ORIGINAL ARTICLE

Knowledge and attitudes of dentists toward shortened dental arch therapy in Saudi Arabia

F Vohra, M Al-Qahtani, N Momenah[1], AA Al-Kheraif[2], SM Ab-Ghani[3]

Department of Prosthetic Dental Science and [1]Intern, College of Dentistry, King Saud University, [2]Dental Biomaterials Research Chair, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia, [3]Department of Restorative Dentistry, Faculty of Dentistry, University Technology MARA, Shah Alam, Malaysia

Abstract

Objective: The aim of this study was to assess and compare the knowledge and attitudes of dentists toward shortened dental arch (SDA) therapy in Saudi Arabia.

Materials and Methods: In this cross-sectional study, self-designed-structured questionnaires were distributed among specialists (SP), residents (RES), and general dental practitioners (GDP) in Saudi Arabia. The questionnaire enquired about dentists' opinion regarding function, esthetic, and comfort in patients with SDA. It also enquired about the risks associated with SDA treatment (tooth wear, temporomandibular dysfunction (TMD), and tooth migration). Participants also graded SDA decision-making factors for their significance. Frequency distribution and Chi-square test were performed to compare the responses.

Results: A total of 300 questionnaires were completed. 53.9% of SP applied SDA therapy in <10% of patients. However, 54.8% of RES and 46.6% of GDP never used SDA therapy. SDA was considered by dentists to provide a satisfactory or acceptable function (76.4%), esthetics (76.1%), and comfort (76.8%). There was a significant difference in opinions of SP, GDP, and RES, in relation to the effect of SDA on esthetics ($P = 0.039$), tooth-wear ($P < 0.001$), TMD ($P < 0.001$), and tooth migration ($P = 0.002$).

Conclusion: The knowledge of SP and GDP with regards to SDA therapy was broadly in line with current standards. Less than 10% of patients had objections towards SDA therapy. SDA therapy was clinically applied in fewer than 10% of cases.

Key words: Attitude, dentist, knowledge, shortened dental arch

Date of Acceptance: 03-Aug-2015

Introduction

Treatment planning for tooth replacement is common in dental practice; removable and fixed prosthesis are usually employed for their replacement.[1,2] For a long-time, replacing all missing teeth was considered as an optimum treatment for adequate oral function and health.[3] However, this strategy has been questioned, as planning for treatment options are influenced by multiple factors, including patient's demands and expectations, the cost of treatment and age.[4-7] Subjective patient needs can vary from professionally assessed goals for treatment, therefore,

Address for correspondence:
Dr. F Vohra,
Department of Prosthetic Dental Science, College of Dentistry,
King Saud University, P.O. Box 60169, Riyadh 11545,
Kingdom of Saudi Arabia.
E-mail: fahimvohra@yahoo.com

Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/1119-3077.179288

How to cite this article: Vohra F, Al-Qahtani M, Momenah N, Al-Kheraif AA, Ab-Ghani SM. Knowledge and attitudes of dentists toward shortened dental arch therapy in Saudi Arabia. Niger J Clin Pract 2016;19:380-5.

treatment plan should be devised to address individual patient requirements. Shortened dental arch (SDA) therapy is a similar approach, aimed at preserving the anterior and premolar teeth for individuals at risk of developing dental caries and periodontal disease.[2,8]

World Health Organization within its goals for oral health for the year 2020, defines the functional dentition as a minimum of 21 healthy and functioning teeth.[9] It has been shown that the oral function is not adversely affected in dental arches where atleast four occluding units in symmetrical position are present, depending on the age of the patient.[8] Käyser[8] defined SDA as the functional, aesthetic, and natural dentition of no more than 20 teeth with an intact anterior region but a reduced number of occluding pairs of posterior teeth. Reported benefits of SDA includes simplification of oral hygiene (OH) maintenance, better prognosis of the remaining teeth, reduction in treatment cost, and preservation of oral tissues.[10,11] However, risks are also associated with the lack of posterior occluding pairs which includes temporomandibular dysfunction (TMD), tooth migration, periodontitis, and tooth wear.[12]

