

ORIGINAL ARTICLE

Impact of prosthetic rehabilitation type on satisfaction of completely edentulous patients. A 5-year prospective study

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Abstract

Objective. The aim of this study was to evaluate the satisfaction of rehabilitated edentulous patients in relation to implant prosthetic type. **Materials and methods.** This prospective cohort study included 40 completely edentulous patients wearing conventional prostheses. They were divided into two study groups: Group A contained 20 patients rehabilitated with implant-supported fixed prostheses and Group B contained 20 patients with overdentures. Subjects were evaluated by means of a specially designed questionnaire before treatment and after 1, 3 and 5 years. **Results.** Group A exhibited better results in terms of esthetics, function and personal satisfaction, although without statistically significant differences. However, statistically significant differences were found within parameters of oral hygiene after 1 year in favor of Group B. **Conclusions.** Overall satisfaction was seen to increase after implant rehabilitation, regardless of the type of prosthesis used. The satisfaction of edentulous patients differs depending on prosthetic type. Patients rehabilitated with fixed prostheses obtain a generally higher level of satisfaction than patients wearing overdentures.

Key Words: Oral Health Impact Profile, overdentures, fixed prostheses, level of satisfaction

Introduction

Life expectancy has increased during recent decades and this is reflected in a growing number of edentulous patients [1]. Edentulism has a considerable impact on these individuals' lives and this has led to numerous studies that analyze quality-of-life in relation to oral health [2–4]. There are various systems and scales for evaluating patient satisfaction in use.

The Oral Health Impact Profile (OHIP) is a tool for measuring patient perception of the social consequences of oral health-related problems. OHIP was developed by Slade and Spencer [5] and is the most complete and sophisticated measure of oral health in use in North America, Canada and Australia. It consists of 49 questions organized in seven parts: functional limitation, physical pain, psychological

pain, physical disability, psychological disability, social disability and handicap. Subject responses take the form of a Likert Response Format scale [6].

The Social Impact Questionnaire (SIQ) and other similar questionnaires are used to evaluate the impact of oral health problems on social and sexual relations [7]. Other evaluation systems designed to assess the psycho-social impact of complete edentulism are the Hopkins Symptom Check List (HSCL) and the Linear Analogue Self-Assessment (LASA) [8].

The Denture Complaint Questionnaire [9,10] is a questionnaire that includes specific questions about esthetics, such as size, color and position of prosthetic teeth, as well as questions dealing with hygiene, ease of cleaning the prosthesis and removing food accumulated around it.

Patient satisfaction can also be rated using an analog visual scale such as the McGill Denture

Table I. Survey of functional, hygienic, esthetic and personal satisfaction.

How often in the past year have you had the following problems?

Never
Hardly ever
Occasionally
Fairly often
Very often

Trouble pronouncing any words
Sense of taste has worsened
Painful aching in your mouth
Uncomfortable to eat any foods
Felt self-conscious
Felt tense
Diet been unsatisfactory
Had to interrupt meals?
Found it difficult to relax?
Been a bit embarrassed
Been a bit irritable with other people?
Had difficulty doing your usual jobs
Life in general was less satisfying
Been totally unable to function

Had halitosis
Had difficulty cleaning your prosthesis
Felt self-conscious when you smile
Felt that treatment has been a waste of money
Felt that treatment has not been worth the trouble.

Satisfaction Instrument [11]. Each questionnaire or evaluation scale must be adapted to the specific aims of research.

Evaluation of the results following treatment must include both the objective clinical assessment as well as the patient's subjective opinion. Many authors have used scales and questionnaires to measure the satisfaction of patients wearing full conventional dentures and who were treated with implant-retained overdentures [12,13]. However, in the literature, no comparison of patient satisfaction has been performed for patients wearing different types of implant prostheses.

The aim of this 5-year prospective study was to evaluate the patient satisfaction of completely edentulous patients following rehabilitation with implant-supported prostheses or overdentures and the impact of prosthetic type on quality-of-life. Patient satisfaction was evaluated by means of a questionnaire designed to cover the key aspects for assessing the success of an implant-supported prosthesis. The questionnaire contained 19 questions (Table I), the first 14 proceeding from the Oral Health Impact Profile-14 (OHIP-14) and five questions were created to extend the questionnaire into the areas not covered by OHIP-14. Subject responses took the form of a Likert Response Format scale.

The aim of the present study was to discern and evaluate patient satisfaction in relation to oral health in completely edentulous patients treated with implant-supported fixed prostheses. In this way, the research assessed the impact of prosthetic type on quality-of-life.

