

Shortened Dental Arches as a Treatment: Attitudes of Sudanese Specialists in Prosthodontics

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Abstract

Background/Purpose: To investigate prosthodontists attitudes towards shortened dental arches (SDAs) in a developing country like Sudan, considering that SDAs can be a viable option to decrease emphasis on restorative treatments for the posterior region of the mouth, while still maintaining oral function at significantly reduced cost.

Materials and methods: This was a questionnaire-based cross-sectional study, including all prosthodontic specialists registered with the Sudanese Medical Council, investigating their attitudes towards SDAs. The response rate was good with 85%. The questionnaires were handed to the specialists at their place of work, which they had to fill out individually and were then recollected by researcher.

Results: Nearly 93% of participants indicated they had heard about SDAs, and only 38% did not think it was necessary to replace absent molars. Approximately one-quarter reported that their experience exerted the main influence over the way they treated patients, while others reported patient desire (21%) or cost (10%) as the main factor. Almost three-quarters agreed with the SDA criteria, and more than 70% agreed that SDAs represented a problem-oriented approach to treatment planning.

More removable prosthodontics specialists than fixed prosthodontics specialists agreed with the SDA criteria, and that it represented a problem-oriented approach, followed by those specialized in both removable and fixed prosthodontics. Overall, those with less experience seemed more knowledgeable of SDAs and were more likely to agree with concept than those with more than 10 years' experience, who mainly agreed that SDA represented a problem-orientated approach. Both the majority of prosthodontists working in dental faculties and those in private practice agreed with the concept, thought it a problem-oriented approach, and did not consider it necessary to replace molars. This was in contrast to prosthodontists working in government hospitals, which mainly disagreed with the concept of SDAs, and were of the opinion that absent molars should be replaced.

Conclusion: The concept of SDAs is widely accepted in Sudan, but they are not widely utilized. The dental profession should be made more aware that SDAs constitute an important cost-effective approach to dental treatment, especially in developing countries such as Sudan, and those SDAs comprising the anterior and the premolar teeth can meet patients' oral functional needs.

Keywords: Attitude; prosthodontic; treatment; molars; Sudan

Introduction

The SDA concept could be an important option in the management of dentitions which have been reduced due to dental disease. The World Health Organization has indicated that the retention throughout life of a functional, esthetic, natural dentition of not less than 20 teeth and not requiring recourse to prostheses should be an oral health treatment goal [1]. The literature indicates that dental arches comprising the anterior and premolar regions meet the requirements of functional dentition. However, both functional demands and the

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number of teeth available to satisfy those demands vary among individuals, and consequently dental treatments must be tailored to each individual's needs and adaptive capabilities [2-7].

Treatment goals can be limited yet still satisfy a patient's expectations and aspirations [8,9]. The SDA concept does not contradict current occlusion theories, and appears to fit well with the problem-solving approach favored in modern dentistry. SDAs offer some important potential advantages, one of which is a reduced emphasis on restorative treatments for the posterior region of the mouth [10-14]. Previous studies in the UK and the Netherlands [15] used questionnaires to investigate dentists knowledge and attitude towards SDA. Due to the lack of information regarding prosthodontists attitude towards the SDA concept in Sudan it was thought worthwhile to use a modified version of these questionnaires to collect the relevant data, considering that SDAs could offer partially dentate Sudanese patients a treatment option that may ensure oral function at reduced cost.

Materials and Methods

This was a cross-sectional study in which all 61 Sudanese specialists in removable and fixed prosthodontics registered with the Sudanese Medical Council were invited to participate.

Data was collected via a modified questionnaire used in previous studies in the UK and the Netherlands [15]. The questionnaires were handed to the specialists at their place of work, which they had to fill out individually and were then recollected by researcher. A letter explaining the aims of the study accompanied the questionnaire, including brief information about SDAs as described by Kayser [9,16]. The letter, explained that the SDA concept was a strategy to reduce complex restorative treatment in the molar area which can be applied either actively (by extraction of badly decayed molars, simplifying complex restorative treatment by SDAs and focusing on the anterior teeth as well as premolars); or passively (by not replacing the molars which have been recently extracted and that prosthetic elongation of the SDA should only be considered after a wait and see period). The letter also gave some the criteria to consider for the problem orientated treatment approach of actively shortening the dental arch which included; major problems (caries or periodontal disease) confined mainly to the molar regions; good periodontal prognosis of the anterior and premolar regions, limited possibility for restorative care, and no contraindication such as young age.