It has been proposed, that there are no true objective or subjective patient treatment needs, and demand for care is established only through the discussion between dentist and patient.[13] In addition to that, the knowledge and understanding of a treatment modality effect, the attitude of the clinician, which in turn could influence their clinical behavior.[14] Therefore, the knowledge and attitude of a dental health care provider toward a treatment option will play a vital role in the provision of dental care for the community. With regards to the understanding and practice of SDA therapy among dentists in Saudi Arabia, no studies are available in published literature. In general, prosthodontists are considered to have a positive attitude toward SDA treatment, but it has been suggested that this therapy is not widely practiced.[10,15-17] Therefore, the aim of this study was to ascertain the knowledge and attitudes of dentists in Saudi Arabia toward SDA therapy.

Materials and Methods

The study population in this cross-sectional study was a sample of dentists in Saudi Arabia divided into three distinct strata (specialists [SP], residents [RES] and general dental practitioners (GDPs). GDP included in the study were the ones who graduated as a dentist and had completed a minimum 1-year internship, and for SP, those who had completed a postgraduate SP program in dental prosthetics and/or restorative dentistry. RES were training in an SP program (Masters or Saudi SP Certification) in prosthetic and restorative dentistry for a minimum of 3 years. Participants also had to be currently engaged in dental practice, teaching, or both. The contact details of the clinicians were obtained from the office of Saudi Dental Society (SDS). The Ethical Committee of College of Dentistry Research Center, King Saud University approved study protocol (Reference No. 0066).

A self-designed-structured questionnaire in the English language was used as an instrument for data collection. The questions included in the survey form were finalized after a pilot distribution of thirty primary questionnaires within the College of Dentistry, King Saud University. In the study questionnaire, SDA was defined as the presence of healthy and functional anterior teeth, extending till second premolars with a minimum of four symmetrically located occluding units. The first part of the questionnaire enquired about the respondent's category of practice, specialty, years of experience and frequency of use of SDA therapy. The second section involved nine questions related to the dentists' opinion regarding specific factors influencing decision making for SDA patients. These factors included patient's reaction to the proposal of SDA, dentist's opinion regarding function, esthetic, and comfort in SDA. Moreover, participants opinion with regards to the association of SDA with possible disadvantages such as tooth wear, TMD, tooth migration, prognosis of dentition, and ease of OH maintenance was assessed. In the last part of the questionnaire, participants were asked to grade factors are considered as important in decision making for SDA therapy, according to their clinical significance. These factors included OH, chewing ability, esthetics, treatment cost, prognosis of dentition, tooth wear, difficulty of treatment, TMD, loss of vertical dimension of occlusion (VDO), and tooth migration. The significance level scores ranged from one to five, one being very insignificant and five being very significant (0–1: Very insignificant, 1–2: Insignificant, 2–3: Neutral, 3–4: Significant, 4–5: Very significant).

Three hundred and fifty questionnaires were randomly distributed among GDP, SP, and RES in the major cities of Saudi Arabia. With the foresight of non-responding participants, 1000 questionnaires were E-mailed on addresses obtained from the SDS. Data entry and statistical analysis were performed using Statistical Package for Social Sciences (SPSS) version 16 (SPSS Inc., Chicago, IL, USA). The assessment of statistical significance between GDP, SP, and RES, for each question was performed using Chi-square test, considering $P = 0.05$ to be statistically significant. Frequency distribution and significance comparison among GDP, SP, and RES was also computed.

Results

One hundred and sixty-six questionnaires were completed out of the 350 hand distributed questionnaires (response rate 47.42%). However, only 134 online

questionnaires were completed by GDP, SP, and RES (response rate 13.4%). A total of 300 complete responses were received, which were assessed and compared among three groups (SP, RES, and GDP). The individual response rates for SP, GDP, and RES, were 47%, 39%, and 14% respectively. Among the total respondents, 42% had <5 years clinical experience, 32.7% had 5–10 years and 25.3% had more than 10 years [Table 1]. Almost 50% of responding dentists were working in government hospital practice, 40.7% belonged to teaching hospitals and <10% were in private practices. 73.8% of SP either never applied SDA therapy or applied only in <10% of their cases. However, 54.8% of RES and 46.6% of GDP had never used SDA therapy in their clinical practice. For all three groups (SP, RES, and GDP), <10% of patients had objections to SDA therapy. However, 47.5%, 38%, and 40.5% of SP, RES, and GDP respectively, expressed that patients agreed to SDA therapy after an explanation.

