Original Article

CONSCIOUSNESS OF SAUDI'S DENTIST TOWARD MANAGEMENT OF MISSING ANTERIOR TEETH IN GROWING PATIENTS

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ABSTRACT

Adolescents and children frequently have missing front teeth. Both function and aesthetics will be affected. There are many options for replacement, ranging from fixed to detachable prostheses but fixed partial dentures (FPD) continue to be the most reliable alternative after dental implants. Therefore, the purpose of this study was to evaluate dental students' and practitioners' understanding of and use of fixed prosthodontics. Our study aimed to assess knowledge, attitude and practice about missing anterior tooth management in growing patients among dental student, interns and dentists in Saudi Arabia This cross-sectional study was conducted in Saudi Arabia between 2022 - 2023. An online survey was distributed among dental students, interns and dentists in Saudi Arabia. The questionnaire section's design followed the (KAP) to assess and measure the population's knowledge, attitude, and practice. In this cross-sectional survey, A sample size calculation was done by (the Raosoft sample size calculator program with a minimum of 377 population size to be expected to participate. we have found that more than half of them (58%) were "strongly agreed" that early treatment for young patient has better prognosis which is consistent with literature. Regarding implantation therapy, (84%) of our studied participants stated that implant is the great way to replace a single missing tooth which is inconsistent with the American Academy of Pediatric Dentistry (AAPD). Loss of anterior teeth accompanied by congenitally missing anterior teeth presents a challenging conquest in terms of prosthodontic rehabilitation. The current results demonstrated adequate and inadequate KAP.

Key words: Missing teeth, Management of anterior tooth, Fixed partial dentures, Replacement, Aesthetics.

Introduction

Children and teenagers frequently lack permanent teeth due to dental trauma or congenital aplasia [1]. Treatment alternatives include implant- supported restorations, conventional fixed bridges, acid- etched bridges, orthodontic space closure or auto-transplantation [2].

Auto transplantation is one of the treatment options for patients whose bones are still developing and who have missing anterior teeth. In 1772, John Hunter performed person to another person transplantation; the technique was successful. Implants are not recommended for patients whose bones are still growing. When teeth are missing, the alveolar ridge is affected, thus implants are utilized to keep the alveolar bone health and minimize the problem [3].

Also one of the most prevalent congenital causes of missing anterior teeth, such as oligodontia and hypodontia. Furthermore, children and teenagers are more prone to traumatize anterior teeth, such as luxation and avulsion, which can result in lost teeth. They account for more than 16% of all traumatic injuries in permanent dentition and 7.2% of injuries in the primary dentition [4].

It has been shown that patients who lose one or more teeth may experience real and perceived adverse effects, which significantly reduce their quality of life, as well as their emotional, social, physical, and psychological well-being. An implant-supported crown, fiber-reinforced composite, modified Nance palatal arch and conventional partial denture can be used to replace a missing maxillary central incisor [5, 6].

Implant is regarded as a high-quality commodity in dentistry since implants are as close to natural teeth as possible in terms of quality. As a result of traumatic injuries or congenital loss of teeth, or developmental anomalies, it is primarily used [7]. Fiber reinforced composites are a long-term and economical treatment without damaging existing tooth structure due to the minimally invasive approach that has demonstrated satisfactory results esthetically [8, 9]. To restore all their functions, these teeth must be replaced [10]. The Groper appliance is ideal for replacing anterior teeth. As a space maintenance, esthetics, and speech- improving appliance, Groper's appliance served three main purposes

[11].

Literature review
In study 2022, this case report describes aesthetic and functional outcomes obtained by the multidisciplinary approach for the restoration of congenitally missing maxillary left and right lateral incisor areas and fabrication of two single crowns. In congenitally missing situations, in absence of any pathologic symptoms or negative radiologic findings, such a kind of treatment suggest a successful and a satisfactory result in short-term evaluation [4]. In addition, in the case reported in 2019 patient was a 5-year-old Middle Eastern boy with oligodontia. Early treatment of missing teeth has more benefits in restoring functions such as masticatory, esthetic, and speech [12].

Most extant research focuses on causes and treatment possibilities.

This study's performance was due to the insufficient number of studies related to our topic, especially in Saudi Arabia. Moreover, dental students need to know the correct diagnosis and management of missing anterior teeth in growing patient to avoid treatment failure and complications.

This study aims to assess the knowledge, attitude, and practice of dental students, interns and dentists in Saudi Arabia regarding missing anterior teeth.