The data acquired through the questionnaire included participants gender; their type of specialty (removable or fixed prosthodontics); number of years in dental practice 1-5, 6-10, > 10 years); place of work (governmental hospital with/without private practice, dental faculty with/without private practice, or private practice only); whether they had heard about the SDA concept; the type of treatment they would apply for patient with existing SDA (metal framework partial dentures, acrylic partial dentures, cantilever bridges, or no replacement for absent molars); whether the main objective of treatment they applied was based on (cost, experience, patients desire or other); whether they agreed with the SDA concept and the criteria for the problem orientated treatment approach as in attached information.

Ethical approval from the Ethics Committee of the University of Khartoum's Faculty of Dentistry was obtained, as was informed consent from the participants.

A good response rate (85%) was attained, as 52 out of 61 prosthodontists invited to participate in the study responded. Of the remaining nine, three were deceased, five had left the country, and one was on a vacation. A total of 59.6% of the respondents were male. Most (53.8%) were specialized in fixed prosthodontics, 36.5% were specialized in removable prosthodontics, and 9.6% were specialized in both fixed and removable prosthodontics. More than half of the prosthodontists (53.8%) had more than 10 years experience.

Most of the prosthodontists were working in both dental faculties and private practice (46.2%), followed by those working in government hospitals and private practice (26.9%), then those in dental faculties only (21.2%), and government hospitals only (5.8%) (Figure 1).

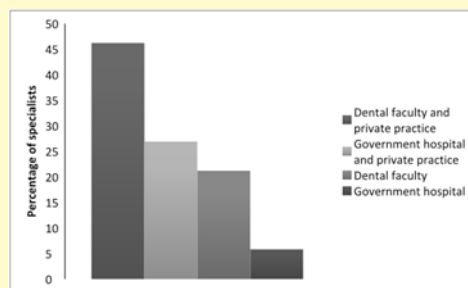


Figure 1: Specialists' places of work.

Results

With regard to their knowledge of SDAs, 92.3% of participants had heard about the concept. Most (26%) replaced absent molars by means of removable partial dentures (RPDs) with a metal framework, while 20% did not replace absent molars, 13% restored absent molars with acrylic partial dentures, and 4% applied cantilever fixed bridges (Figure 2). Almost a quarter of participants (26%) reported that their experience guided them when implementing the main objective of the treatment they applied, while others reported patient desire (21%), and only a few cited cost (10%).

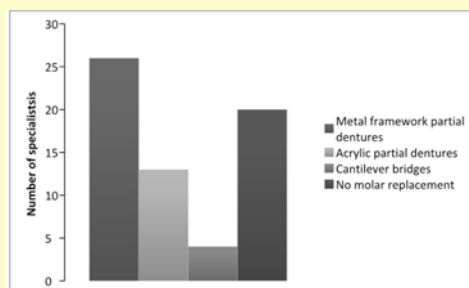


Figure 2: Specialists' choices of treatment for shortened dental arches.

Almost three-quarters of participants agreed with the criteria for SDAs. Nearly 70% agreed that SDAs represented a problem-oriented approach. While all five of the specialists in both fixed and removable prosthodontics included in the study had heard about SDAs, eighteen out of nineteen specialists in removable prosthodontics, and twenty-five of the twenty-eight specialists in fixed prosthodontics had. Over 80% of the removable prosthodontics specialists agreed with the criteria for SDAs, followed by approximately 70% of the fixed prosthodontics specialists and 60% of the specialists in both fixed and removable prosthodontics. Of the prosthodontists who specialized in removable appliances, 78.9% agreed that SDAs represented a problem-oriented treatment approach, followed by 64.3% of the fixed prosthodontics specialists, and 60% of those who were specialists in both (Table 1).

With regard to experience, 95.8% of the participants with less than 10 years experience had heard about the concept of SDAs, compared to 89.3% of the participants with more than 10 years experience. Three-quarters of the participants with less than 10 years experience agreed with the concept, which was only slightly more than the 71.4% of those with more than 10 years experience. Of the prosthodontists with more than 10 years experience, 71.4% agreed that SDAs represented a problem-oriented treatment approach, compared to 66.7% of those with less than 10 years experience (Table 2).