Out of eight questions related to factors influencing decision making for SDA treatment, responses to four questions (50%) were found to have statistical significant difference ($P < 0.05$) between SP, RES, and GDP [Table 2]. Among all respondents, SDA therapy was considered to provide satisfactory or acceptable chewing function (76.4%), dental appearance (76.1%) and oral comfort (76.8%). 35.7% of RES considered esthetics to be unsatisfactory in SDA patients resulting in a statistically significant difference ($P = 0.039$) in comparison to SP and GDP.

Table 1: Category and experience of participating dentists

Years of experience	<5 years		5-10 years		>10 years		Total		*P*	χ^2
	n	%	*n*	%	*n*	%	*n*	%		
Specialists	25	8.3	56	18.7	60	20	141	47	<0.001	24.396
Residents	27	9	12	4	3	1	42	14		
GDP	74	24.7	30	10	13	4.3	117	39		
Total	126	42	98	32.7	76	25.3	300	100		

GDP=General dental practitioners

Table 2: Numerical summary of participant responses to survey questions

Question	Response options	Specialists (%)	Residents (%)	GDP (%)	χ^2	*P*
In what percentage of patients have you applied SDAT	None	19.9	54.8	46.6	31.653	<0.001
	<10%	53.9	38.1	37.9		
	11-25%	21.3	7.1	10.3		
	26-50%	5.0	0.0	5.2		
Patients' reactions after SDAT proposal	Objection	7.1	4.8	5.2	18.105	0.006
	Agree after explanation	47.5	38.1	40.5		
	No objection	27.0	28.6	31.9		
	Not known	18.4	28.6	22.4		
Your opinion about chewing function in SDAT	Unsatisfactory	14.3	33.3	23.2	8.818	0.066
	Satisfactory	46.4	40.5	45.5		
	Acceptable	39.3	26.2	31.3		
Your opinion about appearance in SDAT	Unsatisfactory	14.3	35.7	21.6	10.061	0.039
	Satisfactory	50.7	33.3	47.7		
	Acceptable	35.0	31.0	30.6		
Your opinion about oral comfort in SDAT	Unsatisfactory	15.7	31.0	22.7	5.458	0.243
	Satisfactory	47.1	40.5	46.4		
	Acceptable	37.1	28.6	30.9		
Use of SDAT increases tooth wear	Agree	30.5	66.7	38.9	17.821	<0.001
	Disagree	69.5	33.3	61.1		
Use of SDAT increases TMD	Agree	24.1	64.3	44.7	26.121	<0.001
	Disagree	75.9	35.7	55.3		
Use of SDAT results in tooth migration	Agree	19.4	45.2	33.6	12.831	0.002
	Disagree	80.6	54.8	66.4		
Use of SDAT increases longevity of dentition	Agree	37.4	35.7	36.8	0.041	0.980
	Disagree	62.6	64.3	63.2		
Use of SDAT allows easy oral hygiene maintenance	Agree	77.0	73.8	69.9	1.610	0.447
	Disagree	23.0	26.2	30.1		

SDAT=Shortened dental arch therapy; GDP=General dental practitioners; TMD=Temporo-mandibular dysfunction

Table 3: Comparative significance (percentage) of decision-making factors in SDAT

Factor	Very Insignificant (%)	Insignificant (%)	Neutral (%)	Significant (%)	Very significant (%)	Average weighted (%)
Oral hygiene	22 (7.5)	29 (9.8)	83 (28.1)	93 (31.5)	68 (23.1)	3.53
Chewing ability	19 (6.4)	59 (20.0)	68 (23.1)	109 (36.9)	40 (13.6)	3.31
Longevity of dentition	15 (5.1)	57 (19.4)	106 (36.1)	89 (30.3)	27 (9.2)	3.19
Tooth wear	21 (7.2)	79 (27.0%)	91 (31.1)	81 (27.6)	21 (7.2)	3.01
Cost	13 (4.4)	28 (9.6)	57 (19.5)	129 (44.0%)	66 (22.5)	3.71
Esthetics	24 (8.2)	67 (22.9)	83 (28.3)	86 (29.4)	33 (11.3)	3.13
Difficulty of treatment	17 (5.8)	45 (15.4)	92 (31.4)	93 (31.7)	46 (15.7)	3.36
TMD	24 (8.2)	90 (30.7)	88 (30.0)	74 (25.3)	17 (5.8)	2.90
Loss of VDO	34 (11.6)	77 (26.3)	85 (29.0)	70 (23.9)	27 (9.2)	2.93
Tooth migration	28 (9.6)	89 (30.4)	71 (24.2)	78 (26.6)	27 (9.2)	2.96

