

Longevity of Fixed Space Maintainers

Meher A, Iqbal K, Loo CY, Swee G, Jain S. (Tufts University School of Dental Medicine, Boston, MA)

TUSDM IRB
Approval #03127



Introduction

One of the foundations of pediatric dentistry is space management and preservation during the transitional period of mixed dentition. The safest way to prevent future malocclusion in children who have early loss of primary teeth is to use a space maintainer that is effective, cheap, and long-lasting.¹ Because several studies have shown that space loss happens within the first 3–6 months after tooth loss, it is preferable to place a space maintainer within the first month.² Problems with space maintainers vary from a low of 13% to a high of 63%.^{5,7} In recent years, prefabricated band and loops have been presented to dentistry. Some studies have reported an 84.4% success rate for them.⁸

Objective

The primary aim of this retrospective chart review was to investigate the survival of unilateral (prefabricated and conventional Band & Loops) compared to bilateral fixed space-maintenance appliances (Lower Lingual holding arch and Nance appliance), and the survival comparison within unilateral between prefabricated and custom-made space maintainers that are fitted in over a 5-year period using glass ionomer luting cement.

The secondary aim of this study was to investigate the survival of space maintainers in the maxilla to those in the mandible, and among unilateral space maintainers, the longevity of those on the right side compared to the left side.

Methods

In this retrospective study, electronic dental records of patients at Tufts University School of Dental Medicine, aged 1 -13 yrs. who received treatment from 7/1/2017 to 6/30/2022 were reviewed. Appliance longevity, outcomes, reasons for failure were recorded. In each patient only one appliance was included and the recemented appliances were excluded. Additional data recorded included age, gender, and insurance.



Figure 1: Prefabricated Band and Loop Space Maintainer



Figure 3: Lower Holding Lingual Arch

Types of Space Maintainers in the study



Figure 2: Custom made Band and Loop Space Maintainer



Figure 4: Nance Palatal Arch Space Maintainer

Results

Charts of 1675 patients were reviewed. The mean age of the patients was 8.3 yr. old. Of these 88.6% had mass-health and 11.5% had other insurance. Out of 358 patients included in the analysis, 44.4% of appliances were out and 55.6% were still in the mouth. Kaplan-Meier method was used to compare survival distributions of different categories of space maintainers.

Figure 1: Patient Gender Demographics (N=358)

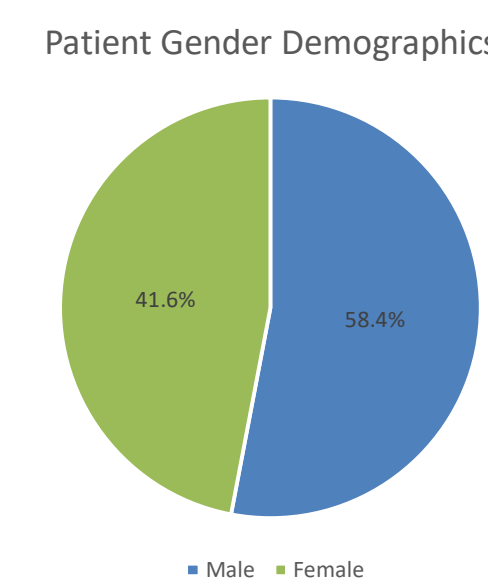


Table 3: By Arch and Side Demographics (N=358)

	Types of Space Maintainers by Arch and Side			
	Arch		Side	
	Maxillary	Mandibular	Right	Left
Prefabricated B & L	8.9%	8.7%	11.2%	6.4%
Custom-made B & L	8.7%	12.9%	9.5%	12%
LLHA	0	38.3%	0	0
Nance Palatal Arch	22.6%	0	0	0

Figure 2: Different types of SMs (N=358)