	Heard about SDAs	Not heard about SDAs	Total	Agreed with criteria for SDAs	Did not agree with criteria for SDAs	Total	Agreed with problem-oriented approach	Did not agree with problem-oriented approach	Total
Specialists in									
Removable prosthodontics	18	1	19	16	3	19	15	4	19
	94.7%	5.3%	100%	84.2%	15.8%	100%	78.9%	21.1%	100%
Fixed prosthodontics	25	3	28	19	9	28	18	10	28
	89.3%	10.7%	100%	67.9%	32.1%	100%	64.3%	35.7%	100%
Fixed and removable prosthodontics	5	0	5	3	2	5	3	2	5
	100%	0%	100%	60%	40%	100%	60%	40%	100%
Total	48	4	52	38	14	52	36	16	52
	92.3%	7.7%	100%	73.1%	26.9%	100%	69.2%	30.8	100%
*Chi square test p value (< 0.05 is significant)	p value = 0.627			p value = 0.364			p value = 0.506		

Table 1: Attitudes towards SDAs according to specialty.

SDAs: Shortened dental arches.

	Heard about SDAs	Not heard about SDAs	Total	Agreed with criteria for SDAs	Did not agree with criteria for SDAs	Total	Agreed with problem-oriented approach	Did not agree with problem-oriented approach	Total
Years of experience									
1-10	23	1	24	18	6	24	16	8	24
	95.8%	4.2%	100%	75%	25%	100%	66.7%	33.3%	100%
More than 10	25	3	28	20	8	28	20	8	28
	89.3%	10.7%	100%	71.4%	28.6%	100%	71.4%	28.6%	100%
Total	48	4	52	38	14	52	36	16	52
	92.3%	7.7%	100%	73.1%	26.9%	100%	69.2%	30.8%	100%
*Fisher's exact test p value (< 0.05 is significant)	p value = 0.366			p value = 0.511			p value = 0.471		

Table 2: Attitudes towards SDAs according to years of experience.

SDAs: Shortened dental arches.

Nearly all (90.9%) of the prosthodontists working in dental faculties agreed with the concept, followed by 71.4% of those working in government hospitals and private practice, 70.8% of those from dental faculties and private practice, and 33.3% of those working only in government hospitals. Prosthodontists from dental faculties exhibited the highest agreement that SDA represented a problem-oriented treatment approach (81.8), followed by those from dental faculties and private practice (70.8%), then those from government hospitals and private practice (64.3%), and finally those who worked solely in government hospitals (33.3%). All prosthodontists working in government hospitals expressed the opinion that it is mandatory to replace absent molars by means of RPDs. Only a few (14.3%) of the prosthodontists who worked in both government hospitals and private practice reported that they did not restore SDAs. Significantly more of the prosthodontists who were working in dental faculties or in both dental faculties and private practice were of the opinion that replacement of absent molars was not a necessity (Table 3), as compared to the other groups of prosthodontists.

	Agreed with criteria for SDAs	Did not agree with criteria for SDAs	Total	Agreed with problem-oriented approach	Did not agree with problem-oriented approach	Total	Types of replacements			
							Metal framework partial dentures	Acrylic partial dentures	Cantilever bridges	No replacement of absent molars
Place of work										
Government hospital	1	2	3	1	2	3	2	1	0	0
	33.3%	66.7%	100%	33.3%	66.7%	100%	66.7%	33.3%	0%	0%
Government hospital & private practice	10	4	14	9	5	14	9	4	2	2
	71.4%	28.6%	100%	64.3%	35.7%	100%	64.3%	28.6%	14.3%	14.3%
Dental faculty	10	1	11	9	2	11	4	1	0	6
	90.9%	9.1%	100%	81.8%	18.2%	100%	36.4%	9.1%	0%	54.5%
Dental faculty & private practice	17	7	24	17	7	24	11	7	2	12
	70.8%	29.2%	100%	70.8%	29.2%	100%	45.8%	29.2%	8.3%	50%
Total	38	14	52	36	16	52	26	13	4	20
	73.1%	26.9%	100%	69.2%	30.8%	100%	50%	25%	7.7%	38.5%
Chi square test p value (< 0.05 is significant)							0.482	0.591	0.056	0.048

Table 3: Attitudes towards SDAs and types of replacements according to place of work.

