

Assessment of Saudi parent's awareness towards space maintainers at Alkharj city: A cross-sectional study

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ABSTRACT

Background: Premature extraction or loss of a tooth due in primary dentition may lead to malocclusion in permanent dentition. Space maintainers are very important to children in mixed and primary dentition for preventing problems of malocclusion. The utilization of space maintainers depends on parental knowledge and awareness about space maintainers. **Aims and Objectives:** To assess the of Saudi parent's awareness toward space maintainers in Alkharj city. **Material and Methods:** A descriptive cross-sectional questionnaire-based study was planned among Saudi parents who visited the College of Dentistry, Prince Sattam Bin Abdulaziz University. Questions related to space maintainers awareness, use, source of information, and utilization of space maintainers were asked. **Results:** Around 312 (82.1%) parents were not aware of space maintainers and did not receive any information about the same. About 166 (43.7%) parents did not have any personal experience of a child's missing deciduous teeth. Only 115 (30.26%) respondents received some information about space maintainers. The majority of parents 298 (78.4%) were unaware whether space maintainers aid in the eruption of permanent teeth. Similarly, 73.7% did not know when to use space maintainers. **Conclusions:** Knowledge of space maintainers among Saudi parents is very less. Dental professionals hence need to create awareness of interceptive orthodontics rather than curative approaches, to achieve better oral health outcomes.

Keywords: Interceptive orthodontics, malocclusion, Saudi parents, space maintainers

Background

The primary dentition plays a very important role in the child's growth and development, not only in terms of speech, chewing, appearance, and the prevention of bad habits but also in the guidance and eruption of permanent teeth.^[1] Exfoliation of primary teeth and eruption of permanent teeth is a normal physiological process.^[2] Primary teeth serve as best space maintainers for permanent dentition. However, if premature extraction or loss of tooth is unavoidable due to extensive caries

or other reasons, it may lead to mesial migration of teeth resulting in loss of the arch length which may manifest as malocclusion in permanent dentition in the form of crowding, impaction of permanent teeth, supra eruption of opposing teeth, and so on.^[3]

The number of children affected by malocclusion due to premature loss of primary teeth has increased significantly and is considered one of the most common dental problems together with dental caries, gingival disease, and dental fluorosis.^[4,5]

Treatment of malocclusion comprises corrective as well as interceptive measures. Interceptive measures are done in the primary or early mixed dentition when the first signs of occlusal maldevelopment are recognized.^[6] A space maintainer is the most

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commonly used tools of interceptive measures. Space maintainers are very important to children in mixed and primary dentition for preventing problems of malocclusion.

Early detection and appropriate referral of cases requiring preventive and interceptive orthodontic treatments are necessary. It will eliminate or reduce the severity of a developing malocclusion, the complexity of treatment, and overall treatment time and cost. It will also improve the self-esteem of the subject and parental satisfaction.^[6,7] Among the preventive measures “space maintenance” using certain appliances called “space maintainers”, which are fixed or removable appliances are used to preserve arch length following the premature loss or elective extraction of the primary tooth.^[8] Space maintenance is a critical process in developing dentition. The loss of arch length may lead to multiple problems such as crowding, ectopic eruption, dental impaction, crossbite formation, and dental centerline discrepancies. Thus, the use of space maintainers often affects the future dental needs of a complex orthodontic treatment as it may potentially obviate the need for later extractions.^[7]

The utilization of interceptive orthodontics is dependent on the knowledge of parents about space maintainers. Parents are usually educated in a nursing home or hospital during their routine visit to the physician for their child’s checkup where they will get information about vaccination, diet and nutrition, and prevention of injuries and accidents, whereas in case of oral health the attitude is entirely different which make them visit the dentist at a later stage of caries progression or malocclusion, and so on.

Many a times, people responsible for the oral care of children feel or believe that since primary teeth will any way shed, it is not worth their while to spend time/money on providing good oral health to children. Even in developed nations, most parents still take their children to the dentist for curative and not for preventive treatments.

The American Academy of Pediatric Dentistry (AAPD) emphasizes the importance of prevention, diagnosis, and treatment necessary to restore and maintain the oral health of infants, children, and adolescents. Comprehensive healthcare cannot be achieved unless dental care is a strong priority in all health service programs.^[9]

With consideration to all the aspects, a study was designed to evaluate the level of awareness of Saudi parents toward space maintainers in Alkharj city.