TMD=Temporo-mandibular dysfunction; VDO=Vertical dimension of occlusion; SDAT=Shortened dental arch therapy

Almost two-thirds of the RES were of the view that SDA therapy increases TMD (64.3%) and tooth-wear (66.7%). However, with regards to SDA increasing TMD and tooth wear, 69% and 75% of SP, and 55% and 61% of GDP respectively, rejected the notion. Although the majority of dentists (SP [80.6%], RES [54.8%], and GDP [66.4%]) disagreed with the view that SDA therapy can cause tooth migration, there was significant opinion difference ($P = 0.002$) among SP, GDP, and RES. Out of all responding dentists, 63.36%, were of the view that SDA therapy does not improve the longevity of dentition, and 73.56% agreed that SDA therapy allows ease of OH maintenance [Table 2].

The average significance for decision-making factors in SDA therapy is presented in Table 3. Factors including OH, chewing ability, prognosis of dentition, esthetics, tooth wear, treatment cost, and difficulty of treatment were regarded as significant for SDA therapy decision making, with an average significance weightage (ASW) ranging from 3.71 to 3.01. The risk of TMD, loss of VDO, and tooth migration was regarded as insignificant with ASW of 2.90, 2.93, and 2.96 respectively.

Discussion

The study presents a unique data comparison of knowledge and attitudes of SP (prosthodontic and restorative), RES (prosthodontic and restorative), and GDP toward SDA therapy. The response rate was 47.4% and 13.4% for hand delivered and E-mailed questionnaires respectively. Electronic questionnaires showed a considerably low response rate as compared to paper surveys. However, this has been reported previously.[18] Multiple reasons for the low response rate of electronic questionnaires in the present study are possible, including failure to send reminders, inactive SDS members, and members failing to update E-mail addresses with the SDS. However for paper surveys the response rate appears similar to a previous study by Baruch.[19] With regards to the amount of clinical experience of participants, the majority group among RES (64%) and GDP (63%) was <5 years. However, among the SP, the majority group (42.5%) had more than 10 years of experience. This statistical difference ($P < 0.05$) in experience renders the comparison of attitudes and knowledge of SDA therapy among the respondents weak.

A low clinical application of SDA therapy was shown in the present study, with 74% of SP using SDA therapy in either none or <10% of patients. In addition, 55% of RES and 47% of GDP said they never used SDA therapy in their dental practice. SDA is based on conservative treatment provision and healthy maintenance of existing dentition. In addition, the cost was shown to be the most significant factor in the decision making of SDA therapy [Table 3]. Therefore, it could be assumed that the low application of SDA treatment, as mentioned by dentists, may be due to the low financial benefit. A low SDA application rate has been shown in a previous study.[20]

Only <10% of dentists were of the view that the patients have objections to SDA therapy. 38–47% of dentists among SP, RES, and GDP were of the view that patients agree to SDA treatment after an explanation. In light of these findings, it can be assumed that dentists have shown the reluctance in using SDA treatment due to reasons other than patients' refusal to treatment.