Materials and methods

Ethical considerations

The ethics committee at Complutense University (UCM), Madrid, Spain, approved the study protocol. The study took place between January 2005 to January 2010 at the Faculty of Dentistry, UCM. After a full briefing as to the nature and purpose of the study, all patients gave their informed consent.

Data collection

Non-probability sampling was used to produce a consecutive case series over 2 years prior to the January 2005 start date. The basic requirement was for total unimaxillary or bimaxillary edentulism rehabilitated with complete conventional prostheses. The total sample group was made up of 18 men and 22 women. The treatment protocol consisted of the development of study models, esthetic analysis (smile line, facial profile, jaw relationships) and computed tomography imaging study. After clinical and radiological study of each case by the surgeon and prosthodontist, patients were divided into two groups. Group A contained 20 patients rehabilitated with implant-supported fixed prostheses and Group B consisted of 20 patients rehabilitated with overdentures (this group included patients requiring sinus lifts or other surgical techniques for grafting, alveolar expansion or distraction prior to rehabilitation with fixed prostheses). Patients were registered in the Department of Dentistry III's database (Complutense University of Madrid).

Of the 20 patients rehabilitated with fixed prostheses, nine had bimaxillary edentulism, the other 11 had unimaxillary edentulism (nine mandibular and two maxillary) and antagonist natural dentition.

The 20 patients rehabilitated with overdentures had bimaxillary edentulism and only one had a conventional prosthesis as an antagonist in the jaw.

Rehabilitation of the 40 patients required a total of 328 Astra TechTM system implants. By consensus between the surgeon and prosthodontist, four implants were placed in the upper maxilla to support each overdenture and eight to support each fixed prosthesis. While, in the jaw, two implants were placed to support each overdenture and six to support each fixed prosthesis.

Patients filled out the questionnaire prior to treatment, when all were wearing conventional prostheses, and then 1 (January 2005), 3 (January 2008) and 5 years (January 2010) after having been treated with implant rehabilitations.

Questionnaire

Patient satisfaction was evaluated by means of a questionnaire designed to cover the key aspects for assessing the success of an implant-supported

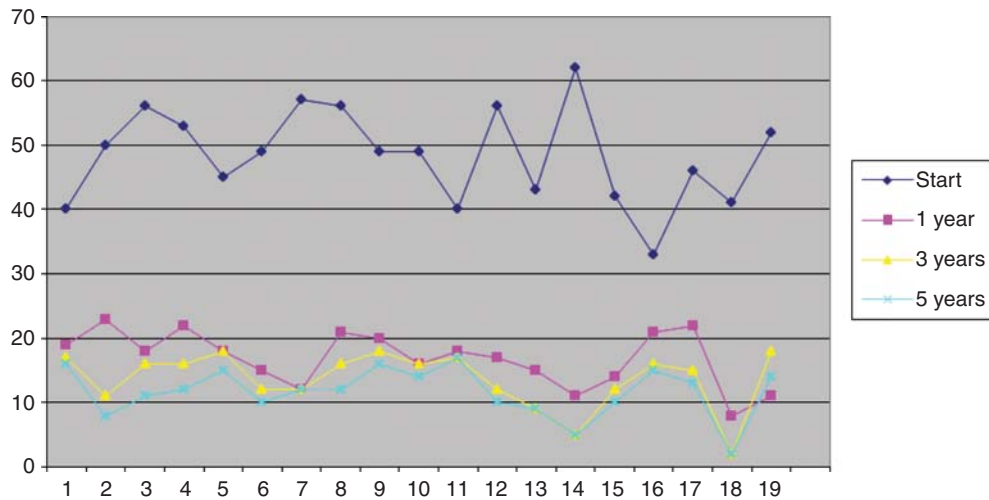


Figure 1. Chronological change in patient satisfaction in patients wearing overdentures. x-axis, 19 questions satisfaction survey; y-axis, total dissatisfaction.

prosthesis: esthetics, function, hygiene and personal confidence. To prevent misunderstanding of the questions by the patients and to avoid any possible bias, the same surgeon conducted all the interviews. The questionnaire contained 19 questions (Table I), the first 14 proceeding from the Oral Health Impact Profile-14. We considered OHIP-14 [14] (a summary of the original OHIP-49) effective for obtaining information concerning the social repercussions of implant-supported rehabilitation treatment (problems in the work place, general life satisfaction, the incidence of embarrassing situations ...) and for assessing function (speech affectation, taste affectation ...). However, the test does not assess other basic requirements of prosthetic rehabilitation such as oral hygiene and esthetics. For this reason, a further five questions were created to extend the questionnaire into these areas not covered by OHIP-14.