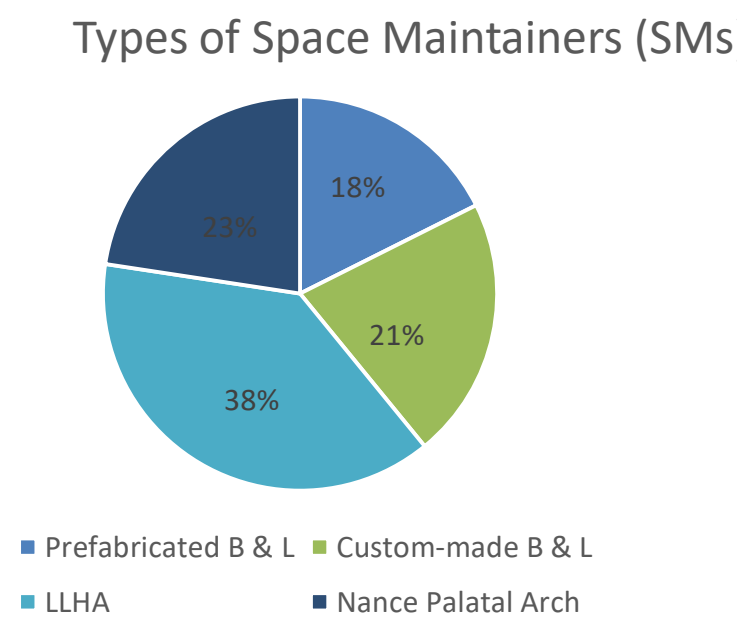
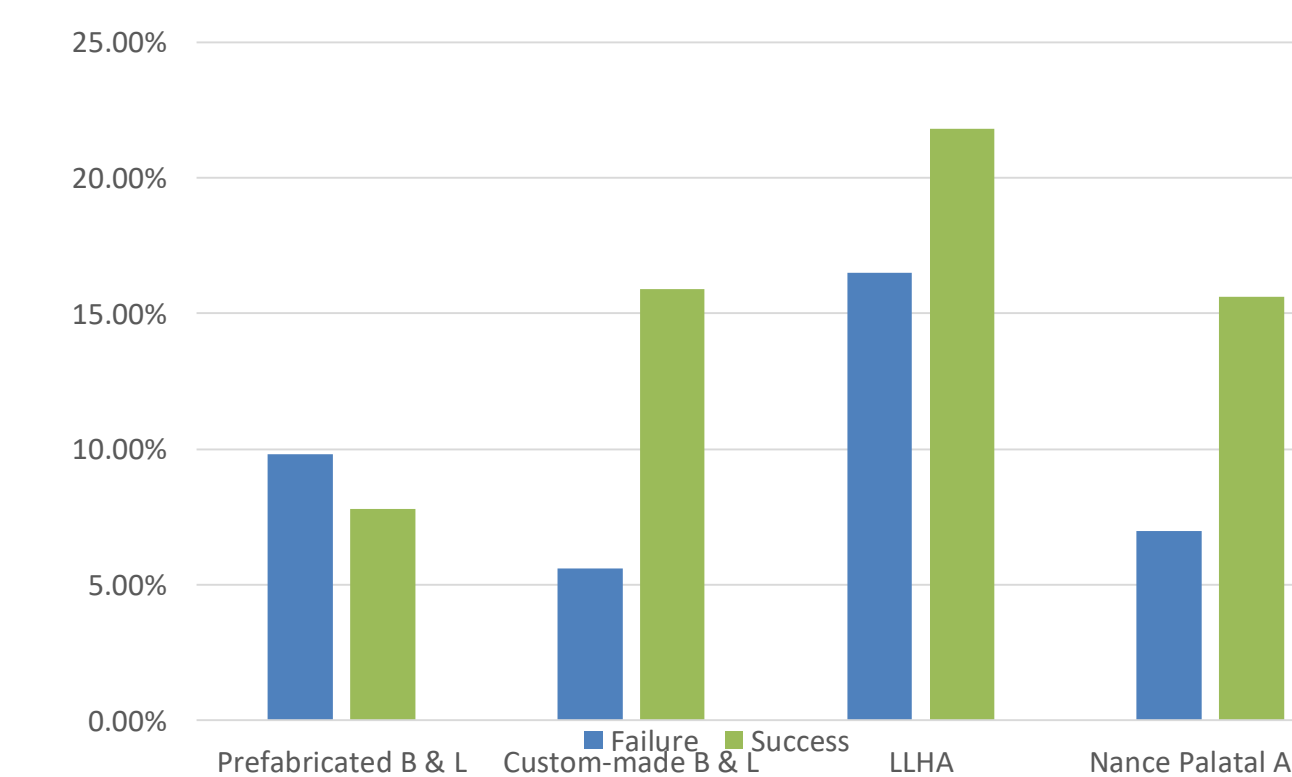


