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Original article

Changes in oral health-related quality of life during implant treatment in partially edentulous patients: A prospective study

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ABSTRACT

Purpose: The aim of this prospective study was to evaluate the changes in oral health-related quality of life (OHRQoL) during implant treatment for partially edentulous patients, and to evaluate the influence of the type of partially edentulous arch.

Methods: Twenty patients with a small number of lost teeth (fewer than 4 teeth) who underwent implant treatment were selected. Chronological QOL change during implant treatment was measured. The subjects completed the shortened Japanese version of the Oral Health Impact Profile (OHIP-J14) before the surgery (T0), 1 week after the surgery (T1), 1 week after interim prosthesis placement (T2), and 1 week after definitive prosthesis placement (T3). Complete data of the twenty subjects were analyzed with the Wilcoxon signed-rank test.

Results: The total OHIP-J14 score was significantly reduced only at T3 ($P < 0.05$). ''Physical pain'' and ''Physical disability'' scores significantly decreased at T3, and ''Psychological discomfort'' scores also significantly dropped at T2. However, ''Functional limitation'' scores significantly increased at T1. ''Psychological disability'', ''Social disability'', and ''Handicap'' scores remained the same. On the other hand, in the comparison depending on the type of partially edentulous arch, the total OHIP-J14 score significantly decreased at T3 in the unilateral free-end edentulous space, whereas no significant difference was observed in the bounded edentulous space.

Conclusion: Although there is a temporary functional limitation after implant placement in overall OHRQoL improvement was observed after the definitive prosthesis placement. Moreover, implant treatment was more effective in the unilateral free-end edentulous space.

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1. Introduction

The goals of prosthodontic treatment for tooth loss are recovery from functional and esthetic problems and improvement of patients' QOL. Implant-supported fixed dental prostheses have been widely used as one of the prosthodontic treatments for missing teeth, and a high success rate has been reported [1,2]. However, since there are many implant treatment methods, oral health-related quality of life (OHRQoL) in implant treatment has not been fully understood. In addition, most of the previous reports based on clinical assessment [3–6], evaluation of health workers (objective clinical evaluation) and evaluation of patients (subjective evaluation) do not correspond to each other [7–9]. Therefore, an outcome index from the point of view of patients is important.

Patient-reported outcome measures (PROMs) have been reported to be indispensable to evaluate the benefits of dental implant therapy in different clinical situations as part of dental implant research [10,11]. The methods of PROMs include the General Oral Health Assessment Index (GOHAI) [12], Dental Implant Profile (DIP) [13], Oral Health Impact Profile (OHIP) [14], and Subjective Oral Health Status Indicator (SOHSI) [15]. Among these, OHIP is a self-reported questionnaire on OHRQoL consisting of 49 questions under seven subscales [14]. It has been translated into different languages and used worldwide, including in China [16], Germany [17], Spain [18], Brazil [19] and Japan. Shortened versions have also been introduced [20–22] to reduce the response time, such as OHIP-14 [23,24]. The Japanese version of the OHIP is also a valid questionnaire to measure the oral health-related QOL, and it has been reported to facilitate evaluation of the effectiveness of prosthodontic treatment [25].

A number of studies on patient-reported outcomes of implant treatment have been conducted regarding implant-supported overdentures and implant-supported fixed prostheses for a single or small number of missing teeth [26–30]. However, few studies have demonstrated a change in detailed patient-reported outcomes during implant treatment. Furthermore, when performing conventional removable denture therapy for a partially edentulous arch lacking 2 or 3 teeth, the therapeutic effects and patient satisfaction level vary between Kennedy classification types II (a unilateral edentulous area located posterior to the remaining natural teeth) and III (a unilateral edentulous area with natural teeth both anterior and posterior to the area). Similarly, when performing implant therapy, the patient satisfaction level is likely to vary depending on the type of partially edentulous arch. However, to the present, there have been no reports on this issue. The aim of this prospective study was thus to evaluate the change in OHRQoL in patients with a small number of lost teeth during implant treatment at each treatment step, and to evaluate the influence of the type of partially edentulous arch, such as bounded and unilateral free-end edentulous space.

2. Materials and method

2.1. Subjects

The subjects ($n = 20$) were partially edentulous patients (the number of missing teeth was three or less) who underwent implant surgery at Kyushu Dental University Hospital between March 2010 and September 2011. They were well informed about the study protocol and provided their written consent for participation. This research was approved by the Ethics Committee of Kyushu Dental University (approval number 11-59) and followed the guidelines of the amended Declaration of Helsinki. We excluded patients with certain criteria (severe diabetes, previous chemotherapy, previous irradiation of the head and neck region, progressive periodontitis, immunosuppression, human immunodeficiency virus infection), as well as those who had poor oral hygiene or were pregnant. Patients who needed bone grafting were also excluded.

2.2. Surgical and prosthetic procedure

In six subjects, the surgery was performed under intravenous sedation in addition to local anesthesia. Only local anesthesia was used in 14 subjects.

One to three rough titanium implants (NobelSpeedy Groovy, Nobel External Mark III, Nobel Replace Tapered Groovy; diameter, 3.5–5.0 mm; length, 8.5–18 mm; Nobel Biocare, Tokyo, Japan or Straumann TE implant; diameter, 3.3–4.8 mm; length, 8.0–10 mm; Straumann, Tokyo, Japan) were placed in each jaw using the conventional protocol. The initial fixation torque was more than 30 Ncm. The acrylic interim prosthesis was fixed at least 2 months after the surgery, when the Periotest value was less than zero [31]. The definitive prosthesis was placed after another month or more, when the marginal bone and soft tissue had stabilized.

2.3. Evaluation of OHRQoL

The shortened Japanese version of the OHIP (OHIP-J14) was used [32,33] to assess OHRQoL. The subjects answered 14 questions under seven subscales (two items each) using five choices before the surgery (T0), 1 week after the surgery (T1), 1 week after interim prosthesis placement (T2), and 1 week after definitive prosthesis placement (T3). Scoring was as follows: very often = 4; fairly often = 3; occasionally = 2; hardly ever = 1; and never = 0. The total OHIP-J14 score (range 0–56) and subscale scores (range 0–8) were then calculated, with a higher score suggesting lower OHRQoL.

2.4. Statistical analysis

The Wilcoxon signed-rank test was used for comparisons of T0 with T1, T2, and T3. Then, Bonferroni correction was applied. $P < 0.05$ was considered significant.

3. Results

3.1. General findings

The mean patient age was 51.9 years (range 34–77 years). Ten women and 10 men received dental implants (8 and 25 in the maxilla and mandible, respectively): there were 6 bonded edentulous space cases and 14 unilateral free-end edentulous space cases (Fig. 1).

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