SDAs: Shortened dental arches.

Discussion

The SDA concept described by Kayser [9,16] proposes that treatment efforts should be directed towards the anterior and premolar teeth, which are important for chewing and appearance. Further, he emphasizes that absent molar teeth should only be replaced if their absence gives rise to problems. Kayser describes SDA as a “problem-oriented approach”; an approach whereby patients’ problems are identified and considered, and subsequent treatment is focused on the alleviation of those problems.

Even though in this present study most of the prosthodontists in Sudan had heard about SDAs, many still thought it necessary to replace missing molars. The replacement of missing teeth can have some drawbacks. For instance, although treatment with cobalt chromium RPDs is more advantageous than treatment with acrylic partial dentures, some studies have shown that abutment teeth for partial dentures can lead to periodontal attachment loss and caries if not well maintained [17-19]. It has also been reported that a lot of patients who had partial dentures made did not wear them [19]. Problems with fixed partial dentures have also been reported, such as loss of vitality of abutments, caries and periodontal disease due to inadequate oral hygiene, and mechanical failure of the bridge [20-21].

To minimize tooth preparation, cantilevered resin bonded bridgework would be more favorable than cantilevered conventional bridgework, as it covers less tissue. However, some authors have reported low survival rates, especially in the posterior region [22,23]. Nowadays, implant-supported crowns or bridges can extend SDAs. In developing countries such as Sudan however, this is not always an option given the financial cost and complex nature of this form of treatment.

Most prosthodontists in this present study reported that their experience was the primary influence when deciding on which treatment to implement. In a study reported by Graham, *et al.* [11] those less experienced in providing cobalt-chromium-based RPDs were generally less willing to provide this type of prosthesis. In addition, they found that if a patient presented with missing posterior lower teeth, dentists tended to recommend an RPD only where physical function would be affected, or if the patient requested one. They also observed that the choice between an RPD and fixed bridgework was influenced primarily by oral health status and affordability.

Although the majority of the Sudanese prosthodontists in this present study had heard about SDAs, and strongly agreed with the criteria for them described in the written explanation given to them, only a small minority utilized SDAs in clinical practice. This might be because they were more familiar with the traditional approach to restorative dentistry, which emphasizes routine replacement of absent molars. Or, it may have been that because they were never taught about SDAs as part of their training, they were not familiar with the concept, which to them was thus relatively new and associated with a lack of contemporary literature.

Some participants did not agree with SDAs, or that they represent a problem-orientated approach. Reasons cited included the importance of molars for chewing ability, that patients may experience esthetic problems (sunken cheeks) due to missing molars, and that patients may develop a habitual class III jaw relationship resulting in attrition of remaining teeth. Lastly, many participants expressed the view that SDAs are not suitable at young ages.

Prosthodontists with less than 10 years experience reported a high level of knowledge of SDAs, and agreement with SDAs, whereas those with more than 10 years experience were generally of the view that the concept represented a problem-oriented approach. An explanation for this observation could be that those with less experience had graduated more recently, and had thus been exposed to more up-to-date literature concerning SDAs.

In this study, prosthodontists working in dental faculties exhibited the highest level of acceptance of SDAs. They also generally preferred not to replace missing posterior teeth, an observation which was statistically significant. This result could be explained by the fact that nowadays, knowledge of SDAs is prevalent in dental faculties that have been able to benefit from the rapid growth in information technology and networking, which has had a profound impact on education and the continuous updating of information.

In conclusion, in Sudan SDAs are widely accepted in theory, but not widely utilized in practice. Some prosthodontists evidently still think it is always necessary to replace missing molars. Factors influencing prosthodontists attitudes towards SDAs seem to be mainly

linked to their exposure to contemporary literature, and their experience. The dental profession should be made aware that SDAs constitute an important cost-effective approach to dental treatment, especially in developing countries such as Sudan, and that SDAs involving the anterior and premolar teeth can meet patients' oral functional needs.

Conflicts of Interest Statement

The authors declare that there are no conflicts of interest.

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