Materials and Methods

Study design
This cross-sectional study was conducted in Saudi Arabia for six months between 2022 – 2023. An online survey was distributed dental practitioner, internships, and undergraduate students.

Inclusion and exclusion criteria
The inclusion criteria of the participants, male and female, dental students and interns, and who dentists agreed to participate in the questionary. The exclusion criteria include missing posterior teeth, adolescent,non-Saudi dental school students.

Sample size
In this cross-sectional survey, A sample size calculation was done by (the Raosoft sample size calculator program)—the marginal error setting at the most common value of 5%. The selection of response distribution of the population at the calculating formula was selected to be 50%. The confidence level settings were chosen to be at 95%—the result of the calculation with a minimum of 377 population size.

Method for data collection and instrument (Data collection Technique and tools)
The questionnaire section's design followed the (KAP) to assess and measure the population's knowledge, attitude, and practice. Therefore, section (I) collect the participant's demographic data after agreeing to participate. Section (II); assess the target population's knowledge about post-space perforation and its prevalence and occurrence. These questions have a Scoring system were, (I don't know) has 0-point.

Section (III); the scoring system was between 1-4 points to assess the awareness level. For that, the points distribution on each answer will be: "Strongly Disagree" have 0-point, "Disagree" have 1-point, "Not Sure" have 2-point, "Agree" have 3-point, and "Strongly Agree" have 4 points.Section (IV); to assess the practice level, the points distribution (5-4-3-2-1-0) will apply to the answer "always," "mostly," "sometimes," "rarely," and "never," respectively.

All the applied questions will enter through a google form link and distributed online through email and social media.

Analyses and entry method
We are exporting the collected data from the google form/survey to the "Microsoft Office Excel Software" program (2016) for windows. The statistical analysis will be through the (SPSS) program-Statistical Package of Social Science Software, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.).

Results and Discussion

Table 1 shows socio-demographic characteristics of the Participants. About 500 individuals participated in this study. More than half of them (66.8%) were males. About (35.6%) of them reported living in western region of Saudi Arabia. As regard Current professional status (34.4%) of them were general dentists. Majority of them (70%) Study dentistry in government school .

Table 1. Socio-demographic characteristics of the Participants (No=500)

Variables		Frequency (No)	Percentage (%)
Gender	Male	334	66.8
	Female	166	33.2
Residence region	Eastern region	109	21.8
	Northern region	71	14.2
	Southern region	142	28.4
	Western region	178	35.6
School affiliation	Government	350	70
	Private	150	30
Current year (professional qualification)	Dental student (last year)	151	30.2
	Intern	113	22.6

	General dentists	172	34.4
	Specialist	64	12.8

The Distribution of Participants according to their experience regarding restoring anterior tooth for growing patient was the majority of studied participants (76.8%) have prior training experience of restoring anterior tooth for growing patient. Nearly (39.2%) and (32.2%) told that they manage (1 or less), (2-3) cases daily respectively and (28.6) more than 3.

As illustrated in **Table 2**, Majority of the studied participants (81.2%) told that the most teeth got lost due to trauma is maxillary central incisor. Also (85.6%) reported that trauma is the common cause that cause anterior tooth lost. About half of them (50.4%) agreed that Patient oral hygiene is the factor that would affect treatment choice. Additionally (84%) stated that implant is the great way to replace a single missing tooth. When asking about chronic diseases, majority of them (86.4%) agreed that chronic disease has an effect on treatment.

Table 2. Knowledge of Participants about post-space perforation and its prevalence and occurrence

Variables	Answer	No (%) (No=500)(100%)
The most teeth got lost due to trauma	Mandibular central incisor	44 (8.8)
	Mandibular lateral incisor	8 (1.6)
	Maxillary central incisor	406 (81.2)
	Maxillary lateral incisor	42 (8.4)
The common cause that cause anterior tooth lost	Genetic	46 (9.2)
	Idiopathic	26 (5.2)
	Trauma	428 (85.6)
The factor that would affect your treatment choice	Age	150 (30)
	Gender	18 (3.6)
	Patient oral hygiene	252 (50.4)
	socioeconomic	80 (16)
The great way to replace a single missing tooth	Esthetic	28 (5.6)
	FPD	10 (2)
	Implant	420 (84)
	RPD	42 (8.4)
Do chronic disease has an effect on treatment	Yes	432 (86.4)
	No	68 (13.6)

As shown in **Figure 1**, Shows the awareness level of Participants about management of missing anterior tooth (post-space perforation). More than half of them (58%) were "strongly agreed" that early treatment for young patient has better prognosis.