Aim of the Study

To evaluate the level of Saudi parent’s awareness toward space maintainers in Alkharj city.

Objectives of the study

To evaluate the level of awareness of Saudi parents toward space maintainers in Alkharj city.

To enhance the awareness of using space maintainers for Saudi children in Alkharj city.

Question of the research

How is the level of awareness of Saudi parents towards space maintainers in Alkharj city?

Hypothesis

Research hypothesis

The level of awareness of Saudi parents towards space maintainers is low.

Null hypothesis

No difference in the level of awareness of Saudi parents towards space maintainers.

Material and Methods

Study design

Descriptive cross-sectional study.

Study population

Saudi parents who live in Alkharj city.

Ethical clearance

Ethical clearance was obtained by the institution review board.

A descriptive cross-sectional questionnaire-based study was planned among Saudi parents who visited the College of Dentistry, Prince Sattam Bin Abdulaziz University.

Sample size

The sample size was calculated by using the formula

$$n = \frac{Z^2PQ}{d^2}$$

Where, Z = Standard score corresponding to a given confidence level. Example, at 95% confidence level (CI) or 5% level of significance ($\alpha = 0.05$), Z = 1.96.

P = Prevalence of awareness about space maintainers among parents 40% = 0.40

$$q = (1 - p) 100 - 40 = 60\% = 0.6$$

d = Precision limit or proportion of sampling error which is usually a 5% confidence limit. = 0.05

After substituting the values required sample size was found to be 374.7 which was rounded to 380.

Study duration

A total of 380 parents (both gender) were randomly selected for the study during the period from June 2018 to December 2018.

Sampling technique

The sampling technique considered as systematic sampling technique with every 5th parent included for the study. Those parents who will give written consent were included and the parents not willing to participate were excluded from the study.

Questionnaire

Parents were requested to fill out an objective type of anonymous questionnaire without providing any oral health information. Questions related to personal information (age and educational status), previous loss of primary tooth and space maintainers, awareness toward the uses and maintenance of space maintainers, source of information and utilization of space maintainers were asked. Educational status was considered as up to secondary schooling, diploma graduate, degree graduate, and master's degree graduate.

Validation of a questionnaire

Initially, questions were prepared in the English language and then translated to the Arabic language again back-translated to English to validate the questionnaire.

Method

Parents were contacted in the available free time in the outpatient department and explained the nature and purpose of the study. The questionnaire was distributed without giving any information. Sufficient time was given to fill the questionnaire and a filled questionnaire was collected back on the same day.

Statistical analysis

Descriptive statistics were computed and data were statistically analyzed using the Chi-square test. All analyses were made with a 95% CI and a *P* value <0.05 considered as statistically significant.

Results

Table 1 shows mean age of study subjects according to gender there were 231 males with a mean age of 38.18 ± 10.02 and 149 females with a mean age of 38.76 ± 9.01 the mean age was statistically nonsignificant according to gender.

Table 2 shows the distribution of study subjects based on educational status. The majority of parents had a graduation level of education (32.7%); education according to gender was statistically nonsignificant.

Table 3 shows the distribution of study subjects based on working status. The majority of parents were working (60.0%); working status according to gender was statistically nonsignificant.

Table 4 shows the awareness of parents about space maintainers. Around 312 (82.1%) parents were not aware of space maintainers and did not receive any information about the same. About 166 (43.7%) parents did not have any personal experience of a child's missing deciduous teeth. Only 115 (30.26%) of

Table 1: Mean age of study subjects according to gender

Gender	Number	Mean age	Std. Deviation	<i>t</i>	<i>P</i> and significance
Males	231	38.18	10.02	0.576	0.565
Females	149	38.76	9.01		Nonsignificant

respondents have received some information about space maintainers. The majority of parents 298 (78.4%) did not know whether space maintainers aid in the eruption of permanent teeth. Similarly, 73.7% did not know when to use space maintainers.

Table 5 shows that only 26 (6.8%) parents correctly answered the question related to the type of space maintainers. Nearly 299 (78.7%) parents were not aware of the purpose of space maintainers. Moreover, 270 (71.1%) parents told they did not know what actions are to be taken in case space maintainers are broken.

