

Original article

Evaluating the Awareness of Parents Toward Space Maintainers in Misurata, Libya

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Primary Teeth, Space Maintainers, Parental Awareness, Pediatric Dentistry, Libya, Dental Education, Orthodontic Prevention.

ABSTRACT

Primary teeth serve essential functions in the oral cavity, facilitating chewing, speech, and maintaining space for permanent teeth. However, premature loss of these teeth due to caries, trauma, or pathology can lead to complications such as drifting teeth and orthodontic issues. Space maintainers, which preserve the arch space for the eruption of permanent teeth, are effective in preventing these issues but are underutilized due to low awareness, particularly in developing countries like Libya. A descriptive cross-sectional study was conducted in Misurata, Libya, from January to March 2026. Data were collected from 350 parents accompanying their children (aged 4-12 years) during routine dental visits. The study aimed to assess parental awareness regarding space maintainers using a structured, self-administered questionnaire. Statistical analysis was performed using SPSS version 26.0. The study found that only 26.6% of parents were aware of space maintainers, with most information sourced from dentists (48.4%) or social media (30.1%). A significant correlation was observed between higher education levels and increased awareness ($p < 0.01$), but no gender-related differences were noted. Furthermore, 74.9% of participants reported never receiving information from their child's dentist about the consequences of early tooth loss, and only 11.7% of children had used a space maintainer. The study highlights a significant gap in parental awareness of space maintainers in Misurata, Libya. Despite their importance in preventing long-term orthodontic problems, most parents are unaware of their purpose and benefits. Increased education from dental professionals, particularly during pediatric visits, and targeted public health campaigns are essential to improving awareness and the adoption of preventive dental practices.

Introduction

Primary teeth serve multiple essential functions beyond their temporary role in the oral cavity. They facilitate proper chewing and speech development, contribute to the child's appearance and self-esteem, and most importantly, maintain the necessary space for the eruption of permanent teeth (1). The natural exfoliation of primary teeth and their replacement with permanent teeth are physiological processes that should occur in a specific sequence and timeframe. However, premature loss of primary teeth—most commonly due to dental caries, trauma, or pathological conditions—can disrupt this process and lead to unfavorable consequences such as drifting of adjacent teeth, midline shifts, supra-eruption of opposing teeth, and crowding (2,3). These disturbances often result in long-term orthodontic complications, requiring complex and expensive corrective treatments.

To prevent such complications, dentists often recommend the use of space maintainers, which are appliances designed to preserve the arch space left by the prematurely lost primary tooth until the permanent tooth erupts (4). Space maintainers can be either fixed or removable, and their early placement is considered one of the most effective interceptive orthodontic measures (5). Despite their importance, the use of space maintainers remains underutilized, especially in developing countries, due in large part to a lack of awareness among parents and caregivers (6).

Parental knowledge and attitudes play a crucial role in determining when and how children receive dental care. Unfortunately, many parents still perceive primary teeth as unimportant because they are temporary, leading to neglect in preventive care and late presentation to dental clinics—often after complications arise (7). This attitude is further reinforced by limited access to dental health education, low frequency of routine dental visits, and an overall focus on curative rather than preventive services in many healthcare systems (8).

The World Health Organization has emphasized the significance of early prevention and public education in reducing the burden of oral diseases globally (9). In Libya, and particularly in cities like Misurata, there is a growing concern about the increasing prevalence of early childhood caries and the associated consequences, including premature tooth loss. However, there is limited data available regarding the awareness levels of Libyan parents toward the importance and function of space maintainers.

Understanding the extent of parental awareness and identifying knowledge gaps is essential to developing targeted public health strategies and educational programs. By assessing how much parents in Misurata know about space maintainers,

this study aims to provide insights that could inform future interventions and improve pediatric oral health outcomes in the region.

