Changes in Attitudes Toward Desire for Implant Treatment: A Longitudinal Study of a Middle-Aged and Older Swedish Population

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Purpose: To assess, at a 10-year interval, changes in attitudes toward desire for implant treatment among middle-aged and older Swedish subjects with respect to dental status. ***Materials and Methods:*** Three thousand subjects, residents of Örebro County, Sweden, were surveyed via the same questionnaire in 1989 and again in 1999 regarding their possible need for and interest in implant-based prosthodontic treatment. ***Results:*** One thousand six hundred sixty-five subjects responded to both surveys. In 1989 few respondents indicated an interest in implant treatment, whereas in 1999, 92% of those who had not indicated an interest in the earlier survey now indicated that they desired implant treatment. The cohort reporting having no teeth had a considerable lower increase in desire. Among those who reported a possible treatment need (ie, missing 1 or more teeth and had not had them replaced or those who wore complete dentures), cost was the most commonly cited reason for declining implant treatment. ***Conclusions:*** There was a dramatic increase in the interest for implant treatment over the period from 1989 to 1999. Changes in awareness of implant treatment, along with an expansion in the number of qualified providers, may have contributed to this increase. *Int J Prosthodont 2008;21:481–485.*

Oral diseases are not cured by means of prosthodontic treatment. Instead, the main role of prosthodontics is the rehabilitation of patients after loss of teeth and oral function. However, there are no generally accepted rules about how to estimate need, demand, or utilization of prosthodontic services in most situations, since individual preferences play a very important role.[1,2]

Many factors are involved in the prosthodontic treatment process. The patient's financial situation has a great impact, and patient preference is also an important factor. Attention has been paid to the gatekeeping processes between both need and demand and between demand and utilization.[3] Attempts have also been made to evaluate need and demand for prosthetic services over time in populations.[4] Subjective need should not be considered as equivalent to demand for treatment but rather as a prerequisite for a possible demand. However, the definition of objective need by professionals merely puts one subjective opinion—the professional's—against another subjective opinion—the patient's. In this study, "desire for implants" will be referred to as "possible demand." Because of new technology, more restorative options have become available for partially and completely edentulous patients, and therefore changes in demand for prosthodontic treatment are interesting to evaluate in longitudinal studies. The need for implant treatment in particular has come into focus, since this treatment option has provided excellent long-term results in the rehabilitation of the partially or completely edentulous patient.

The purpose of the present study was to examine changes in attitudes toward desire for implant treatment over time with respect to dental status in a population of middle-aged and older individuals in Sweden.

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Materials and Methods

Two questionnaire studies were performed, one in 1989 and the other in 1999, with the intention of evaluating the desire for implant treatment among 3,000 subjects aged 45 to 69 years in Örebro County, Sweden.[5,6] The participants were randomly selected from the official population register. This Swedish county has about 280,000 inhabitants and was considered average socially and economically at the time of the studies.[7] A questionnaire was mailed to all subjects, and the response rate in 1989 was 79.4% (2,383 individuals).

Of the original sample, 2,708 respondents were found in the national population register 10 years later, on the basis of the criteria that they were alive and still resided in Örebro County. In 1999, a new questionnaire was mailed to them.

The number of respondents in the 1999 survey was 1,848, yielding a response rate of 68%. Among those, 1,665 (90%) had also responded in the 1989 survey. The individuals who responded in both 1989 and 1999 constituted the panel used in this study and accounted for 56% of the 1989 survey sample.

