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Research Article

**STUDY TO KNOW EFFICACY OF SPACE MAINTAINERS  
PLACED BY DENTAL UNDERGRADUATE STUDENTS****\*Dr. Sara Izhar, \*Dr. Duaa Naem, \*Dr. Rabia Iqbal, \*Dr. Mohsin Majeed****\*Nishtar Institute of Dentistry, Multan Pakistan****Abstract:**

**Objective:** The purpose of this retrospective analysis was to determine the performance of space maintainers placed by male university students.

**Study Design:** A Retrospective Study.

**Location and Duration:** In the Nishtar Institute of Dentistry, Multan for two years duration from April 2016 to April 2018.

**Methods:** The children Dental records with minimum one space maintainer which was applied were evaluated. The two interns evaluate the selected subjects and determined the space maintainers performance which was classified in four groups: success / detection, successful / current operation, failure, and loss of follow-up. A total of 130 space maintainers were viewed.  $8.4 (\pm 1.39)$  years was the mean age patients and the mean time between examination and device placement was  $18.06 (\pm 7.03)$  months.

**Results:** The overall space maintainers performance was that 42 (32.3%) of the devices were successful 25.06% were still working, 27 (19.0%) were lost in follow-up and failed in 62 (47.7%) and removed in 7.7%. The failure most common cause is the complete loss of the device, followed by fracture and loss of cement. There was no vast variation in the space maintainers performance in terms of gender, age group, space maintainer and arc.

**Conclusion:** It can be proven that almost 50% of the space maintainers placed by dentists failed in two years or less than 2 years. In order to prevent this result, it should be emphasized that devices should be closely monitored and monitored regularly.

**Key words:** space maintainers, children, dentistry students.

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**INTRODUCTION:**

Early primary teeth loss may damage the normal growth of the teeth. Displacement of permanent and primary teeth adjacent to the cavity created by a premature tooth loss may result in improper development of successive teeth but space maintainers' immediate placement can preserve length and decrease the development of malocclusions. Various types of space maintainers can be used depending on causes such as the developmental stage of the child's teeth, tooth strap, number of teeth and strap and the teeth lost type. Several analysis have evaluated the clinical efficacy of space maintainers. In 1975 Hill et al determined 225 space maintainers placed in a comprehensive dental care program and followed a 4 years period. Failure reported in 43% of the cases. The most common hurdle in the analysis was the loss of appliances, which accounted for total failure of 37%, 27% of fractures and 14% of cementation failure. The overall failure incidence was 31.05%; 34% due to cement loss, Solder failures accounted for 37% of total failures and 19% of soft tissue injuries. In most cases, the retrospective study on the longevity of the holders was approved by the Department of Pediatric Dentistry. Failure occurred in 64% of the devices were examined. Fracture and complete loss were 25% and 10%, respectively. Rajab (2002) reported that 30.7% of the teachers in the Department of Pediatric Dentistry of the University of Jordan failed for 5 years. Although the rupture of the solder was 48.96% of the total failure, 11% to soft tissue injury and 33.08% were related to cement loss. The purpose of this retrospective study was to determine the space maintainer's performance placed by male university students.

**MATERIALS AND METHODS:**

This Retrospective Study was held in the Nishtar Institute of Dentistry, Multan for two years duration from April 2016 to April 2018. The procedure is carried out by one of the audit professors of the Department of Pediatric Dentistry after approval of the treatment plan. The pediatric dental patients dental records treated by licensed dentists were reviewed. Children with at least one fixed or removable space maintainer produced during this period were included in the study. His family was informed and contacted about the study nature. An appointment was made for clinical follow-up if parents accepted. The following information was recorded in a form specially designed for the analysis.

- Patient's age and gender.
- Current status of space maintainers.

The two interns were trained for the follow up. He started the follow-up examination with full prophylaxis and the determination of the space maintainers in the place. Topical fluoride was administered at the end of the visit. If the child needs more dental treatment is arranged for appointment or advice. The situation of space maintainer was evaluated using the criteria described by Rajab 20027 (Table 1). Using SPSS version 16.0 the collected data were analyzed. Space maintainers were analyzed using the Chi-square test. A p value of 0.05 and less was considered significant.

**RESULTS**

A total of 103 children, totaling 103 children, were treated in the dentistry clinic. The age range was 5-11 years and the mean age was 8.5 ( $\pm$  1.41) years.