Table 6 shows 360 (94.7%) parents never used any space maintainers. Around 349 (91.8%) respondents never interacted with medical or dental experts regarding deciduous tooth loss and space maintenance. About 330 (86.8%) parents were unaware of the eruption sequence of permanent teeth. About 303 (79.7%) parents did not know about treatment options available if deciduous teeth were lost. Again the responses were statistically nonsignificant according to gender with a *P* value >0.05.

Discussion

Parents have a unique position to address dental disease in children. The result of the present study suggests that more than 50% of the parents were having a personal experience of child's missing tooth. This study is first of its kind to assess parent's knowledge towards space maintainers. There is very limited literature assessing parents' awareness toward the management of early loss of primary teeth and the use of space maintainers. The present study suggests the overall awareness about space maintainers among parents is very low (17.9%) this is in accordance with the study by Amal I Linjawi *et al.*^[10] and Ahad Fahad Alshammari *et al.*^[11] wherein the authors have observed a very limited knowledge among parents of Saudi Arabia.

Borrie *et al.*^[12] in Scotland reported that the greatest obstacle in supplying interceptive orthodontic care was the specialists' absence of positive self-image in their selected treatment strategy.

The use and choice of preventive measures by dental practitioners can differ between countries and among individual dentists, with the ultimate common goal of improving oral health. The differences are perhaps, due to oral healthcare legislation, acceptance, and appreciation of preventive approaches by patients and by the dental community, availability of preventive agents, and workload of restorative care, as well as dentists' location of practice, years in practice, age, and income.^[13,14]

Table 2: Study population and educational status according to gender

	Gender		Total	Chi-square value	P and significance
	Males	Females			
Up to Secondary schooling	72 31.2%	47 31.5%	119 31.4%	1.609	0.657 Nonsignificant
Diploma Graduate	40 17.3%	27 18.1%	67 17.7%		
Degree Graduate	72 31.2%	52 34.9%	124 32.7%		
Master degree Graduate	47 20.3%	22 15.4%	69 18.2%		
Total	231 100.0%	149 100.0%	379 100.0%		

Table 3: Study population and working status according to gender

Working status	Gender		Total	Chi-square value	P and significance
	Males	Females			
Working	137 59.3%	91 61.1%	228 60.0%	0.749	0.407 Nonsignificant
Nonworking	94 40.7%	58 38.9%	152 40.0%		
Total	231 100.0%	149 100.0%	380 100.0%		

Table 4: Response of parents about space maintainer knowledge

		Gender		Total	Statistics
		Males	Females		
Personal experience of Childs missing deciduous teeth:	Yes	131 56.7%	83 55.7%	214 56.3%	$\chi^2=0.037, P=0.916,$ Nonsignificant
	No	100 43.3%	66 44.3%	166 43.7%	
Have you ever received any information regarding space maintainers	Yes	37 16.0%	31 20.8%	68 17.9%	$\chi^2=1.413, P=0.273,$ Nonsignificant
	No	194 84.0%	118 79.2%	312 82.1%	
From where you received information about space maintainers	Dentist	18 7.8%	15 10.1%	33 8.7%	$\chi^2=2.659, P=0.752,$ Nonsignificant
	physician	2 0.9%	2 1.3%	4 1.1%	
	Friend	6 2.6%	4 2.7%	10 2.6%	
	Internet	14 6.1%	12 8.1%	26 6.8%	
	Any other	23 10.0%	19 12.8%	42 11.1%	
Does space maintainers aid in eruption of permanent teeth	Yes	35 15.2%	21 14.1%	56 14.7%	$\chi^2=0.094, P=0.954,$ Nonsignificant
	No	16 6.9%	10 6.7%	26 6.8%	
	Do not know	180 77.9%	118 79.2%	298 78.4%	
Do you know when space maintainers are used?	Yes	29 12.6%	16 10.7%	45 11.8%	$\chi^2=0.714, P=0.700,$ Nonsignificant
	No	31 13.4%	24 16.1%	55 14.5%	
	Do not know	171 74.0%	109 73.2%	280 73.7%	