Subject responses took the form of a Likert Response Format scale offering five options which scored 0–4 points (never = 0, hardly ever = 1, occasionally = 2, fairly often = 3, very often = 4). The final score was the sum of all points scored, with high marks indicating poor levels of satisfaction.

Statistical analyses

Study data were transferred to a spreadsheet (Excel, Microsoft, Redmond, WA) and exported to a program for statistical analysis (SPSS, Version 17.0 for Windows, SPSS, Chicago, IL). First, a descriptive analysis was performed, followed by an inferential statistics analysis.

Non-parametric statistical testing was applied and Fisher's exact test to evaluate age and sex differences between groups. The Shapiro-Wilks normality test did not reject the null hypothesis that the sample group had a normal distribution. Analysis of variance was used to study the influence of prosthetic

type followed by a multiple comparison to test the influence of time on patient satisfaction.

Results

The sample of 18 men and 22 women were divided into two groups. Group A was made up of 20 patients (average age 61.1 years) rehabilitated with fixed prostheses and Group B of 20 patients (average age 62) rehabilitated with overdentures. The age difference between groups was not statistically significant ($p = 0.71$). Group A consisted of 12 women and eight men and Group B of 10 women and 10 men; the distribution frequency for sex between the groups was not significant, according to Fisher's exact test ($p = 0.65$).

A comparative study of the points scored in the questionnaires before treatment and following the change in patient satisfaction over 1, 3 and 5 years was performed. Significant differences were obtained ($p = 0.003$) between some study times. With statistical confidence of 95%, patient satisfaction improved with statistical significance over the first year following implant rehabilitation. After the first year there was an evenly progressive improvement in patient satisfaction and so no significant differences were found between the third and fifth follow-up years (Figures 1 and 2).

Comparing patient satisfaction between Group A and Group B by means of Analysis of Variance (ANOVA), statistically significant differences were not found between the groups regardless of study time ($p = 0.39$). Prior to rehabilitation, at the first study time, when both groups wore conventional prostheses, group A was more satisfied although without statistically significant differences. This relation continued after the first year and third year of rehabilitation by implant prosthetics, but at the fifth year both groups showed similar levels of satisfaction (Figure 3).

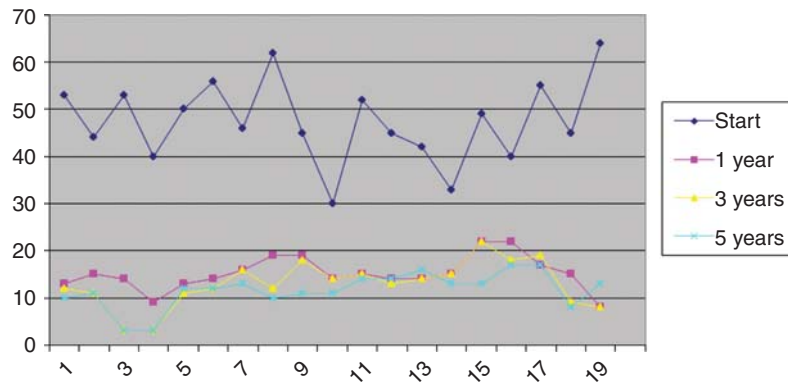


Figure 2. Chronological change in patient satisfaction in patients with implant-supported fixed prostheses. x-axis, 19-questions satisfaction survey; y-axis, total dissatisfaction.

Group A exhibited better results in terms of esthetics, function and personal satisfaction. Socially, the patients felt more confident, relaxed and active and function had improved in mastication, speech and pronunciation, although without statistically significant differences. However, statistically significant differences were found within oral hygiene parameters (parameters 15, ‘had halitosis’ and 16, ‘had difficulty cleaning your prosthesis’) after 1 year in favor of Group B.

Nevertheless, patients rehabilitated with implant-supported fixed prostheses experienced an overall higher level of satisfaction than patients wearing dentures, with statistical differences ($p = 0.03$). After analyzing the survey responses, patients in group A (fixed) have an average score of 32, while patients in group B (overdenture) have an average of 47. This means that the level of patient satisfaction fixed

prostheses is higher, since the maximum score (76 points) indicates the highest level of dissatisfaction.

Discussion

In addition to this study, there are several studies in the literature which evaluate the attitude of patients who were completely edentulous and received implant treatment. The majority of these studies refer to an improvement in the quality-of-life for patients who wore conventional complete dentures after undergoing an implant treatment [15–18].

The design of a randomized clinical trial is needed in order to provide an evidence base with regard to the effectiveness of the treatment; and the measuring instruments chosen should be able to detect real differences where they actually exist. The study analyzed the general opinion of patients who were treated with dentures worn over implants and, as observed by Meijer et al. [19], improvements compared to the initial situation were noted for the vast majority of patients, regardless of the denture they wore.