Responding dentists showed a positive attitude toward SDA therapy with respect to oral function, esthetics, and comfort [Table 2]. Almost 84–85% of SP, 64–69% of RES, and 76–78% of GDP regarded oral function, esthetics and comfort to be satisfactory or acceptable in SDA patients. Similar questionnaire based surveys[10,16,17] on attitudes and perception of SDA therapy among dentists have shown a comparable outcomes to the present study. In a study by Sarita *et al*.,[20] chewing function was considered to be sufficient for SDA patients in the opinion of 71% of clinicians. The statistical difference in the number of RES, SP, and GDP considering esthetics in SDA patients unsatisfactory was significant ($P = 0.039$). Most unsatisfactory responses for chewing function (33.3%),

esthetics (35.7%), and comfort (31%) among the three groups, were mentioned by RES. In suitable cases, implant retained restorations can improve esthetics and oral function in SDA patients by closing spaces and increasing occluding units. In addition, training and clinical exposure related to implant restorations in SP training programs for graduate have also increased.[21] Therefore, the higher unsatisfactory opinion of RES toward esthetics, and function in SDA patients, in the present study could be in comparison to the benefits of implant-retained restorations.

Most of the SP and GDP disagreed with the notion that SDA can cause tooth migration (SP: 80.6%, GDP: 66.4%), increase tooth wear (SP: 69.5%, GDP: 61.6%) and results in TMD (SP: 75.9%, GDP: 55.3%). However, the opinion of RES in relation to tooth wear, tooth migration, and TMD in SDA patients was significantly different ($P < 0.05$) from the views of SP and GDP [Table 2]. 66.7%, 64.3%, and 45.2% of RES agreed with the view that SDA can increase tooth wear, TMD, and tooth migration respectively. Although a risk of TMD exists in the presence of SDA, in a study by Sarita *et al*.,[22] no evidence was found, that SDA treatment could cause TMD. Furthermore, it has been reported that cases with extreme SDA (zero to two occluding pairs) are at increased risk of tooth migration and spacing.[23] However, in the present study SDA was defined as intact anterior teeth, extending till second premolars (minimum of 4 occluding units). Although the risk of tooth migration and occlusal instability in SDA patients does exist, its occurrence is not certain. Furthermore, it has been proposed that patients with SDA, shows more tooth wear on premolars as compared to patients with complete dental arch (CDA) and decreasing the posterior occluding units increases wear on anterior teeth.[24] However, the evidence in support of above statements is scarce. A recent study by Gerritsen *et al*.[25] indicated that the risk of losing premolar teeth in SDA patients was significantly greater as compared to CDA patients. Furthermore, the risk of tooth loss and restorative intervention in SDA patients with or without removable partial denture was similar. Therefore, the attitude of RES toward the risks associated with SDA treatment (TMD, occlusal instability, and tooth wear) although unfounded in published literature cannot be disregarded. Hence, it is recommended that the postgraduate training in dentistry should be based on best available current evidence to align the practice of RES trainees and future SP with evidence-based dentistry.

The most significant decision-making factors for SDA therapy were treatment cost (ASW 3.71), OH (ASW 3.53), treatment difficulty (ASW 3.36), and chewing ability (ASW 3.31) [Table 3]. These findings are in line with the advantages of SDA treatment, as it is a conservative treatment option resulting in reduced treatment cost. Moreover, increasing occlusal units in an SDA patient by providing prosthesis increases the effort for OH maintenance as well as the overall treatment duration and difficulty.

Conclusions

Within the limitations of the study, the results show that the knowledge of SP and GDP with regards to the risks related to SDA treatment were broadly in line with current standards. According to respondents, SDA treatment was clinically applied in only <10% of tooth replacement cases. In addition, only <10% of patients had objections toward SDA therapy. RES expressed a higher risk of TMD, tooth wear, and tooth migration as compared to SP and GDP for SDA patients. Treatment cost, OH, treatment difficulty, and chewing ability were considered to be the most significant decision-making factors for SDA.

Acknowledgements

This project is financially supported by Vice Deanship Of Research Chair, King Saud University, Riyadh, Saudi Arabia.

Financial support and sponsorship

This project is financially supported by Vice Deanship Of Research Chair, King Saud University, Riyadh, Saudi Arabia.

Conflicts of interest

There are no conflicts of interest.

