Attitudes Toward the Shortened Dental Arch Concept Among Swedish General Dental Practitioners

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Purpose: The purpose of this investigation was to obtain the opinions and assess the attitudes of Swedish general dental practitioners in private practice versus a public health care setting regarding management of patients with a shortened dental arch (SDA). ***Materials and Methods:*** A questionnaire containing different statements regarding the SDA concept was sent to a random sample of 189 clinicians. Differences between male and female practitioners and between private practitioners (PPs) and those employed by the Public Dental Health Service (PDHS) were tested for statistical significance by the Student *t* test. ***Results:*** The response rate was 54% (102 clinicians). Among the respondents, 62% were men and 38% were women. Fifty-six percent were PPs and 44% were employed by the PDHS. The results showed small differences in attitudes between various groups of practitioners but large individual variations. In general, Swedish general practitioners had a positive attitude toward the SDA concept with respect to oral function and oral comfort. They recognized few risks with a dentition lacking molar support, although female clinicians were more risk conscious. PPs expressed fewer advantages in using the SDA concept than PDHS practitioners with respect to the reduced risk for overtreatment, better patient economy, and the ability for older patients to keep their teeth. ***Conclusion:*** The results from this questionnaire study indicate that, overall, Swedish general practitioners have an affirmative opinion toward the SDA concept. *Int J Prosthodont 2006;19:171–176.*

Oral function, esthetics, and comfort should always be included in the treatment-planning process of edentulous or partially dentate patients. Subjective needs vary among patients, and treatment should be designed on an individual basis according to the patient's needs and demands. Even though the goal is to provide optimal restorative treatment, often a patient's economic situation[1] or general health act as limitations. There have been several attempts to develop a restorative treatment concept for older patients or for patients with limited financial capacity. One example is the "problem-oriented approach," which includes limited treatment goals based on individual oral requirements among patients.[2] The "problem-oriented approach" served as a guiding principle behind the shortened dental arch (SDA) concept, which was developed mainly for older individuals and for those considered at high risk for developing dental caries and periodontitis. The concept was aimed at preserving the most strategic parts of the dental arches: the anterior and premolar regions.[3,4] Severe conditions such as periodontitis, labial and distal tooth migration, impaired occlusal stability, and temporomandibular joint (TMJ) problems, including dislocation of the condyle and arthrosis, have been associated with lack of occlusal stability in the posterior regions.[5]

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However, it has been shown that patients with 10 or fewer occluding pairs of teeth have an acceptable level of oral function and oral comfort.[3] It has further been suggested that the number of occluding pairs of teeth required for satisfactory oral function is associated with age. There is controversy regarding the relationship between professionally assessed need and subjective treatment need, especially regarding dental care for elderly people. An example is the large number of distal-extension removable partial dentures (RPDs) made for patients who do not demand such treatment. Furthermore, too many artificial teeth are often placed on the distal extensions of an RPD in an attempt to resemble the original dentition.[6] Narby and coworkers contended, in an article on the need concept, that "there is no true objective or subjective need" and "need is established only through the dialogue between the professional and the patient."[7]

Attitudes of dental practitioners can be expected to play a role in clinical behavior in dentistry. According to social-psychologic theory, attitudes have at least two interdependent components: cognitive perceptions (the way the facts are understood) and affective emotions (the way one feels about the facts).[8] Attitudes should be included as background factors when analyzing prosthodontic decision making among general practitioners.[9] Other studies have shown a relationship between attitudes and clinical behavior. Experience and continuing education, for example, affect clinicians' attitudes toward risk in oral radiology, and these attitudes in turn influence clinical behavior.[10]

There are only a few reports in the literature that describe attitudes among dental clinicians toward the SDA concept.[11–15] In general, practitioners with special interests in prosthodontics are considered to have a positive attitude to the SDA concept, but it has also been suggested that this concept is not widely practiced.[11–13] Little is known regarding the attitudes toward and acceptance of the SDA concept in prosthodontic treatment planning among general practitioners (GPs). The aim of this study was therefore to describe the attitudes toward the SDA concept among Swedish GPs and to investigate differences between various groups of clinicians.

Materials and Methods

In 2003, questionnaires were sent to a random sample of 200 general practitioners in Sweden. About 50% of the dentists in Sweden are employed in the Public Dental Health System (PDHS), while the remaining dentists work as private practitioners (PPs). The sample was taken from the membership register of the Swedish Dental Association, which comprises almost all dental practitioners in Sweden. No specialists were to be included in the study, but it was not possible to identify clinicians with a specialty in the sample frame from the Dental Association, because the directory of the Swedish Dental Association does not subclassify its members based on specialty training. Eleven practitioners were later excluded from the study, since they did not belong to the study population. Nine practitioners had a certificate in a specialty issued by the Swedish National Board of Health and Welfare. One practitioner was working abroad, and one was not working as a dental clinician any longer. Data on employment—private or public—were obtained through the membership register of the Swedish Dental Association. Those who had not responded within 3 weeks were sent a mailed reminder. After that, no further attempts were made to contact the practitioners. As the response rate was 54% (102 of 189 practitioners), analysis of dropouts was accomplished.