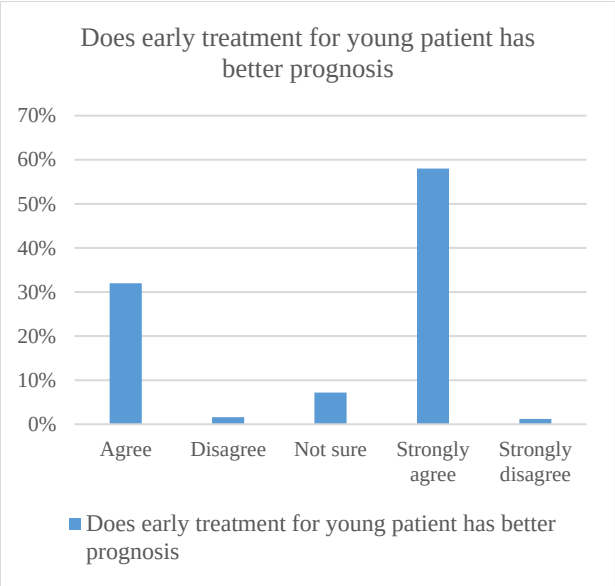

Figure 1. The awareness level of Participants about management of missing anterior tooth (post-space perforation)

Table 3 shows that (24.4%) stated that provisional restoration "Mostly" play an important role to evaluate only aesthetic not phonetics. (43.6%) reported that partial denture is the ideal choice for old Poor patient with long lip want to restore anterior teeth also (31.4%) it is the ideal choice for old Poor patient with short lip Want to restore anterior teeth. (70.8%) reported that implant is the ideal choice for old rich patient with long lip and with short lip want to restore anterior teeth . About (54%) choose Implant as the ideal choice for young patient want to restore anterior teeth

Table 3. Practice regarding management of missing anterior tooth (post-space perforation)

Variables	Answer	No (%) (No=500)(100%)
Provisional restoration play an important role to evaluate only aesthetic not phonetics	Always	102 (20.4)
	Mostly	122 (24.4)
	Never	83 (16.6)
	Rarely	53 (10.6)
	Sometimes	140 (28)
What is the ideal choice for old Poor patient with long lip Want to restore anterior teeth	FPD PFM	112 (22.4)
	FPD Zirconia	78 (15.6)
	Implant	92 (18.4)
	Partial denture	218 (43.6)

What is the ideal choice for old Poor patient with short lip Want to restore anterior teeth	FPD PFM	96 (19.2)
	FPD Zirconia	144 (28.8)
	Implant	103 (20.6)
	Partial denture	157 (31.4)
What is the ideal choice for old rich patient with long lip Want to restore anterior teeth	FPD PFM	40 (8)
	FPD Zirconia	80 (16)
	Implant	354 (70.8)
	Partial denture	26 (5.2)
What is the ideal choice for old rich patient with short lip Want to restore anterior teeth	FPD PFM	34 (6.8)
	FPD Zirconia	82 (16.4)
	Implant	354 (70.8)
	Partial denture	30 (6)
What is the ideal choice for young patient Want to restore anterior teeth	FPD PFM	34 (6.8)
	FPD Zirconia	96 (19.2)
	Implant	270 (54)
	Partial denture	100 (20)

Table 4 Among male participants (37.2%) were strongly agree that early treatment for young patient has better prognosis versus (20.8%) among female participants. (17.6%) of male participants stated that Provisional restoration "Mostly" play an important role to evaluate only aesthetic not phonetics versus (6.8%) among female participants. There is statistically significant association between practice level and gender

Table 4. Relation between awareness level , practice level and gender about restoring anterior tooth for growing patient

Variable	**Female**	**Male**	**P – value***
	(No= 166) (33.2 %)	**(No= 334)(66.8 %)**	
	(NO.) (%)	**(NO.) (%)**	
Does early treatment for young patient has better prognosis			
Agree	42 (8.4)	118 (23.6)	.084
Disagree	2 (0.4)	6 (1.2)	
Not sure	14 (2.8)	22 (4.4)	
Strongly agree	104 (20.8)	186 (37.2)	
Strongly disagree	4 (0.8)	2 (0.4)	
Provisional restoration play an important role to evaluate only			
Always	30 (6)	72 (14.4)	.011
Mostly	34 (6.8)	88 (17.6)	
Never	37 (7.4)	46 (9.2)	
Rarely	25 (5)	28 (5.6)	
Sometimes	40 (8)	100 (20)	