**TABLE 1: OUTCOME CRITERIA OF SPACE MAINTAINER PERFORMANCE**

Successful/removed	The space maintainer accomplished its primary purpose of placement with successful space management and the appliance was removed
Successful/currently functioning	This category registered either during examination of the child or from dental records
Failure	The space maintainer was intact and still under observation at the termination of the study
Lost to follow up	Any appliances that were removed because of cement loss, complete loss of the appliance breakage or solder breakage, soft tissue lesion interference with eruption of the permanent teeth
	Any appliance lost to follow up with unknown status because the patient failed to attend the recall visit.

The average time between device placement and follow-up was 19.6 ( $\pm$  8.03) months. 59 (56.93%) children were male and female were 45 (43.07%). 64 of the 130 space maintainers (49.2%) were band and loop (B & L), 39 (30.0%) had (LLHA), 22 (16.9%) were Nance devices and 5 (3.9%) were tools Transpalatals (TPA). The status of all space maintainers was considered successful devices 42 in Table 2, 10 devices were removed and 32 were still in operation.

TABLE 2: STATUS OF THE SPACE MAINTAINERS

Status of SM	Types of space maintainers				Total
	B & L	LLHA	Nance	TPA	
Successful/removed	4	4	2	0	10(7.7%)
Successful/currently functioning	19	5	6	2	32(24.6%)
Failure	33	22	6	1	62(47.7%)
Lost to follow-up	8	8	8	2	26(20.0%)
Total	64(49.2%)	39(30.0%)	22(16.9%)	5(3.9%)	130(100.0%)

B&L: Band and loop; LLHA: Lower lingual holding arch; TPA: Transpalatal arch

In 26 (20.0%) of the follow-up was lost, approximately half of the devices (48.0%) were considered unsuccessful. Table 3 reports the causes of various application failures depending on the field holder type. The most common failure reason in this analysis was the complete loss of the device recorded in 44 patients (71.0%). The second most common cause of failure is 9.7% failure after carburation and 8.1% failure.

TABLE 3: CAUSES OF FAILURE FOR SPACE MAINTAINERS

Reasons of failure	Types of space maintainers				Total
	Band & loop	LLHA	Nance	TPA	
Complete lost	23	15	5	1	44(71.0%)
Breakage	2	3	1	0	6(9.7%)
Cement lost	3	2	0	0	5(8.1%)
Soft tissue lesion	3	1	0	0	4(6.5%)
Interfere with eruption	2	1	0	0	3(4.8%)
Total	33(53.2%)	22(35.5%)	6(9.7%)	1(1.6%)	62(100.0%)

B&L: Band and loop; LLHA: Lower lingual holding arch; TPA: Transpalatal arch

### DISCUSSION:

Many authors have discussed contraindications, thoughts for the use of space maintainers and indications, but there is little evidence of their performance. Therefore, this analysis adds information about the space maintainers performance placed by undergraduate male students. In previous analysis, the use of removable devices support exceeded 60% in a different study in a study. In this study, removable space maintainers limited use of can be attributed to the lack of retention, the likelihood of suffocation, and the high compatibility required by the child. In this study, tape and loop were the most commonly used space maintainer, followed by LLHA and were consistent with several previous reports. One-fifth of the patients were in the "follow-up loss" group in this study, which is similar to the percentage reported by other studies. On the contrary, Tulunoğlu *et al*<sup>8</sup> reported that more than

50% of the devices disappeared from follow-up; High follow-up rate (more than 6 years) and negative attitudes of parents to recall visits were determined. Failure rate in this study (47.7%) was reported by Hill *et al*. This rate shows that 191 children (6-10 years) have been followed for 4 years. These failure rates were lower than the 63% failure rates reported by Qudeimat and Fayle, 6 higher rates were linked to higher age ranges (3.4 to 22.1 years) and longer periods follow-up (5 years). In contrast, Rajab and Baroni *et al*. Low failure rates have been reported. In the first 5 years, 358 children reported a 30.7% failure in 4 to 9 consecutive years; and 61 children in the last 5 to 9 years, 30.5% and 53 months. However, both studies were carried out by university clinics in the education of the pediatric dentistry department. 52 failed to track the failure rate in this group. The most common failure in this study was the total loss of the device, which accounted for 71% of total

failure.

### CONCLUSION:

The overall space maintainer's performance can be summarized as 33.3% success, 21.0% monitoring and 47.7% failure. The most common cause of failure in space maintainer is complete loss of the device, followed by fracture and loss of cement. The gender and age of the child and the arch-type did not show a significant relationship ( $p > 0.05$ ).

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