Dentists' attitudes to the shortened dental arch concept

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SUMMARY The aim of restorative dentistry in high-risk groups tends to shift over time from the preservation of complete dental arches towards the preservation of functional dental arches, using a functionally oriented approach. An example of this approach, aimed at limited treatment goals, is the shortened dental arch (SDA) concept. The objective of this study was to investigate dentists' attitudes to the SDA concept in general practice. A questionnaire seeking information pertaining to the attitudes and application of the SDA concept in clinical practice was sent to all

dentally qualified members of staff in the field of restorative dentistry in the Nijmegen School of Dentistry ($n = 64$). From a 64% response, it was found that all but one of the respondents view the SDA concept as having a useful place in clinical practice. Although the respondents indicated only regular or occasional use of SDA in <10% of patients, the outcome of SDA management was generally satisfactory or at least sufficient, notably in the care of special category patients. The findings support the view that the SDA concept has a role in contemporary clinical practice.

Introduction

The traditional approach to restorative dentistry stresses the use of idealized morphological criteria and mechanically oriented concepts (Mohl *et al.*, 1988). To many practitioners the preservation of complete dental arches remains the prime aim of restorative dentistry. As this may not be attainable nor affordable for the majority of elderly patients, such an aim may be considered to be unrealistic even in industrialized countries with sophisticated dental care systems (Pilot, 1986). At present the principle aim of dental care may be considered to be the maintenance of a natural functional dentition throughout life, including all the social and biological functions, such as self-esteem, aesthetics, speech, chewing, taste and oral comfort (Sheiham, 1985, 1991). The current criteria for a healthy or physiologic occlusion, as developed by Mohl *et al.* (1988) and Ash & Ramfjord (1995), reflect this shift:

- (i) absence of pathologic manifestations;
- (ii) satisfactory function (aesthetics, chewing, etc.);
- (iii) variability in form and function; and
- (iv) adaptive capacity to changing situations.

Variability in form and function means that the number of teeth may vary and thus the number may be less than 28. This variability, as well as the presence of adaptive capacity, justifies the adoption of limited treatment goals in dental treatment planning for selected patients depending on individual functional demands. Treatment goals can be limited and still satisfy a patient's expectations and aspirations (Käyser, 1994). In high-risk groups, subjects have a greater risk for caries and periodontal disease and are more prone to decayed, periodontally deteriorated or missing teeth. This situation occurs particularly in the elderly with an accumulation of dental problems and where other age-related risks and limitations may arise. Restoring complete dental arches in high-risk subjects with

Fig. 1. Schematic representation of a SDA with 3, 4 and 5 ou (occlusal units).

complicated treatment may be technically possible, but is beyond the economic resources of many subjects and health care systems. This means that dental care strategies, aiming at preserving the natural dentition, should be challenged on the basis of cost-benefit analyses.

Based on the current criteria for a physiological occlusion as well as recent research findings, the Nijmegen School of Dentistry advocates a functionally oriented therapeutic approach for subjects with reduced dentitions. This comprises all aspects of oral function, such as mandibular stability, aesthetics, chewing function and oral comfort. This approach involves making an inventory of the dental and the patient's functional problems and the treatment is then directed towards solving these problems (Käyser & Witter, 1985; Käyser *et al.*, 1988).

Several studies have shown the large discrepancy between professionally assessed need and subjective treatment demand, especially among elderly patients (Battistuzzi, Käyser & Kanters, 1987; Palmqvist, 1988; Liedberg, Norlén & Öwall, 1991). In all probability, this is the main reason why free-end removable partial dentures (RPD), replacing permanent molar teeth, are often not worn by the patient (Toremalm & Öwall, 1988; Cowan *et al.*, 1991; Meeuwissen, 1992).

A shortened dental arch (SDA) is an arch with a reduction of teeth starting posteriorly (Fig. 1). This condition is seen frequently as permanent molar teeth are affected most frequently and most seriously by both caries as well as periodontal disease (Chase & Low, 1993). Molars are high-risk teeth, whereas the anterior and premolar teeth tend to survive longer (Meskin *et al.*, 1988; Gordon, Murray & Todd, 1994).