Questionnaire

General information about the SDA concept was included in the questionnaire:

Dear colleague: As you presumably know, there are many different factors to consider before selecting a prosthodontic treatment. One treatment concept, which is discussed for patients who are lacking molar support, is the so-called "shortened dental arch concept" (SDA concept). However, there are different opinions about such treatments. Some assert that a shortened dental arch will maintain good chewing ability and appearance and also simplifies the oral hygiene for older patients, while others claim that lack of molar support contributes to temporomandibular joint problems, tooth migration, and increased occlusal tooth wear. (The definition of an SDA is a dentition of 10 occluding pairs of teeth [pairs of teeth = natural teeth, crowns, and/or pontics].)

The questionnaire contained 64 questions and also included a reference to the SDA concept in the dental literature.[3] The responses were reported on a visual analogue scale (VAS), which was later divided into 10 equal parts for data registration.

The questionnaire was divided into 4 main sections:

1. Questions about factors to be considered when planning a prosthetic treatment in a SDA
2. Attitudes related to risks and benefits in a SDA
3. Attitudes related to various statements concerning the SDA concept
4. Questions about gender, age, approximate working time as a clinician, and place of dental education

The precise formulation of the statements is found in Tables 1 to 3. Data are shown in frequency tables.

Table 1 Frequency Distribution of Opinions About Different Statements Concerning the SDA Concept

Item	Overall population mean	SD	Mean for men	Mean for women	*P*	Mean for PP	Mean for PDHS	*P*
Appearance								
1. A dental arch to the second premolar is often sufficient to be esthetically acceptable for the patient.	6.0	2.4	5.9	6.2	.640	5.8	6.3	.232
2. My experience is that patients without molar support are satisfied with their appearance.	7.0	1.8	7.0	7.1	.855	6.9	7.2	.403
Chewing function								
3. My experience is that patients without molar support have sufficient chewing function.	7.3	1.9	7.6	6.9	.081	7.2	7.5	.420
4. Patients younger than 50 years of age without molar support can obtain an acceptable chewing function.	6.4	2.2	6.5	6.1	.476	6.4	6.3	.857
TMJ problems								
5. My experience is that patients without molar support often have TMJ problems.	2.6	2.1	2.4	2.9	.277	2.8	2.4	.422
Occlusal tooth wear								
6. My experience is that patients without molar support have more occlusal tooth wear than patients with molar support.	4.1	2.8	4.0	4.3	.663	4.3	3.9	.392
Attitudes toward the SDA concept with respect to patient age								
7. Between the ages of 20 and 50 years, sufficient oral function is obtained with a minimum of 12 occluding pairs of teeth.	7.6	2.1	7.5	7.7	.678	7.6	7.7	.805
8. Patients older than 80 years of age have difficulty in adapting to removable dentures if they have no earlier experience	7.4	2.3	7.4	7.3	.964	7.3	7.3	.959
9. Between the ages of 40 and 80 years, sufficient oral function is obtained with 10 occluding pairs of teeth.	6.5	2.2	6.7	6.2	.275	6.6	6.4	.725
10. Planning treatment for older patients should concentrate on preserving the most strategic parts of the dental arches: the anterior and premolar regions.	5.7	2.9	6.0	5.3	.229	5.3	6.2	.108
11. If you are between the ages of 70 and 100, sufficient oral function is obtained with 8 occluding pairs of teeth.	5.0	2.4	5.4	4.4	.038	5.0	5.0	.985

Responses were on a VAS ranging from 0 ("I do not agree") to 10 ("I agree"). $99 \leq n \leq 101$.

Differences were tested for statistical significance by the Student *t* test and significance was set as $P \leq .05$.

Results

Analyses of Dropouts

For the nonresponders, information was available about sex, age, and dental care system (PDHS versus PP). A logistic regression model was applied with response/no response as the dependent variable and gender, age, and dental care system as independent variables. No significant differences were seen between the responders and nonresponders regarding age, gender, and dental care system. The internal nonresponse rate was low, not exceeding 2.9% for any question. It was concluded that the nonresponse pattern was random.