Methods

This descriptive cross-sectional study was conducted to assess the awareness of parents in Misrata, Libya, regarding space maintainers. Data were collected between January and March 2026 from a number of public and private dental clinics across the city. The study targeted Libyan parents residing in Misrata who accompanied their children, aged 4 to 12 years, during routine dental visits. Participants were selected according to predefined eligibility criteria. Inclusion criteria involved parents of children within the specified age range who provided written informed consent. Parents working in the medical or dental field, as well as those whose children had congenital craniofacial anomalies or systemic conditions affecting tooth eruption, were excluded to minimize bias.

The sample size was calculated using the standard formula for cross-sectional studies (10): $n = Z^2 \times P \times (1-P) / d^2$. Assuming a 95% confidence level ($Z = 1.96$), an expected prevalence (P) of 0.35 based on preliminary data, and a margin of error (d) of 0.05, the estimated sample size was 350 participants.

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Dentistry, Misrata University. Participants were fully informed about the study objectives, and confidentiality was maintained. Participation was entirely voluntary.

Data were collected using a structured, self-administered questionnaire initially developed in English, then translated into Arabic and back-translated to English to ensure clarity and accuracy. A pilot study was conducted on 20 parents to test the reliability and clarity of the questions based on established survey design guidelines; their responses were excluded from the final analysis (11). The questionnaire included sections on demographic information, history of primary tooth loss in children, parental knowledge and awareness of space maintainers, and prior sources of information. Data were entered and analyzed using SPSS Statistics version 26.0 (12). Descriptive statistics (frequencies, means, and standard deviations) were used to summarize participant characteristics. The Chi-square test was used to evaluate associations between awareness levels and demographic variables. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 350 parents participated in the study. Of the respondents, 212 (60.6%) were mothers, and 138 (39.4%) were fathers. The mean age of participants was 37.8 ± 8.9 years. Most respondents (64.9%) had a university-level education or higher.

Table 1. Demographic Characteristics of Participants (n = 350)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	138	39.4%
	Female	212	60.6%
Age Group	20–29 years	58	16.6%
	30–39 years	154	44.0%
	40–49 years	102	29.1%
	50 years and above	36	10.3%
Education Level	Primary or below	40	11.4%
	Secondary school	83	23.7%
	University degree	157	44.9%
	Postgraduate	70	20.0%

Regarding previous knowledge of space maintainers, only 93 participants (26.6%) had ever heard of them. Among those, 45 (48.4%) stated that their source of information was a dentist, while 28 (30.1%) heard through social media or internet sources.

Table 2. Awareness and Knowledge of Space Maintainers

Statement	Yes (n, %)	No (n, %)	Not Sure (n, %)
Have you heard of space maintainers before?	93 (26.6%)	257 (73.4%)	---
Do you know their purpose (preserving space for permanent teeth)?	68 (19.4%)	205 (58.6%)	77 (22.0%)
Can space maintainers prevent future orthodontic problems?	52 (14.9%)	184 (52.6%)	114 (32.6%)
Do you know when they should be used (after early tooth loss)?	47 (13.4%)	203 (58.0%)	100 (28.6%)

A large portion of respondents (74.9%) reported never receiving any information from their child's dentist regarding the consequences of early tooth loss. Furthermore, only 41 participants (11.7%) reported that their child had ever used a space

maintainer. Chi-square analysis revealed a statistically significant association between higher educational level and awareness of space maintainers ($p < 0.01$). No significant associations were found between gender and awareness ($p > 0.05$).

Table 3. Experience and Sources of Information

Variable	Frequency (n)	Percentage (%)
Received information from dentist	88	25.1%
Child previously used a space maintainer	41	11.7%
Aware of eruption sequence of permanent teeth	79	22.6%
Familiar with treatment options for early loss	67	19.1%

Discussion

The results of this study provide significant insight into the level of awareness and knowledge regarding space maintainers among parents. The data revealed that only 26.6% of participants were familiar with space maintainers, which is consistent with previous research that highlights the limited public knowledge on this topic. Ali et al. () emphasized that there is still a significant gap in the general understanding of preventive dental treatments such as space maintainers. This gap is concerning, as a lack of awareness can significantly influence parents' decisions regarding dental care for their children, especially when preventive measures could help avoid more complex orthodontic problems later on.