*Chi-square test

As shows in **Table 5** Among participants who had any prior training experience of restoring anterior tooth for growing patient (46.8%) were "strongly agree" that early treatment for young patient has better prognosis versus (11.2%) among participants with no prior training experience. (18.8%) of participants who had any prior training experience of restoring anterior tooth for growing patient stated that Provisional restoration "Mostly" play an important role to evaluate only aesthetic not phonetics versus (5.6%) among participants with no prior training experience. There is statistically significant association between awareness level and experience about restoring anterior tooth for growing patient

Table 5. Relation between awareness level, practice level and experience about restoring anterior tooth for growing patient

Variable	**Having any prior training experience of restoring anterior tooth for growing patient**		**P –value***
	Yes	**No**	
	(No=384) (76.8%)	**(No=116) (23.2%)**	
	(NO.) (%)	**(NO.) (%)**	
Does early treatment for young patient has better prognosis			
Agree	118 (23.6)	42 (8.4)	.003
Disagree	2 (0.4)	6 (1.2)	
Not sure	26 (5.2)	10 (2)	
Strongly agree	234 (46.8)	56 (11.2)	
Strongly disagree	4 (0.8)	2 (0.4)	
Provisional restoration play an important role to evaluate only aesthetic not phonetics			
Always	82 (16.4)	20 (4)	.366
Mostly	94 (18.8)	28 (5.6)	
Never	65 (13)	18 (3.6)	
Rarely	35 (7)	18 (3.6)	
Sometimes	108 (21.6)	32 (6.4)	

*Chi-square test

Table 6 shows that (20%) among general dentists, (16%) among dental student , (13.2%) among intern , (8.8%) among specialist were "strongly agree" that early treatment for young patient has better prognosis. (12.8%) among general dentists, (7.6%) among dental student , (3.2%) among intern, (0.8%) among specialist stated that Provisional restoration "Mostly" play an important role to evaluate only aesthetic not phonetics. There is statistically significant association between awareness level, practice level and professional qualification) about restoring anterior tooth for growing patient.

Table 6. Relation between awareness level , practice level and (professional qualification) about restoring anterior tooth for growing patient

Variable	Professional qualification				P –value*
	Dental student (last year)	Intern	General dentists	Specialist	
	(No=151) (30.2%)	(No=113) (22.6%)	(No=172) (34.4%)	(No=64) (12.8%)	
	(NO.)(%)	(NO.)(%)	(NO.)(%)	(NO.)(%)	
Does early treatment for young patient has better prognosis					
Agree	50 (10)	36 (7.2)	60 (12)	14 (2.8)	.008
Disagree	0	2 (0.4)	6 (1.2)	0	
Not sure	17 (3.4)	9 (1.8)	6 (1.2)	4 (0.8)	
Strongly agree	80 (16)	66 (13.2)	100 (20)	44 (8.8)	
Strongly disagree	4 (0.8)	0	0	2 (0.4)	
Provisional restoration play an important role to evaluate only aesthetic not phonetics					
Always	24 (4.8)	26 (5.2)	34 (6.8)	18 (3.6)	<.001
Mostly	38 (7.6)	16 (3.2)	64 (12.8)	4 (0.8)	
Never	25 (5)	26 (5.2)	16 (3.2)	16 (3.2)	
Rarely	22 (4.4)	9 (1.8)	12 (2.4)	10 (2)	
Sometimes	42 (8.4)	36 (7.2)	46 (9.2)	16 (3.2)	

In addition to their functional value, teeth play a significant role in a person's psychological well-being; in young adults, losing teeth can have a negative effect on social integration and self-concept; in younger patients, tooth loss is primarily caused by trauma, caries, and genetics [13]. Chronic mouth breathing brought on by nasal adenoids has been shown to exacerbate periodontal and gingival disorders. The relationship between tongue pushing, anterior open bite, and nasal breathing is demonstrated by dental literature. The balance of forces from the tongue and perioral musculature determines the form of the arch and the position of the teeth. When a patient thrusts their tongue, their tongue muscles contract more forcefully, causing their anterior teeth to flare and become more vulnerable to trauma and periodontal disease [14].

Patients' anterior guidance will be impacted by the absence of anterior teeth in addition to their aesthetic and phonetic impairments. Before beginning the process of replacing the maxillary anterior teeth, the clinician must comprehend the impact of the teeth's palatal surface on mandibular movement [15].

