



## Investigation on Level of Practice and Attitude of Dentists Toward Space Maintainers as an Essential Intervention for Premature Loss or Extraction of Primary Teeth (A field study in Bani Waleed, Libya)

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**Abstract:** Premature loss of primary teeth is one of the most frequent issues affecting children's dental growth and development. The premature loss of primary teeth causes the migration of adjacent teeth into the lost space and prevents permanent teeth from erupting. This leads to a number of dental discrepancies, including malocclusion and loss of the dental arch, that require early preventive measures. The use of space maintainers appliances through safe yet is one of the most popular preventative methods, but it requires proper knowledge and practical expertise to produce effective therapy results. Therefore, this study aimed to determine the level of practice and attitude among dentists in Bani Waleed, Libya, about the possibility of using space maintainers and their prevalence as an essential intervention for premature loss or extraction of primary teeth. A descriptive, cross-sectional, questionnaire-based study was distributed among dentists. Statistical Package for the Social Sciences (SPSS) was used to analyze the filled-out questionnaires (IBM, NY, USA, Version 26.0). The results revealed that (69.1%) did not utilize space maintainers. The majority of the sample (71%) uses Band and loop space maintainers. Cost (36.4%) was the major reason for not using space maintainers, followed by parental refusal (25.4%), (21.9%) claimed that patients aren't compliant with follow-up, and (16.3%) of them pointed to time-consuming. From this, It can be concluded that numerous dentists don't use space maintainers as an essential intervention to avoid malocclusion when there is premature loss of the primary teeth. However, Significant numbers of dentists place space maintainers one week after tooth extraction.

**Keywords:** Primary teeth, premature loss, preventive orthodontic, space maintainers..

### Introduction

Primary teeth play an essential role in children's growth and development in terms of speaking, chewing [1], facial appearance, preventing bad oral habits, and, of course, in the orientation and eruption of permanent teeth. The eruption of permanent teeth after the shedding of primary teeth is a normal physiological process. Primary teeth work as the ideal space maintainer for permanent dentition. However, in some cases, such as where primary teeth are lost prematurely or early extraction is inevitable due to severe decay, delayed permanent teeth eruption may cause teeth to migrate (Fig. 1), which results in loss of the arch length, which may appear as malocclusion in permanent teeth such as crowding, impaction of permanent teeth, supra erupting of opposing teeth, and others [2]



**Figure. 1:** Migration of adjacent teeth and reduction of space required for the eruption of 2.5 (Collection of the Department of Pediatric Dentistry)

Along with dental caries and gingival disease, malocclusion is one of the most frequent dental issues [3]. Both corrective and interceptive methods are used to treat malocclusion. To prevent or reduce the severity of developing malocclusion in growing children, early detection and appropriate referral of cases requiring preventive and interceptive orthodontic treatments are crucial. This reduces the complexity of treatment as well as overall treatment time and costs in the future. One of the preventive methods "space maintenance," includes using certain appliances referred to as "space maintainers", which are fixed (Fig. 2) or removable appliances used to preserve the arch length following the premature loss or extraction of the primary tooth [4].



**Figure 2:** Band and loop space maintainer (*Textbook of Pediatric Dentistry*)

The loss of arch length may result in many issues, such as overbite, ectopic eruption, crowding, and crossbite formation, as well as overjet and dental centerline discrepancies (Fig. 3) [5].



**Figure. 3:** Unilateral early loss of the right primary canine, showing the resultant inclinations of the incisors and loss of space and centerline discerption (International Journal of Oral Science

The use of interceptive orthodontics is based on dentists' knowledge and practice of space maintainers [6, 7]. Parents often have very low awareness of space maintainers; therefore, dentists must educate them. For this, there should be sufficient practice guidelines regarding the usage of space maintainers among dentists to offer better therapy. In order to compare our study with other published research on this topic of space maintainers, it was very challenging to find studies with similar objectives to our study [8, 9]. So we conducted a field study to determine the level of practice and attitude among dentists in Bani Waleed – Libya, about the possibility of using space maintainers and their prevalence as an essential intervention to prevent malocclusion or other consequences of premature loss or extraction of primary teeth in a growing child. present similar studies has been conducted in many cities around the world Similar studies have recently been carried out in other cities throughout the world. Dr. P. S. Krithika *et al.* 2019, who studied assess the dentists' understanding of space maintainers at the graduate and postgraduate levels in Chennai. Aimed at assessing the dentists' postgraduate and graduate knowledge about space maintainers in Chennai's northwestern area. According to the survey, almost all dentists (97.5%) are conscious of the importance of space maintainers. A large number of dentists were knowledgeable about the situational selection criteria, follow-up duration, and elimination criteria. It concluded Upon reflection, it was determined that dentists had a good knowledge of space maintainers. The increasing popularity might be due to parents' improved awareness of the importance of primary teeth for sound permanent teeth. [10].