Figure 4: By success and Failure N=358



Log Rank Test showed that there was no statistically significant difference between survival distribution of Unilateral and Bilateral Space maintainers (p-value =0.622) but within Unilateral space maintainers there was statistically significant difference between survival distribution of prefabricated and custom-made B &L. (p-value =0.002)

Figure 5: Survival distributions of Unilateral and Bilateral SMs (N=358)

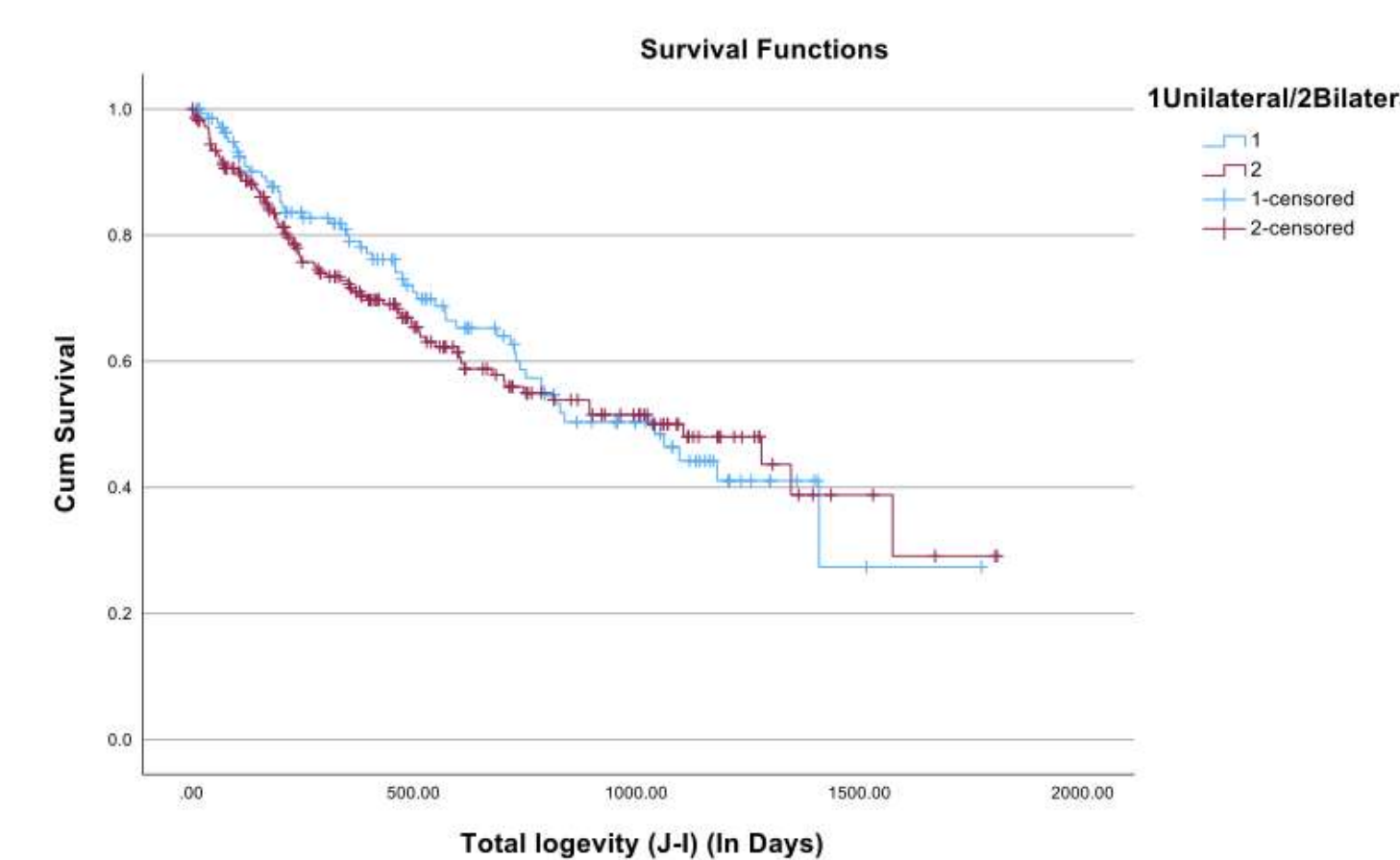
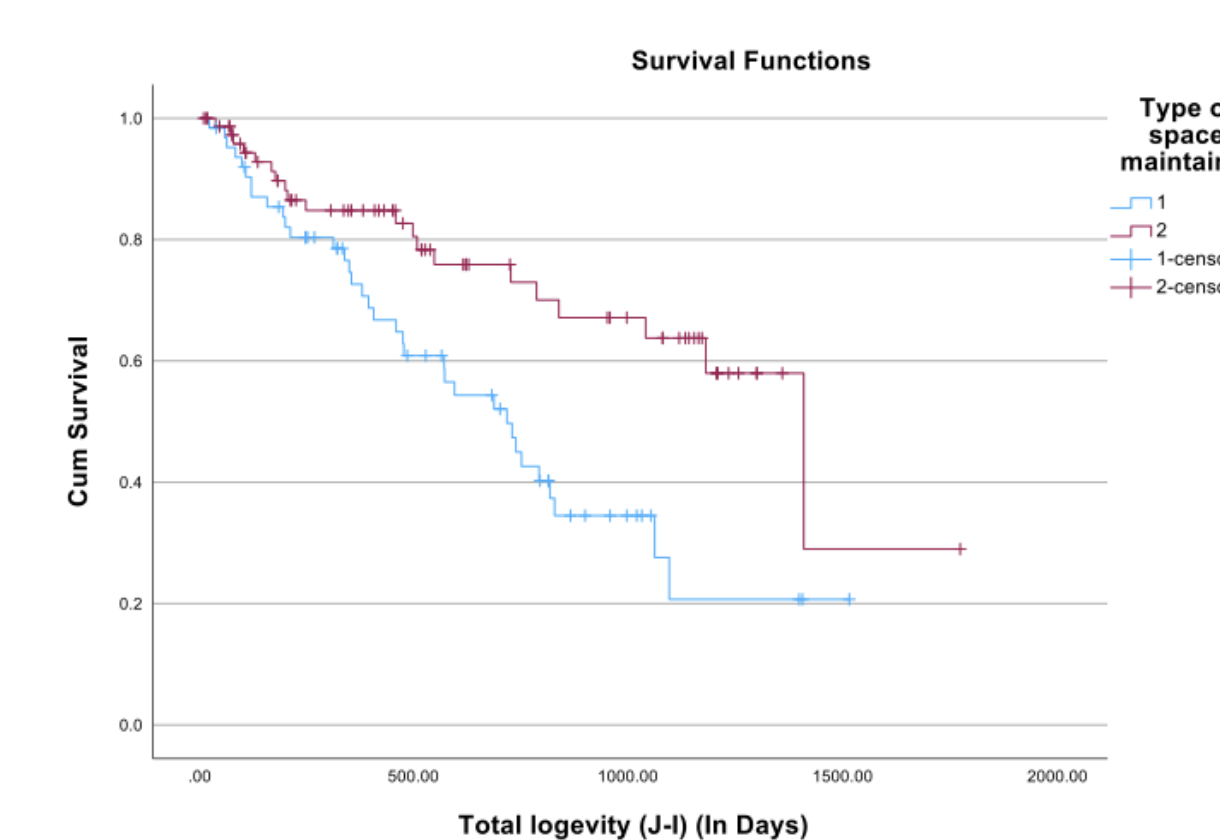


Figure 6: Survival distributions of Prefabricated and Custom made Unilateral SMs (N=358)