A nonresponse analysis was presented earlier.[7] A comparison of those who responded only in 1989 with those participating in both 1989 and 1999 found significant differences between the groups. The subjects who responded on both occasions were, compared with those who responded only in 1989, younger, had a higher level of education, and reported better dental status, ie, fewer of them wore removable dentures. Internal nonresponse varied for different questions, which resulted in different *n* values for different analyses. Among those responding in both 1989 and 1999, however, no significant differences in dental condition were noted between nonresponse groups and the other subjects.[7]

Questionnaires

The questionnaire sought to assess dental conditions and opinions regarding dental implants. The variables used in the questionnaire were published earlier and gathered information about dental condition (in 7 categories), socioeconomic conditions, attitudes towards dentures, and desire for various kinds of prosthodontic treatment.[5]

The 2 questionnaires were identical except for a few new questions added in 1999 about the number of lost teeth, prosthodontic treatments, and various complications having occurred since the previous survey. Written information about costs and treatment procedures for implants was included in both questionnaires. The information included estimated costs for a complete-arch fixed implant-supported prosthesis in the maxilla, for a single-tooth implant restoration, and for complete maxillary and mandibular dentures. The cost of implant treatment was considerable, although such treatment was subsidized by the national dental insurance system. For example, the treatment cost for a complete-arch fixed implant-supported prosthesis was approximately 5 times higher than that for conventional removable dentures in both 1989 and 1999.

Questions presented elsewhere related to the subjects' dental conditions and desire for implant treatment. Participants missing 1 or more teeth that had not been replaced, and those with removable denture(s), were considered to have a possible treatment need. Subjects who reported that all teeth remained were asked 2 hypothetical questions about what prosthodontic treatment they would prefer if they lost 1, a few, or all teeth. The response options included "no treatment," "dental implants," "conventional fixed partial denture," and "removable denture." No "don't know" response alternative was presented for any of the questions. Only those who responded that they would choose dental implants were considered having a possible desire for such treatment. The total panel was divided into 2 groups—those with and those without changes in dental conditions during this period—to evaluate their need for implant treatment.

Statistical Methods

Statistical significance was determined through Pearson chi-square test with $P < .05$ as the significance level. For dichotomous responses, odds ratios (ORs) with 95% confidence intervals were also calculated. All calculations were done in SPSS 11.0.

Results

There was a substantial increase in reported desire for implant treatment. Ninety-two percent of those who did not express a desire for implants in 1989 had changed their mind 10 years later (Table 1). There was a very high probability (OR = 3.9) that participants who wanted implant treatment in 1989 held the same opinion 10 years later.

Age group differences among those who desired implant treatment in 1989 are presented in Table 2. The reported desire for implant treatment decreased with age. There were no significant age differences in 1999, since almost all respondents desired implants.

Forty-seven of the 111 edentulous individuals (7% of the panel) answered the questions regarding the desire for implant treatment. Two thirds of those (32 individuals) reported a desire for implant treatment at the time of the second questionnaire study. Of those who were edentulous and not interested in having implant treat-

Table 1 Changes in Desire for Implant Treatment Among Participating Subjects

	1999			
1989	No desire (%)	Desire (%)	Total (%)	n
No desire (%)	8	92	61	801
Desire (%)	2	98	39	518
Total (%)	6	94	100	1,319

Chi-squared = 18.98; degrees of freedom 1; $P < .0001$, odds ratio 3.9 (95% confidence interval 2.0–7.4).

Table 2 Desire for Implant Treatment with Respect to Age in 1989 (n = 2,383)

Age	No desire (%)	Desire (%)	Total (%)	n
45–49	54	46	23	558
50–59	66	34	36	869
60–69	78	22	40	956

Chi-squared = 99.54; degrees of freedom 2; $P < .0001$.

ment in 1989, 38% changed their opinion and reported an affirmative attitude in the study 10 years later. The increase in desire for implant treatment was similar between those who reported changes and those without changes in dental conditions over the 10-year period.

Changes in desires of respondents with a possible treatment need, missing 1 or more teeth, and with or without removable dentures, are presented in Table 3. This group had a significant increase in desire for implant treatment between 1989 and 1999, whereas there was no significant increase among those without such a need. Of the total cohort, 92% had changed their minds in 1999.