## **Materials and Methods**

### **2.1. Study design:**

A cross-sectional study was carried out from January 31, 2023, to June 3, 2023, among dentists.

### **2.2. Sample size:**

The sample size was calculated using the (Krejcie and Morgan) Table [11], based on the total number of dentists in Bani-Waleed City that was taken from the Department of Health Services – Bani Waleed. It consisted of (55) dentists.

### 2.3. Development of the Questionnaire:

A questionnaire with 13 closed-ended questions was prepared. It was written in the English language, and 2 orthodontists reviewed it to identify the items that were crucial to retention based on the validity and assessment of the content.

### 2.4. Details of the Questionnaire:

The questionnaire had 2 sections. The first section included questions about the gender and number of years of dental experience. The second section involves questions about the use of space maintainers, reasons for none use, placement, types and follow-up treatment for the space maintainers.

### 2.5. Statistical analysis:

Statistical Package for the Social Sciences (SPSS), version 26.0, IBM, New York, USA, was used for the analysis of descriptive statistics. Pie charts, bar charts, and percentage tables were used to present the results.

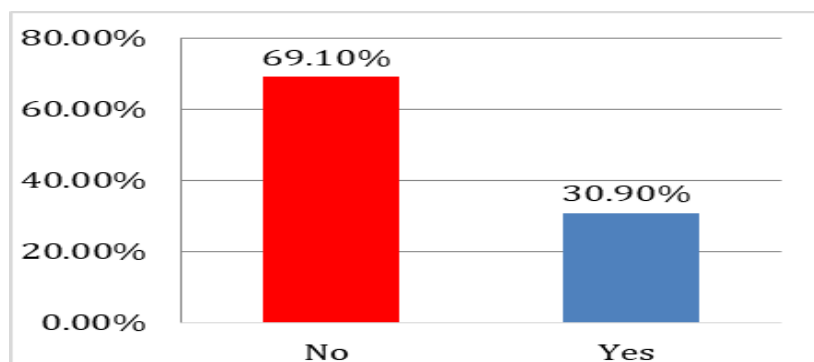
### Results and Discussion:

In the current study, 55 dentists have been included in the sample that consisted of 31 male and 24 female dentists, with a gender split of 56.4% and 43.6%, respectively. When it comes to experience, The majority of dentists (45,5%) have been in dental practice for < = 9 years, while (20%) have been in dental practice for 10 -19 years, There were almost equal percentages of those who had 20-29 or more than 30 years' experience, (Table 1). It should be mentioned that male dentists outnumbered females in this study. Despite the reality that more than 40% of the sample had experience in dentistry for more than ten years they all still required to be reminded on the options for therapy for primary teeth

**Table 1:** Dentists' sociodemographic features.

Percentage	Parameter	Number	
Gender	Male	31	56.4 %
	Female	24	43.6 %
Experience	< = 9 years	25	45.5 %
	10 – 19 years	11	20 %
	20 – 29 years	9	16.4 %
	More than 30 years	8	14.5 %

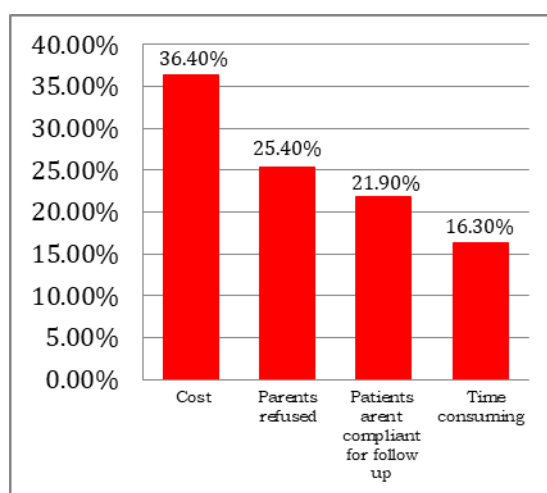
(69.1%) of the dentists did not utilize space maintainers during their years of practice. On the other hand, space maintainers were used by (30.9%) of dentists (Fig. 4)



**Figure. 4:** Using of space maintainer.

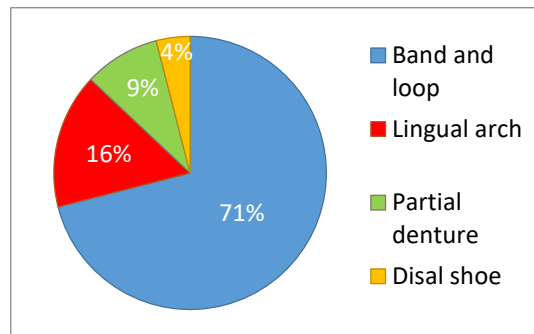
The study showed that (51.4%) of dentists educate children and parents about the necessity of space maintainers, whereas (48.6%) of dentists don't educate them.