Results

Further Log Rank Test showed that there was a statistically significant difference between survival distribution of space maintainers in maxilla and mandible (p-value =0.027) but within Unilateral space maintainers there was no statistically significant difference between survival distribution of right and left side B &L. (p value =0.727)

Figure 7: Survival distributions of SMs in Maxilla and Mandible (N=358)

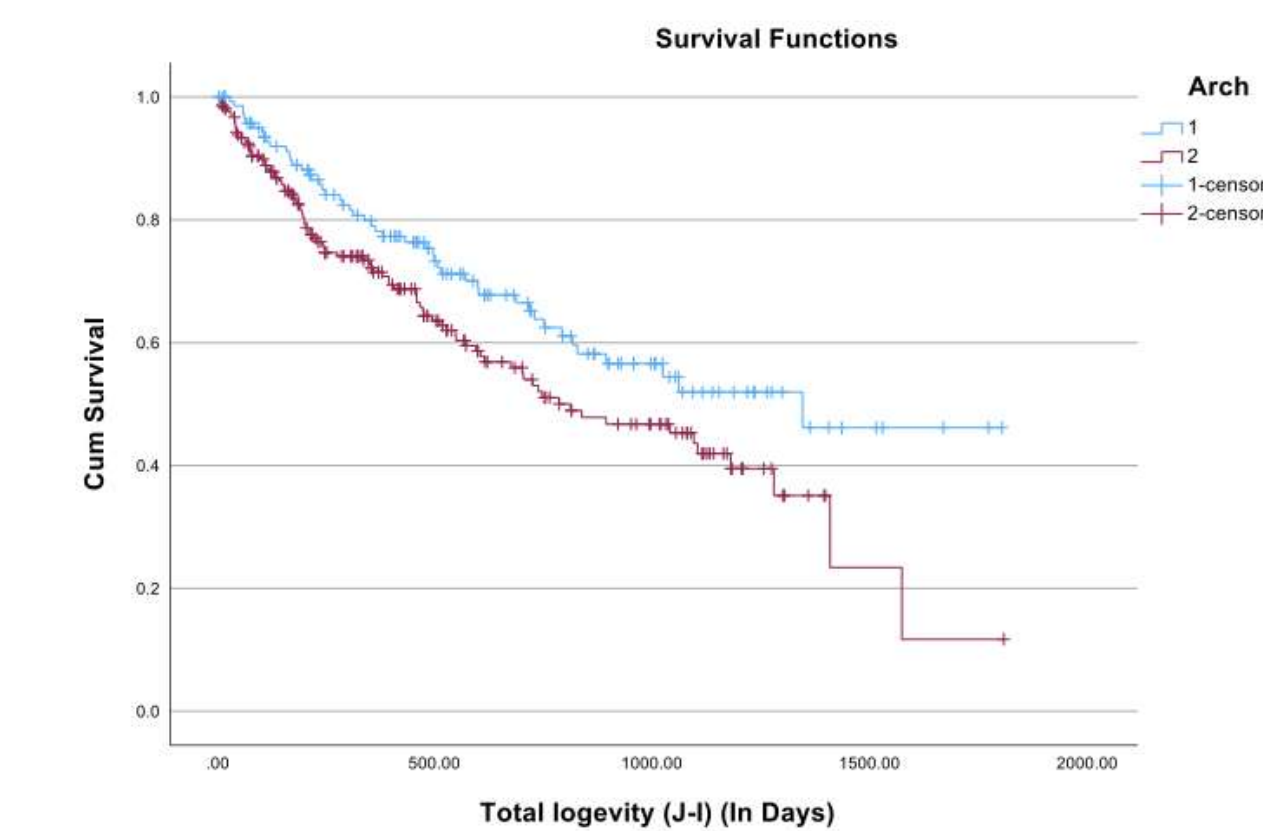
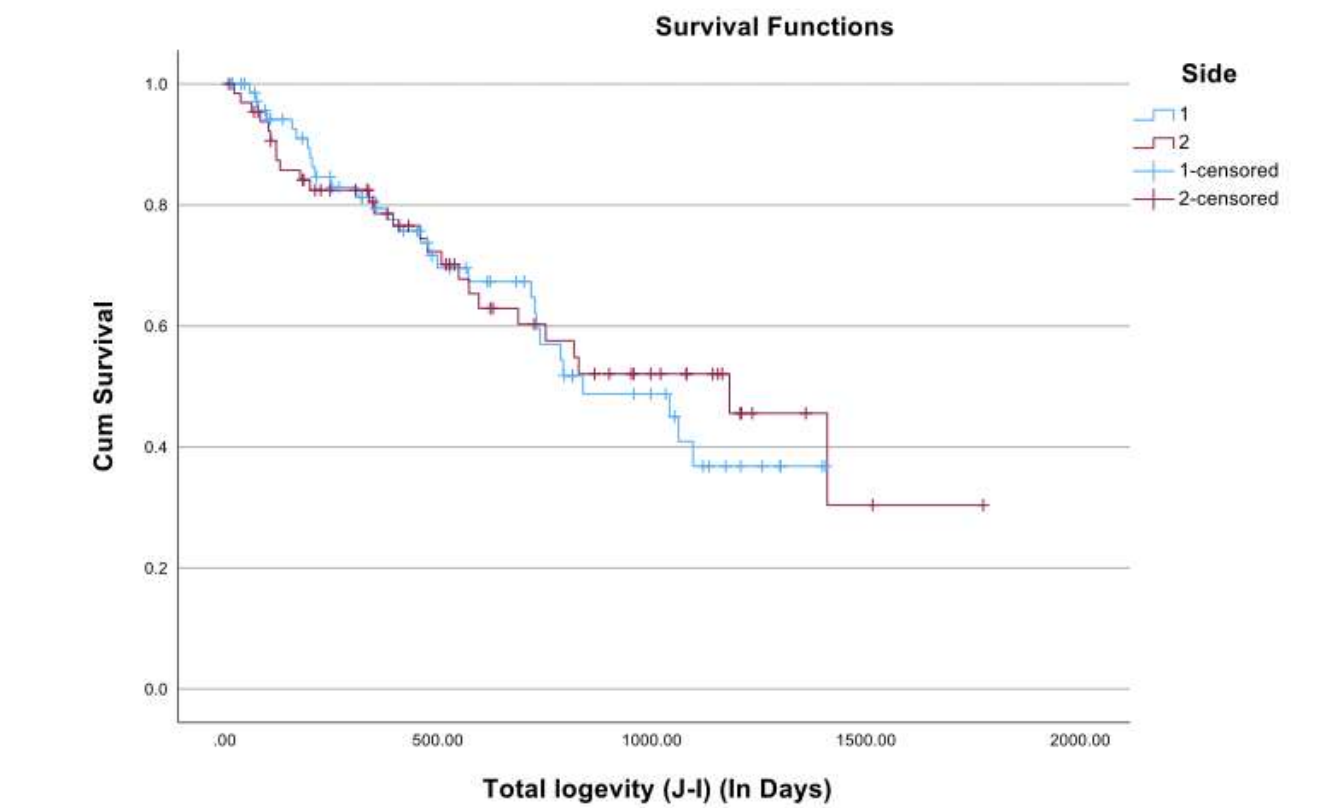


Figure 8: Survival distributions of right and left side Unilateral SMs (N=358)



The most common reasons of appliances failure or removal were cement loss (76/139=54.7%), solder breakage (4/139=2.9%), split bands (28/139=20.1%), soft tissue impingement (17/139=12.12%), Abutment tooth failure (11/139=7.9%) and not specified (3/139=2.2%).

Conclusion

Based on the Study results Following conclusions can be made

- There is no statistically significant difference between survival distribution of Unilateral and Bilateral Space Maintainers.
- The survival rate of Custom-made Unilateral SMs was higher than Prefabricated SMs.
- Longevity of SMs in the Maxillary arch was higher than mandibular arch.
- Survival time was shorter on the left side than in the right side unilateral SMs.
- Loss of cement was the most commonly recorded cause of space maintainer failure followed by breakage/split band and then soft tissue impingement.
- Due to risk of appliance failure, follow-up examinations are highly recommended.



References