Based on 6-year follow-up studies of subjects with a SDA condition (Witter *et al.*, 1994a,b) the following

was concluded: (i) SDA can provide sufficient occlusal stability, (ii) SDA have sufficient mandibular stability to prevent signs and symptoms of mandibular dysfunction, (iii) SDA do provide sufficient oral comfort in terms of chewing ability and dental appearance, and (iv) oral function was not improved in SDA by a free-end RPD.

Limited information is available on dentists' attitudes to the SDA concept. The objective of this study was to investigate the level of acceptance of this concept in general practice. This was performed in a joint project between the dental schools of the Universities of Manchester and Nijmegen (Allen, 1993; Allen *et al.*, 1996).

Materials and methods

A questionnaire originally designed and sent to UK consultants in restorative dentistry (Allen, 1993; Allen *et al.*, 1996) was amended, translated into Dutch and sent to all dentally qualified members of staff in the field of restorative dentistry in the Nijmegen School of Dentistry ($n = 64$). This questionnaire sought opinions regarding the value of the SDA concept, the aptness of the criteria for actively shortening the dental arch, the dentist's experience with the concept and the willingness of the patients to accept shortening of their dental arches.

The questionnaire was prefaced by a short explanation of the SDA concept. The criteria to consider active shortening of the dental arch were summarized in this explanation as follows:

- (i) major problems (caries, periodontal disease) confined mainly to the molar regions;
- (ii) good (periodontal) prognosis of the anterior and premolar regions;
- (iii) limited possibilities for restorative care; and
- (iv) no contra-indications, such as young age.

The data from the completed questionnaires were analysed as described by Allen (1993).

Results

Of 64 dentists of the Nijmegen Dental School to whom the questionnaire was sent, 41 (64%) responded. The distribution of the dentists according to years of experience as a dentist after graduation, dental discipline, and the number of patients they recall and treat annually in their own practice, are summarized in Table 1. It appears from Table 1 that most of the

Table 1. Distribution of the responding dentists according to experience, department, and the average number of patients re-called and treated annually

Years of experience	No. of dentists	Specialty				Average no. of patients treated annually
		Perio	Prosthod.	Operative	Other	
0-9	9	0	4	4	1	1550
10-19	17	0	8	7	2	850
≥20	15	2	7	3	3	575
Total	41	2	19	14	6	

Table 2. Distribution of the dentists according to their experience with the SDA concept and the percentage of patients in which this concept was applied

	Dentists	
	No.	%
Experience		
No experience	3	7
Incidentally	22	54
Regularly	11	27
Well-experienced	5	12
Patients with SDA		
≤10%	27	66
11-25%	10	24
26-50%	1	2
≥51%	1	2
Unknown	2	5

respondents treated a restricted number of patients, as most of them have teaching and research positions. Of the six dentists classified as 'other', one worked in paedodontics, one reported 'combinations', one gerodontology and three mentioned dentistry for the handicapped.

All but one dentist judged the SDA concept to have a useful place in clinical practice. However, 7 out of the 41 respondents (17%) did not agree with the criteria for the SDA concept as set out in the explanation. One of them mentioned a combination of problems (caries, periodontal disease), mainly confined to the molar area and a good prognosis of the premolar and anterior area to be rare. Another dentist was concerned about occlusal attrition and craniomandibular dysfunction symptoms. One dentist stated that the SDA approach should not be applied in subjects younger than 18 years of age, whilst another suggested that shortening the dental arch is not appropriate in cases opposing a full denture.

Table 2 shows the distribution of the dentists according

Table 3. Distribution of the dentists according to patients' reactions after proposing to shorten the dental arch

Patients' reaction	Dentists	
	No.	%
Objections	3	7
Initially objections, agreed after detailed explanation	27	66
No objections	9	22
Do not know	2	5

to their experience with the SDA concept, and the estimated percentage of their patients in which this concept was applied. Most of the dentists (93%) indicated experience with the SDA approach on at least an occasional basis. However, most of the dentists (66%) had applied this concept in less than 10% of their patients.