Cost was the major reason for not choosing implants among subjects who reported that 1 or a few teeth were missing and had not been replaced and among those with removable denture(s). No significant changes were observed between 1989 and 1999. The subjects were asked if they wanted to replace their missing teeth/removable dentures with dental implants. Those who responded that they had no interest in implant treatment were asked to indicate the reason(s) why, and several response alternatives were given (Table 4).

Table 3 Changes in Desire for Implant Treatment Among Subjects with Possible Need

	1999			
1989	No desire (%)	Desire (%)	Total (%)	n
No desire (%)	8	92	77	705
Desire (%)	2	98	23	206
Total (%)	7	93	100	911

*Possible need = Missing 1 or a few teeth and not replaced or wearing removable denture(s).

Chi-squared = 9.33; degrees of freedom 1; $P < .001$; odds ratio 4.36 (95% confidence interval 1.6–12.2).

Discussion

The main result from the present study was a huge increase in interest for implant treatment from 1989 to 1999. In 1999 almost all (94%) of the study population expressed desire for implant treatment, a strongly significant increase.

Changes in Desire

The strong and significant change in desire for implant treatment for the entire panel, as well as for different subgroups, may be explained by increased knowledge about implant treatment. It is likely that most individuals had a better knowledge about dental implants in 1999 compared with the situation 10 years earlier because of newspaper articles and information provided by dental practitioners.

Increasing knowledge of implants may have had an impact on clinicians' practice profiles. In 1989, few practitioners in Sweden with board certification in prosthodontics or had received mandatory additional training were allowed to perform the restorative part of the implant treatment within the dental insurance system. By 1999, all clinicians were allowed to perform implant treatment, including the surgical part, within the insurance system; this may have influenced clinicians to inform patients about this option. During the last decades, there has been a clear trend to involve the patient in the prosthodontic treatment planning process.[7] This has resulted in a more patient-oriented decision-making process using the emancipatory perspective in which the patient-practitioner dialogue is of utmost importance to achieve an optimal treatment outcome.[1] However, clinicians may still play a dominant role in the information and decision-making process in implant dentistry.[8]

The overall desire for a better oral health–related quality of life has become a reality in dentistry. Further, there is evidence that a high interest in esthetic dentistry and tooth bleaching among patients could be related to television commercials publicizing new cosmetic treatment options.[9] This could be related also to innovations that focus on consumption, which could promote an increased interest, especially among the young, wealthy, and well educated.[10]

Table 4 Percentage Distribution Among Respondents with Possible Need* Regarding Reason(s) Not to Choose Implant Treatment

	1989				1999			
Response alternative	Men (%)	Women (%)	Total %	n	Men (%)	Women (%)	Total %	n
Cost for treatment	45	55	15	256	44	56	34	566
Too invasive	37	63	5	75	35	65	6	107
Afraid of surgery	33	67	3	55	22	78	9	142
Afraid of side effects	40	60	3	48	32	68	11	177

*Possible need = Missing 1 or a few teeth and not replaced or wearing removable denture(s).
1989: Chi-squared = 14.42; degrees of freedom 3; $P < .006$. 1999: Chi-squared = 28.12; degrees of freedom 3; $P < .0001$.

The results of the study indicate a great increase in desire for implant treatment for those with a possible treatment need. This could support the assumption that an individual's need may turn from latent to manifest, when previously unrealistic treatment options become available. New desires will emerge.[1]

Edentulism and Desire for Implants

Among the 111 individuals who reported having no natural teeth, with or without removable dentures, the response rate was only 42%. The number of respondents was sufficient to permit some conclusions; 47 persons allowed a precision of about 15%. This rather small group had a lower increase in desire compared to the total panel. This could be the effect of several socioeconomic gatekeeping processes.[11] Individuals with less education and low income tend to have poorer dental status, in part because of poor finances, and edentulism is often associated with poverty and deprivation.[12] It is likely that some individuals do not even consider treatments they know they cannot afford. In such situations, the desire for treatment does not change from latent to manifest. The national dental insurance system in Sweden was introduced in 1974, with the intention to help all citizens afford necessary treatment, especially expensive prosthodontic care. However, the results of the present study clearly indicate that several edentulous individuals are still unable to afford implant-supported prosthodontics. It is obvious that although Sweden has a general dental insurance system, there are still orally handicapped individuals who are not able to benefit from implants because of the high costs.