Table 2 Frequency Distribution of Opinions of Risks in a Shortened Dental Arch

Item	Overall population mean	SD	Mean for men	Mean for women	*P*	Mean for PP	Mean for PDHS	*P*
1. SDA results in a reduced chewing ability	5.2	2.4	5.7	4.5	.011	5.0	5.5	.349
2. SDA aggravates periodontitis in patients with low marginal bone levels	5.4	2.4	5.8	4.6	.019	5.5	5.2	.610
3. SDA contributes to greater abrasion	5.4	2.3	5.8	4.7	.023	5.4	5.4	1.000
4. SDA leads to loss of vertical dimension of occlusion	6.0	2.3	6.5	5.2	.005	6.0	6.1	.811
5. SDA contributes to tooth migration	6.1	2.0	6.3	5.7	.176	5.9	6.2	.408
6. SDA develops TMJ disorders	6.1	2.4	6.5	5.3	.016	5.7	6.6	.056
7. There is a risk that the patient with SDA will not be pleased with the esthetics	7.1	1.7	7.1	7.0	.688	7.1	7.1	.995
8. SDA can create speech problems	8.0	1.6	8.3	7.6	.052	8.0	8.1	.743

Responses were on a VAS ranging from 0 ("great risk") to 10 ("minimal risk"). $99 \leq n \leq 101$.

Table 3 Frequency Distribution of Opinions of Advantages of a Shortened Dental Arch

Item	Overall population mean	SD	Mean for men	Mean for women	*P*	Mean for PP	Mean for PDHS	*P*
1. SDA simplifies the oral hygiene for the patient	6.1	3.0	6.1	6.1	.969	6.0	6.2	.753
2. SDA allows the patient to keep his own natural teeth longer	5.7	2.7	5.6	5.9	.623	5.2	6.3	.035
3. The SDA treatment focuses on replacing teeth that are necessary for oral function	5.6	2.4	5.6	5.5	.721	5.4	5.8	.487
4. SDA treatment reduces the technical difficulty of therapy	4.7	2.6	4.9	4.5	.444	4.4	5.1	.192
5. SDA reduces the risk of overtreatment	4.7	2.7	4.7	4.5	.765	4.1	5.3	.033
6. SDA allows for better patient economy	4.4	2.5	4.3	4.5	.634	3.9	5.0	.034
7. SDA makes it easier to predict the prognosis for delivered treatment	4.3	2.7	4.7	3.9	.163	4.5	4.2	.629
8. SDA enables simpler treatment planning	4.3	2.5	4.6	3.8	.116	4.2	4.5	.523

Responses were on a VAS ranging from 0 ("small advantage") to 10 ("great advantage"). $96 \leq n \leq 100$.

Analyses of Data from Responders

Among the respondents, 62% were men and 38% were women. Fifty-six percent were PP and 44% were employed in the PDHS. Of the men, 62% were PP and 38% were employed in the PDHS; of the women, 46% were PP and 54% were employed in the PDHS. The median age of the responders was in the range of 45 to 49 years, and the average number of years in the profession was 23.6 years (SD = 8.9 years). The results showed great individual variation among the clinicians regarding their opinion of appearance, oral function, TMJ problems, wear, and attitudes toward the SDA concept with respect to patient age (Table 1). In interpreting the data, one should bear in mind that the directionality in some questions is reversed. No statistically significant differences were found with respect to gender and dental care system (Table 1).

There was a general opinion among the GPs that there were few risks associated with the SDA concept (Table 2). Female practitioners were significantly more risk conscious than male practitioners ($P < .05$), but there were no significant differences in attitudes toward risks with respect to dental care delivery systems. In the evaluation of "advantages" with the SDA concept, no differences were observed between men and women, but PDHS practitioners, compared with PPs, considered the SDA concept as more favorable, with a reduced risk of overtreatment ($P < .05$; Table 3). PDHS practitioners also regarded the SDA concept

more favorable for maintaining the natural dentition ($P < .05$) and respecting patients' economic limitations ($P < .05$) than did PPs (Table 3).

Discussion

In general, Swedish GPs had a positive attitude toward the SDA concept with respect to oral function and oral comfort. The results showed small differences in attitudes between various groups but great variation in attitudes among individual practitioners.

In a questionnaire study on practice profiles and decision making among Swedish GPs in 1999, great variations in individual attitudes among clinicians were found, but differences in attitudes between various groups of practitioners were small.[9] The author of that study stated that attitudes probably are individual and not group attributes, and it is therefore important to include individual attitudes as background factors when studying decision making in prosthodontics.[9]

Generally, Swedish GPs felt that there are few risks with a dentition lacking molar support, although female practitioners were significantly more risk conscious. One possible reason could be that Swedish female clinicians may be less experienced in extensive prosthodontic treatments than their male colleagues. In a previous study on practice profiles, it was reported that female practitioners produce fewer prosthodontic services compared with male clinicians, even though they use relatively more working time for prosthodontics.[9] The same study also reported that male practitioners compared with female practitioners had a higher production of fixed and removable prosthodontic services, and treated more older patients, who are more likely to demand prosthodontic services.[9] The results in the present study could mirror the fact that female clinicians, who might have less experience in more extensive prosthodontic treatments, may identify a higher risk of reduced chewing ability, periodontitis, tooth wear, loss of vertical dimension of occlusion, and TMJ disorders among patients who are edentulous in the posterior region, ie, patients with SDA.