Patients' reactions to proposals for shortening of the dental arch are given in Table 3. It appears that a great majority of the dentists (88%) felt that the patients had no objections to shortening the dental arch. However, in 75% of these patients this was achieved following further detailed explanation of the concept.

Table 4 shows the distribution of the dentists according to their judgement concerning the oral function, as perceived and expressed by the patients after shortening dental arches. It shows that a majority of the dentists, reflecting the patients' experiences, considered oral functions as related to the chewing function (92%), dental appearance (80%) and oral comfort (90%) to be sufficient or satisfactory in SDA.

A question was included in the questionnaire with respect to the necessity to extend a SDA, for example with a free-end RPD. Of the 41 dentists 27 (66%) indicated having had to extend a SDA in less than 10% of the cases, with a further 4 dentists indicating having

	Chewing		Appearance		Oral comfort	
	No.	%	No.	%	No.	%
Unsatisfactory/not acceptable	0	0	0	0	0	0
Unsatisfactory/acceptable	1	2	6	15	2	5
Sufficient	28	68	26	63	23	56
Satisfactory	10	24	7	17	14	34
Do not know	2	5	2	5	2	5
Total	41	99	41	100	41	100

Table 4. Distribution of the dentists according to their assessment about chewing function, dental appearance and oral comfort after shortening the dental arch

had to resort to such measures in 11–50% of SDA cases. The remainder (10 dentists) did not know.

All respondents, except one, answered affirmatively to the question whether a functionally oriented approach is a valid approach to achieve limited treatment goals. The question whether the SDA concept has a place in general practice for treatment of high-risk subjects was answered affirmatively by all 41 respondents, with the exception of one, stating that shortening of dental arches may result in the loss of potential abutment teeth.

Discussion

Generally, the responding dentists (83%) agreed with the criteria to consider shortening of the dental arch as described in the written explanation. Some, who disagreed, had noticed additional restrictive indications.

Most responding dentists applied the SDA concept incidentally or regularly in a small proportion (less than 25%) of their patients. This is to be expected as the SDA concept is intended only for subjects with conditions as listed in the criteria for the SDA approach. Most dentists reported satisfactory function after shortening dental arches in terms of chewing, aesthetics and oral comfort. Consequently, many dentists (66%) extended a SDA only occasionally (less than 10% of the SDA). Considering the results, it is apparent that all dentists (with the exception of only one) were of the opinion that the SDA concept has a place in contemporary clinical practice.

As the questionnaire used in this study was sent to a selected group of dentists, it is desirable to compare the findings with those of another population of dentists. In a study involving 135 consultants in restorative dentistry in the UK, 91 consultants (67%) responded with usable data (Allen, 1993; Allen *et al.*, 1996). Despite

some differences between the findings of the present study and the study involving the UK consultants, notably in relation to patients' willingness to accept SDA management, and the experience of the respondents with the SDA concept, it is suggested that the findings of the two studies are in general agreement. In particular, in relation to the outcome of SDA care, the majority of the respondents in both studies indicate that the outcome is invariably satisfactory or at least sufficient.

The essentially unanimous view of the respondents in the present study regarding the role of the SDA concept in the care of special category patients is viewed as being of particular importance. This category includes the middle-aged and elderly with limited possibilities for complicated restorative dental care. Limiting factors can be poor general health, an accumulation of dental problems and financial restrictions. As a result of the increasing concern for the preservation of a functional natural dentition, and given the growing range and numbers of special category dentate elderly in populations of the type served by the respondents in this investigation, further work is considered to be indicated in this area. For example, it would be relevant to quantify the cost benefits of the SDA approach in the management of special category patients, many of whom present with complex problems and a limited ability to afford extensive dental care.

Conclusions

The findings of the present study indicate that most of the members of staff in the field of restorative dentistry in the Nijmegen School of Dentistry: (i) are of the view that the SDA concept has a useful place in clinical practice; (ii) apply the SDA concept on a regular or at least occasional basis to <10% of the patients attending

their practices; and (iii) judge the outcome of the SDA management to be generally satisfactory or at least sufficient.

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