email with background information and a link to complete the survey via REDCap.

•The survey was sent to 7,333 AAPD members.

•Descriptive statistics were used to summarize the data



both bilateral and unilateral space maintainers? Figure 3: Respondents indicated lack of patient compliance and cement failure to be the two most common issues for failure with space maintenance appliances

In your opinion, what is the most common issue for failure in

- based, combined, FQHC)
- medical assistance
- maintenance appliances
- respondents.
- no. 5, 5 Sept. 2018, pp. 311–320.
- 473-93.
- Dentistry. 2018;11(5):440-445.

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#### CONCLUSIONS

Band and loop, lower lingual holding arch (LLHA), and maxillary nance appliances are the most commonly used appliance in practice. Distal shoe appliances are used more frequently in residency

programs than in private practice. Respondents reported an overall decline in the use of distal shoe appliances

A trend toward using de novo band and loop appliances over labfabricated ones has been more recently observed

Some respondents noted that new graduates are placing fewer space maintainers, opting for increased orthodontic intervention instead. Removable space maintainers are the least common type of appliance used among clinicians/residents

No significant differences were found in appliance usage across different residency program types (i.e. university based, hospital

Practices who accept Medicaid reported a higher median number of unilateral space maintenance relative to practices that do not accept

Clinicians and residents feel adequately prepared for placing space maintainers based on residency training, with most having placed around 40 appliances during training.

Patient behavior is the most important factor while social history is the least important factor in determining patient candidacy for space

Recall visits every 6 months are considered sufficient by 91.5% of

The primary cause of appliance failure is patient non-compliance, including issues like ignoring dietary restrictions, appliance tampering, and missed follow-up appointments.

#### REFERENCES

1. Ahmad, AJ, et al. "Methods of Space Maintenance for Premature Loss of a Primary Molar: A Review." European Archives of Paediatric Dentistry, vol. 19,

2. American Academy of Pediatric Dentistry. Management of the developing dentition and occlusion in pediatric dentistry. The Reference Manual of Pediatric Dentistry. Chicago III; American Academy of Pediatric Dentistry; 2024:

3. Deshpande S, Vikas Bendgude, Kokkali VV. Survival of Bonded Space Maintainers: A Systematic Review. International Journal of Clinical Pediatric

4. Fathian, Mehrdad, et al. "Laboratory-Made Space Maintainers: A 7 Year Retrospective Study from Private Pediatric Dental Practice." Pediatric Dentistry, vol. 29, no. 6, 2007, pp. 500–6, pubmed.ncbi.nlm.nih.gov/18254421/.