Damage to the posterior teeth, reduced aesthetics, and mechanical failures of the prosthesis result from improper repair or replacement of the front teeth. The supporting tissues of the abutment teeth are more vulnerable to harm when a prosthesis is poorly designed. The disocclusion of posterior teeth in protrusive and lateral mandibular excursive movements will also benefit from optimal anterior guiding [16]. Longer disclusion times caused by anterior tooth loss can result in temporomandibular problems. For effective treatment, a patient with anterior tooth loss and pre-existing TMD needs to have a number of restorative concepts carefully integrated [17]. For a TMD patient to fully recover, anterior guidance that provides appropriate phonetics, comfort, and aesthetics as well as the ideal disocclusion period is essential [18]. our study aimed to assess knowledge, attitude and practice about missing anterior tooth management in growing patients among dental student, interns and dentists in Saudi Arabia.

Regarding the awareness level of our participants about management of missing anterior tooth (post-space perforation), we have found that more than half of them (58%) were "strongly agreed" that early treatment for young patient has better prognosis which is consistent with literature [19]. On the other hand, In previous studies done by Al-Johany *et al*. [20] and Al-Rafee *et al*. [21], which were done in Riyadh, Saudi Arabia, they found a higher level of awareness among participants (56% and 66%, respectively), which is consistent with our results.

Regarding implantation therapy, (84%) of our studied participants stated that implant is the great way to replace a single missing tooth which is inconsistent with the American Academy of Pediatric Dentistry (AAPD), which said that because there could be negative effects on the permanent tooth's development, it is not advisable to replant avulsed primary teeth. This finding is consistent with a systematic review by Gurunathan *et al*. that found that watchful waiting therapy was the most commonly used therapeutic strategy in all of the included studies. Among the intruded primary anterior teeth, 42.5 to 92.86% fully reerupted within 1 to 6 months without any pathological consequences. The primary tooth may also develop a dental abscess or experience ankyloses [22].

Regarding the knowledge of participants about post-space perforation and its prevalence and occurrence, we have found that the majority of the studied participants had knowledge about common causes of missing anterior teeth, factors affecting treatment choice, and the role of chronic diseases on treatment plan (81.2%, 50.4%, 86.4% respectively) which is consistent with literature [23, 24]. On the other hand, A KAP survey was conducted on undergraduate dental students at Prince Sattam bin Abdul-Aziz University Dentistry College [25], revealed that the undergraduate dental students had insufficient information regarding the management of traumatic dental injuries including missing anterior teeth, which is inconsistent with our results. Although when interns were compared to fourth-

and fifth-year students, they were having slightly more knowledge. Similar results were obtained by a few other authors [26, 27].

Regarding prior training experience of restoring anterior tooth for growing patient, we have found the majority of studied participants (76.8%) have prior training experience of restoring anterior tooth for growing patient in term of cutting time for re-implantation of an avulsed tooth and the best transportation media for avulsed teeth, which is consistent with literature. On the other hand, another study conducted in Saudi Arabia [28], revealed that 69.7% of fifth-year students and 66.7% of interns selected the Hanks-balanced solution as the best media for storage, whereas 57.1% of fourth-year dental students selected milk as the best media for transportation. In contrast, a recent study revealed that long shelf-life ultra-high temperature skim cow milk is not effective in preserving fibroblast viability in vitro [29]. In the same study, 4.8% of students correctly answered that the cutoff time for re-implantation of an avulsed tooth is within 30 minutes of trauma, indicating that more than 65% of students were unaware of this information. This indicates that 57.1% of students are not aware of updates. Earlier research had revealed comparable results, but with different experts [24, 30].

Conclusion

When anterior teeth are lost along with congenitally missing anterior teeth, prosthodontic rehabilitation is faced with a difficult challenge. The current results demonstrated adequate and inadequate KAP accordingly; Regarding the awareness level of our participants about management of missing anterior tooth, more than half of them (58%) were "strongly agreed" that early treatment for young patient has better prognosis. Regarding implantation therapy, (84%) of our studied participants stated that implant is the great way to replace a single missing tooth which is inconsistent with the American Academy of Pediatric Dentistry (AAPD). Regarding the knowledge of participants about post-space perforation and its prevalence and occurrence, the majority had knowledge about common causes of missing anterior teeth, factors affecting treatment choice, and the role of chronic diseases on treatment plan (81.2%, 50.4%, 86.4% respectively). Regarding prior training experience of restoring anterior tooth for growing patient, the majority of studied participants (76.8%) have prior training experience of restoring anterior tooth for growing patient.

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Ethics statement: Ethical approval was obtained from the research ethics committee of Dentistry at King Abdulaziz University, Jeddah. Application number: (127-10-22). An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for the research purposes only.
Written informed consent was obtained from all individual participants included in the study.

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