References

1. Nassani MZ, Devlin H, Tarakji B, McCord JF. A survey of dentists' practice in the restoration of the shortened dental arch. Med Oral Patol Oral Cir Bucal 2010;15:e85-9.
2. Kayser AF. Shortened dental arch: A therapeutic concept in reduced dentitions and certain high-risk groups. Int J Periodontics Restorative Dent 1989;9:426-49.
3. Kanno T, Carlsson GE. A review of the shortened dental arch concept focusing on the work by the Käyser/Nijmegen group. J Oral Rehabil 2006;33:850-62.
4. Bagewitz IC, Söderfeldt B, Palmqvist S, Nilner K. Social equality and dental conditions – A study of an adult population in Southern Sweden. Swed Dent J 2000;24:155-64.
5. Bader JD, Shugars DA. Understanding dentists' restorative treatment decisions. J Public Health Dent 1992;52:102-10.
6. Kay EJ, Nuttall NM, Knill-Jones R. Restorative treatment thresholds and agreement in treatment decision-making. Community Dent Oral Epidemiol 1992;20:265-8.
7. Bader JD, Shugars DA. Descriptive models of restorative treatment decisions. J Public Health Dent 1998;58:210-9.
8. Käyser AF. Shortened dental arches and oral function. J Oral Rehabil 1981;8:457-62.
9. Hobdell M, Petersen PE, Clarkson J, Johnson N. Global goals for oral health 2020. Int Dent J 2003;53:285-8.
10. Allen PF, Witter DF, Wilson NH, Kayser AF. Shortened dental arch therapy: Views of consultants in restorative dentistry in the United Kingdom. J Oral Rehabil 1996;23:481-5.
11. Armellini D, von Fraunhofer JA. The shortened dental arch: A review of the literature. J Prosthet Dent 2004;92:531-5.
12. Owall B, Kayser AF, Carlsson GE. Teeth, tooth loss and prosthetic appliances. Prosthodontics: Principles and Management Strategies. London: Mosby-Wolfe; 1996. p. 35-47.
13. Narby B, Kronström M, Söderfeldt B, Palmqvist S. Prosthodontics and the

patient: What is oral rehabilitation need? Conceptual analysis of need and demand for prosthodontic treatment. Part 1: A conceptual analysis. Int J Prosthodont 2005;18:75-9.
14. Svenson B, Söderfeldt B, Gröndahl HG. Analysis of dentists' attitudes towards risks in oral radiology. Dentomaxillofac Radiol 1996;25:151-6.
15. Korduner EK, Söderfeldt B, Kronström M, Nilner K. Attitudes toward the shortened dental arch concept among Swedish general dental practitioners. Int J Prosthodont 2006;19:171-6.
16. Witter DJ, Allen PF, Wilson NH, Käyser AF. Dentists' attitudes to the shortened dental arch concept. J Oral Rehabil 1997;24:143-7.
17. Allen PF, Witter DJ, Wilson NH. A survey of the attitudes of members of the European Prosthodontic Association towards the shortened dental arch concept. Eur J Prosthodont Restor Dent 1998;6:165-9.
18. Nulty D. The adequacy of response rates to online and paper surveys: What can be done. Assess Eval High Educ 2008;33:301-14.
19. Baruch Y, Brooks H. Survey response rate levels and trends in organizational research. Hum Relat 2008;61:1139-60.
20. Sarita PT, Witter DJ, Kreulen CM, Creugers NH. The shortened dental arch concept – Attitudes of dentists in Tanzania. Community Dent Oral Epidemiol 2003;31:111-5.
21. Mattheos N, de Bruyn H, Hultin M, Jepsen S, Klinge B, Koole S, *et al.* Developing implant dentistry education in Europe: The continuum from undergraduate to postgraduate education and continuing professional development. Eur J Dent Educ 2014;18 Suppl 1:3-10.
22. Sarita PT, Kreulen CM, Witter D, Creugers NH. Signs and symptoms associated with TMD in adults with shortened dental arches. Int J Prosthodont 2003;16:265-70.
23. Sarita PT, Kreulen CM, Witter DJ, van't Hof M, Creugers NH. A study on occlusal stability in shortened dental arches. Int J Prosthodont 2003;16:375-80.
24. Zhang Q, Witter DJ, Bronkhorst EM, Bartlett DW, Creugers NH. Occlusal tooth wear in Chinese adults with shortened dental arches. J Oral Rehabil 2014;41:101-7.
25. Gerritsen AE, Witter DJ, Bronkhorst EM, Creugers NH. Increased risk for premolar tooth loss in shortened dental arches. J Dent 2013;41:726-31.