With respect to the advantages of using the SDA concept, the results showed significant variations between groups of clinicians (Table 3). The finding that PDHS clinicians, compared with PPs, considered the SDA concept as more favorable in reducing the risk of overtreatment could be related to the different traditions between delivery systems. PPs, compared with PDHS practitioners, generally have a higher production of prosthodontic services,[9] and from their point of view, providing patients with a prosthesis in the posterior part of the jaw might not be considered as "overtreatment." Moreover, the use of dental implants in prosthodontic treatment is now common among PPs and has been shown to successfully restore missing teeth, including in the posterior arches.

PPs held a less favorable opinion of SDA for maintaining the natural dentition and improving patient economy than did PDHS practitioners (Table 3). The results indicate that when comparing and evaluating opinions regarding various prosthodontic treatment options among practitioners who are employed on a fixed salary (eg, PDHS dentists) and PPs, there might be an economic bias toward providing more comprehensive and costly care.[9]

The results regarding dental clinicians' attitudes toward oral function and comfort in SDA resemble the findings of similar studies.[11–14] For example, there are few reports on developing temporomandibular disorders (TMD) in a SDA. In a study by Allen et al, 12% of the responding clinicians replied that signs and symptoms of TMD occurred following application of the SDA concept.[12] The low scores for the risk of developing TMD are in accordance with findings in the present study.

Swedish GPs claimed that patients without molar support were satisfied with their appearance and had an acceptable chewing ability (Table 1). The results from the present study resemble those found by Allen et al, who reported that 92% of practitioners with SDA experience were satisfied with the outcome in terms of chewing function and 81% agreed that appearance was satisfactory.[12] In another study, Allen et al found that 82% of the respondents had a satisfactory outcome concerning oral comfort, 87% concerning oral function, and 80% concerning dental appearance.[11] Witter et al reported that practitioners in their study population considered chewing function (92%), dental appearance (80%), and oral comfort (90%) to be sufficient or satisfactory in patients with SDA.[13] The finding in the present study that most practitioners revealed an experience with successful patient outcome using the SDA concept is also supported in a questionnaire study in which 71% of the responding clinicians claimed that SDA provided the patients with satisfactory chewing function and 79% of the responding practitioners reported that their patients were happy with the esthetic outcome.[14]

A limitation of the present study was the relatively low response rate (54%). A possible reason for this could be that the nonresponders were sent only one mailed reminder. The topic itself could perhaps be regarded as somewhat delicate because of recent changes in the Swedish general dental insurance system regarding improved insurance coverage for prosthodontic services among individuals 65 years and older. It is not known how such regulatory changes in the insurance schemes affect practitioners' opinions regarding choice

of prosthodontic treatments, but it is likely that it will have an impact, because such treatments are usually expensive for the patient. However, insurance does not cover implant prosthodontics, which would include replacement of any molars. This decision is based on the opinion that SDA is sufficient to provide the patient with an acceptable oral function and comfort. The attitudes of Swedish GPs in the present study may reflect changes in attitudes toward oral rehabilitation for elderly patients as life expectancy increases and elderly patients today are generally healthier and retain more natural teeth compared to the situation only a decade ago. Other studies of the SDA concept have reported response rates somewhat similar to those in the present study. Response rates ranging from 40% to 82% indicate that the SDA concept still could be regarded as somewhat controversial among dental practitioners.[11–14]

The scope of prosthodontic treatment has changed over the years—especially implant treatment, which is more common than a decade ago and should always be included in the treatment-planning process for the partially edentulous patient. In 1981, when the SDA concept was introduced, implant treatment was not widely acknowledged or practiced. At that time a conventional RPD would be the only treatment available for those patients who wanted to replace lost teeth in posterior areas. There are a number of studies reporting on patients with a SDA who have been treated with RPDs to extend the dentition.[16–21] The results of those studies show that the RPD treatment did not provide any improvement in oral function or comfort but rather the opposite—indicating that the need for the conventional RPD to replace posterior teeth probably is much lower than is expressed in curricula taught at dental schools worldwide.

Conclusion

The results of the present study indicate that, overall, Swedish GPs have a positive opinion toward the SDA concept. Female practitioners expressed a higher risk of impaired oral function, periodontitis, and TMD than male practitioners, while PPs compared with PDHS clinicians felt that there were significantly fewer advantages to using the SDA concept with respect to the reduced risk for overtreatment, better patient economy, and the ability for patients to keep their natural teeth as they aged.

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