Table 5: Response of parents about space maintainer knowledge

???	???	Gender		Total	Statistics
		Males	Females		
Types of space maintainers	Removable	7 3.0%	4 2.7%	11 2.9%	$\chi^2=1.482,$ $P=0.686,$ Nonsignificant
	Fixed	14 6.1%	5 3.4%	19 5.0%	
	Both	16 6.9%	10 6.7%	26 6.8%	
	Do not know	194 84.0%	130 87.2%	324 85.3%	
What are the types of food that should be avoided when having space maintainers	Gum	19 8.2%	11 7.4%	30 7.9%	$\chi^2=5.006,$ $P=0.287,$ Nonsignificant
	Popcorn	13 5.6%	16 10.7%	29 7.6%	
	Candies	31 13.4%	13 8.7%	44 11.6%	
	All	150 64.9%	96 64.4%	246 64.7%	
Parent's awareness toward actions taken in case space maintainers get broken	Yes	13 5.6%	9 6.0%	22 5.8%	$\chi^2=0.155,$ $P=0.926,$ Nonsignificant
	No	55 23.8%	33 22.1%	88 23.2%	
	Do not know	163 70.6%	107 71.8%	270 71.1%	
Purpose of space maintainers is to prevent	Caries	6 2.6%	0 0%	6 1.6%	$\chi^2=5.692,$ $P=0.223,$ Nonsignificant
	Gum Disease	5 2.2%	2 1.3%	7 1.8%	
	Malocclusion	40 17.3%	26 17.4%	66 17.4%	
	Do not know	178 77.1%	121 81.2%	299 78.7%	

Table 6: Response of parents about space maintainer knowledge

		Gender		Total	Statistics
		Males	Females		
Have you ever received space maintainer treatment for your child	Yes	10 4.3%	10 6.7%	20 5.3%	$\chi^2=1.031, P=0.350$, Nonsignificant
	No	221 95.7%	139 93.3%	360 94.7%	
Have you ever interacted with medical or dental experts regarding deciduous tooth loss and space maintenance	Yes	16 6.9%	15 10.1%	31 8.2%	$\chi^2=1.192, P=0.337$, Nonsignificant
	No	215 93.1%	134 89.9%	349 91.8%	
If yes, where did this interaction occur	Casually	2 0.9%	1 0.7%	3 0.8%	$\chi^2=4.042, P=0.400$, Nonsignificant
	At seminars	3 1.3%	0 0.0%	3 0.8%	
	During consultation	14 6.1%	13 8.7%	27 7.1%	
	Any other	43 18.6%	34 22.8%	77 20.3%	
Are you aware of eruption sequence of Permanent tooth	Yes	33 14.3%	17 11.4%	50 13.2%	$\chi^2=0.656, P=0.442$, Nonsignificant
	No	198 85.7%	132 88.6%	330 86.8%	
Deciduous teeth if lost how can it be treated?	Crown	1 0.4%	0 0.0%	1 0.3%	$\chi^2=0.895, P=0.827$, Nonsignificant
	Can leave like that	14 6.1%	11 7.4%	25 6.6%	
	Space maintainer	31 13.4%	20 13.4%	51 13.4%	
	Do not know	185 80.1%	118 79.2%	303 79.7%	

A gap seems, however, to exist between what is known about preventing oral diseases and what is provided in private practice, public clinics, dental schools, and community-based programs in many countries.^[15]

Public knowledge of oral diseases and their prevention is assessed in several studies, with a gap between the general public and current scientific knowledge of the prevention of dental diseases.^[15,16] In general, people are aware of the importance of oral hygiene for the prevention of oral diseases. The results are similar in our study.

A lower educational level is consistently associated with a low level of knowledge.^[17] This is also reflected in the present study.

In a study conducted to know the caries-preventive knowledge and reported behavior among Japanese parents resident in London showed their knowledge and behavior to be generally lower than those reported by English parents. This difference was also seen among British expatriates in Tokyo compared to the Japanese, the former knowing more about dental caries.^[18] The result in the present study also reflects in the same way wherein less than 20% of parents were aware about space maintainers.

This manuscript is of importance to primary care physicians because they are the first healthcare providers for young children. In general, physicians with adequate knowledge about early loss of deciduous teeth and their consequences can guide parents about space maintainers.

Conclusions

Knowledge of space maintainers among Saudi parents who live in Alkhraj city is very less. Moreover, less than 20% of parents know about space maintainers. Hence, dental professionals need to create awareness of interceptive orthodontics rather than curative approaches, to achieve better oral health outcomes. Furthermore, this would potentially be reflected as an improvement in the oral

health of the general public especially concerning the prevention of malocclusion.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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