When these dentists were also questioned about the causes behind not utilizing space maintainers. The Significant percentage (36.4%) of dentists claim financial reasons, this may require to be addressed more by promoting dentists' usage of space maintainers and lowering space maintainer costs. followed by parental refusal (25.4%); therefore, greater emphasis should be placed on educating parents about the benefits of utilizing space maintainers for their children to prevent malocclusion. (21.9%) claimed that patients are not compliant with follow-up. (16.3%) of them pointed time-consuming, space maintainers may be an argumentative choice therapy for some dentists who do not use space maintainers and may believe that attempting to utilize this treatment for children is a waste of time and, in certain instances, harmful to the remaining dentition (Fig. 5).



**Figure. 5:** The reasons of not using space maintainers by dentists.

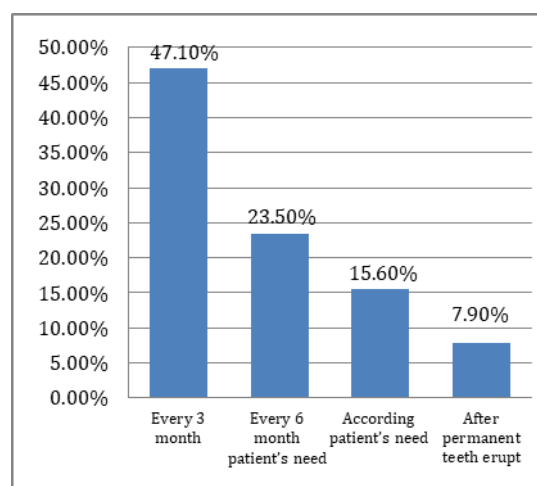
Band and loop, or crown and loop space maintainer, was the most frequently utilized type (71%). This confirms previously published results that the band and loop space maintainer is frequently utilized and meets virtually all requirements [12]. The lingual arch came in second (16%) of the dentists. Only (9%) of dentists have utilized partial dentures. It is enjoyable to observe that only (4%) of dentists used the Distal Shoe, owing to the difficulties of using this kind of space maintainer and the potential danger of infection if we used it(Fig. 6). A number of new types of space maintainers have recently been introduced, including Glass fiber reinforced composite space maintainers [13, 14], fixed space maintainers combined with open-face stainless steel crowns [15], simple fixed space maintainers bonded with flow composite resin [16], and free end space maintainers [17]. These kinds of space maintainers may not be utilized in the city, although according to authors, they have shown a good chance of being used in the years to come.



**Figure. 6:** Distribution of the types of space maintainer used by dentists.

The study indicates that the majority of dentists (54%) prefer placing space maintainers one week after extraction, which can prevent the development of malocclusion or minimize its severity. According to the authors [18], that pointed out how important it is to preserve space in time to prevent possible proximal drifting of adjacent teeth. In addition, opposing teeth tend to supra erupt rapidly in positions without opposing occlusion. Minority (17%) prefer immediate placement.

Most dentists (47.1%) agree that space maintainers should be followed up every 3 months. Other dentists were split between those who believe that space maintainers should be followed up every 6 months (23.5%), as needed by patients (15.6%), and after the eruption of permanent teeth (7.90%) (Fig. 7).



**Figure. 7:** Dentists opinions regarding how frequently space maintainers should be followed-up.

### Conclusion

Following are the conclusions drawn from the current study's findings:

1. More than half of dentists do not utilize space maintainers as a prevention measure for premature loss of primary teeth.
2. The majority of dentists (51%) educate children and parents about the necessity of space maintainers.
3. The most popular type of space maintainer used by dentists was a band or a crown and loop.

4. A significant percentage of dentists prefer to place space maintainers 1 week after extraction.
5. More than one-third of the dentists approved that space maintainers should be followed up every 3 months.
6. The main reasons for not using space maintainers were financial reasons and parents' refusal.

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**Conflicts of interest:**

The authors assert that There are no conflicts of interest.

**Financial support and sponsorship:**

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