For any denture, the basic goals are to restore the functionality and esthetics [20] and to replace the missing teeth. This study confirms that this need is clearly satisfied, given that 84.76% of the patients eat well with their new denture, do not present any difficulty when speaking and believe that their physical appearance has improved as a result of the treatment.

In the study by Grogono et al. [21], 82% of patients achieved an improvement in their chewing ability after treatment with implants and most patients treated with implant-supported dentures reported noticing the dentures as ‘part of their physical being’. Geertman et al. [22], in two studies that also assessed the ability to chew, compared complete denture wearers and patients with overdentures and their results were statistically significant in the group of patients treated with an implant-supported denture.

Overall, Boerrigter et al. [23] found that 1 year after implant treatment, 93% of patients with mandibular overdentures were satisfied; and in the studies by

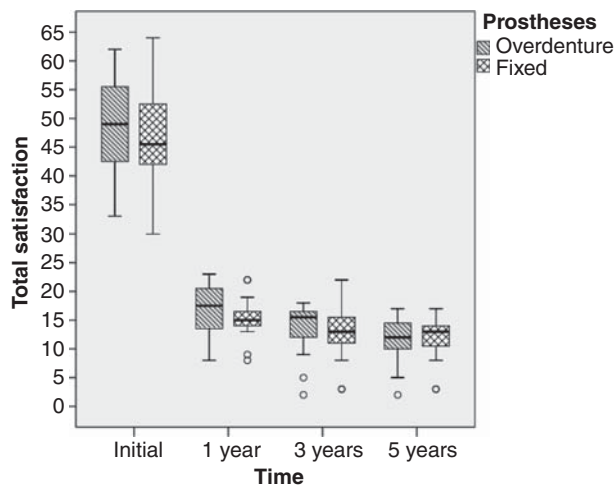


Figure 3. Box plot. Comparison of patient satisfaction between Group A (fixed prosthesis) and Group B (overdenture). Prior to rehabilitation of implants, group A was more satisfied although without statistically significant differences. This relation continued after the first year and third year of rehabilitation by implant prosthetics, but at the fifth year both groups showed similar levels of satisfaction.

Cibirka et al. [24] and Grogono et al. [21], they observed that the patients' satisfaction and subjective perception regarding hygiene, functionality and esthetics with the implant treatment was higher than when they wore a conventional complete denture. Such findings are also consistent with this study, which presents statistically significant results relating to these three points.

This was done using the OHIP-14 [25], a questionnaire validated by numerous other studies. Analysis of social and functional satisfaction included in the OHIP-14 were supplemented by five additional questions concerning esthetics and oral hygiene, so that the questionnaire would cover all the basic requirements of any dental prosthetics [26].

When patient satisfaction was evaluated, no statistically significant differences were found between groups, although satisfaction levels were higher among patients treated with implant-supported fixed prostheses than patients wearing overdentures. Burns et al. [27] concluded that simple treatment with overdentures anchored by ball attachments is sufficient to satisfy patient needs. In our clinical experience, satisfaction will depend on the patients' expectations as well as their experiences with previous prosthetics.

The most significant change experienced by patients was during the first year following rehabilitation. Having expressed their prior satisfaction with conventional removable prostheses, when the questionnaire was repeated after 1 year with implant supported fixed prosthetics, these completely edentulous patients affirmed that their quality-of-life and satisfaction had improved notably, a finding corroborated by other authors [28].

Socially, the patients felt more confident, relaxed and active and function had improved in mastication, speech and pronunciation. However, the results were evolutionarily negative at the 1-year mark with regard to Group A oral hygiene (fixed prosthesis). Although this result was significant, there was a high percentage of 3- and 4-point Likert scale responses (3 = fairly often, 4 = very often), so that patients with fixed prosthetics experienced a reduced capacity to maintain prosthetic hygiene over this time period, while patients with over-dentures found hygiene satisfactory. Ambard et al. [29] compared patient satisfaction in patients wearing overdentures with different types of retention. They concluded that anchorage type does not determine patient satisfaction; plaque and gingival indices between groups were similar and patients generally satisfied with oral hygiene levels.

Conclusions

Most patients treated with implant prostheses experience a good general level of satisfaction. Edentulous

patient satisfaction differs in areas of esthetics, function, hygiene and personal confidence, depending on the type of prosthetics used for rehabilitation. Patients treated with implant-supported fixed prostheses exhibit a higher overall level of satisfaction than patients wearing overdentures.

Further studies with higher sample sizes are necessary in order to compare and confirm the tendencies displayed by these results.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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