In our study, it was found that the majority of participants who were familiar with space maintainers obtained their knowledge from their child's dentist (48.4%), followed by social media and online platforms (30.1%). This finding mirrors the trends observed by Bhatia & Shrestha (14), who noted that while dental professionals are the primary source of accurate information, online platforms have also become an increasingly common medium for parents to gather health-related information. However, the information found online can often vary in quality and accuracy, which raises concerns about the reliability of these sources. Given that most parents receive their knowledge about space maintainers from a dentist, it underscores the pivotal role healthcare providers play in educating patients and their families on the importance and benefits of such preventive treatments.

Despite the relatively small number of parents familiar with space maintainers, those who had heard of them exhibited a limited understanding of their purpose and benefits. Only 19.4% of participants recognized that space maintainers serve to preserve space for permanent teeth, and an even smaller proportion (14.9%) understood their potential to prevent future orthodontic issues. This aligns with the findings of Al Motawah et al(15), who found that the parents had only a superficial understanding of the role space maintainers play in ensuring optimal dental health. This lack of comprehension can contribute to a reluctance to use space maintainers when indicated, which may ultimately lead to long-term dental complications for children.

Moreover, 74.9% of the parents in this study reported not receiving any information from their child's dentist about the consequences of early tooth loss, which raises significant concerns. Han et al. (16) stressed the importance of integrating preventive education into routine dental visits, especially for issues such as early tooth loss and the subsequent need for space maintainers. The absence of such discussions suggests that there is an opportunity for dental professionals to improve their approach by providing more thorough and consistent information about preventive measures. When parents are not made aware of the potential risks of early tooth loss, they are less likely to seek out preventive solutions such as space maintainers.

One of the more striking findings in this study was that only 11.7% of children had used a space maintainer. This suggests that despite the availability and potential benefits of space maintainers, they are underutilized, likely due to the low levels of awareness and understanding identified in this study. Mahajan & Soni (17) reported similar findings, where despite the known advantages of space maintainers, their use remained minimal in populations with limited awareness. This points to the need for better communication between dental professionals and parents regarding the necessity and advantages of using space maintainers after early tooth loss.

Furthermore, the study found a significant correlation between higher educational levels and greater awareness of space maintainers, indicating that parents with higher education were more likely to understand the purpose and benefits of these devices. This finding aligns with the results of Naaman (6), who highlighted that individuals with higher levels of education are more likely to engage with health-related information and act upon it. The relationship between education and awareness emphasizes the need for targeted educational interventions, particularly for parents with lower educational levels, to ensure that all families, regardless of background, have access to essential information that can improve their children's oral health.

Interestingly, gender was not found to have a significant impact on awareness of space maintainers, which is consistent with the findings of Redwan et al. (18), who also found no gender-based differences in parents' knowledge about preventive dental treatments. This suggests that factors such as access to healthcare, socioeconomic status, and education play a more significant role in determining awareness than gender alone.

Conclusion

Our study revealed a significant lack of awareness among parents in Misrata, Libya, regarding the importance and function of space maintainers. Although these appliances play a critical role in preventing future orthodontic problems following the premature loss of primary teeth, only a small proportion of parents were familiar with them, and even fewer understood their purpose. Most participants reported receiving no information from dental professionals, pointing to a notable gap in preventive oral health communication. Awareness levels were significantly higher among parents with higher educational attainment, while no significant differences were observed between male and female respondents. To bridge this gap, dental professionals must integrate parental education into routine pediatric visits. Public health authorities should also launch targeted awareness campaigns aimed particularly at parents with lower education levels. Furthermore, providing accessible educational materials in clinics and encouraging early and regular dental checkups could substantially improve the adoption of preventive dental care practices for children.

Conflict of interest. Nil

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