Another possible explanation could be that older individuals who are accustomed to wearing dentures have little or no interest in implant treatment.[13] Studies indicate that a large number of patients (65% to 90%) are satisfied with the functional aspects of their dentures, often in spite of technical imperfections identified by dental professionals.[14,15] There is also evidence that removable prostheses are preferred among those who have few or no remaining teeth, compared with those who have only 1 or a few missing teeth.[16] It appears that those with a removable prosthesis have a lower expectation and demand for oral function and esthetics, and that satisfaction with removable prostheses may be a rationalization in which an attitude could develop through behavioral change.[17,18]

Reasons for Not Choosing Implants

In the questionnaires, there were also questions that evaluated reasons for not choosing implant treatment. The structure of the gatekeeping processes determining an individual's choice was discussed in an earlier study.[4] Such processes are multifactorial. For example, there can be combinations of problems of oral health and quality of life, psychologic factors and health beliefs, social structure and demographics, and economic factors.

In the second study, more individuals with 1 or a few missing teeth that had not been replaced and those wearing removable dentures expressed interest in choosing implants compared with the situation 10 years earlier. This could indicate that when a treatment option has become a realistic alternative and is conceivable, patients are more motivated to make a final decision regarding whether or not to choose treatment.

Cost was the major reason for not desiring implant treatment, but also the percentage of those who reported that they were "afraid of surgery" and "afraid of unknown side effects" had increased slightly over the 10-year period. A study of Walton and MacEntee showed that the most common reason for refusing free treatment with implant-supported mandibular dentures was concern about surgical risks.[15] Dental anxiety appears to be an important gatekeeper in dentistry among many patients.[19] In the present study, women were more concerned about implant surgery and the risk of unknown side effects of implants (Table 1). Such a gender variation has been discussed in other prosthodontic studies.[20,21]

Validity

A validation study was performed earlier among the subjects in the 1989 questionnaire showing high agreement

between self-reported and clinically observed number of missing teeth, replaced teeth, and removable dentures.[22] This was in accordance with another validation study on congruence between clinical findings and patients' self-reported oral status.[23] In the present study, the focus was not on self-reported dental conditions but on attitudes and opinions regarding need and demand, which may have even better validity because the subjects are reporting their opinions. The nonresponse rate should be less important when studying changes in attitudes over time among the same individuals in a cohort on 2 different occasions. Changes in attitudes are principally intraindividual, since the panel included the same individuals on both occasions.

The results of the present study should be interpreted with some caution. Questionnaires may not, of course, provide all the answers when evaluating actual desire for implant treatment. In some aspects the questions were hypothetical, and the responses should be assessed with that in mind. However, the magnitude of changes in attitude seems to be unambiguous, and the expressed desire for implant treatment could be seen as a result of changes in society, with new standards of esthetics, new cosmetic treatment options, and desire for a better oral health–related quality of life, rather than of self-perceived functional need.

Conclusion

This study shows that almost all surveyed individuals expressed desire for implant treatment in 1999, which is a major increase in interest compared with the findings in the 1989 study. Individuals with a possible treatment need showed a great change in desire for implant treatment, pointing out the fact that when an individual's need alters from latent to manifest, the treatment desire changes even more.

Cost was the major gatekeeper for not expressing desire for implant treatment. Costs, along with uncertainty about risks and physical and technical prerequisites, are among the factors that apparently can influence a patient's choice of prosthodontic treatment.

The findings in the present study are in agreement with those in previous articles in this series, where it is inferred that there is no true objective or subjective need and demand, especially in prosthodontic treatment. Manifest need and demand change over time and are influenced by the patient's attitude and situation and the clinician's practice profile. True need can only be identified in a dialogue between the professional and the patient.

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