



Original article

Oral health and oral implant status in edentulous patients with implant-supported dental prostheses who are receiving long-term nursing care

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Oral health and oral implant status in edentulous patients with implant-supported dental prostheses who are receiving long-term nursing care

Aim: The aim of this study was to investigate oral health and oral implant status in a group of edentulous patients receiving long-term residential or nursing care (LTC), all of whom had implant-supported fixed or removable dental prostheses.

Material and methods: A dental examination was performed on a total of 3310 patients receiving LTC and from this population 35 edentulous patients in whom dental implants had been placed formed the cohort for this study. All examinations were performed by a specialist in hospital dentistry and took place in the patients' own home environment. Oral health was assessed by means of a protocol which evaluated oral hygiene status, possible oral mucosal inflammation and oral mucosal friction levels. Any problems with the implant-supported prosthesis, implant mobility or other complications were also assessed. In addition, patients were asked about any oral symptoms and their usual oral hygiene procedures.

Results: About half of the subjects (17/35) were registered as having no/mild inflammation with 18 of 35 having moderate/severe inflammation. Twelve of the 35 patients had good/acceptable oral hygiene and 23 of 35 had poor/bad oral hygiene. Twenty-one of the 35 patients depended on help from the nursing personnel for their daily oral hygiene procedures. Obvious problems with food impaction were noted in 11 patients. A total of 229 implants had been placed in 43 jaws supporting 40 full arch-fixed prostheses and three implant-borne overdentures. There was no evidence of mobility or fractures of either the implants or the prostheses. Fifteen implants showed some exposed screw threads. Pus was exuding from one implant site and general peri-implant gingival hyperplasia was noted in two patients. Twenty-four patients were completely satisfied with the function and appearance of their implant-supported prostheses. Two patients were totally dissatisfied.

Conclusion: This study indicates that oral implant therapy can be considered as a treatment of choice in elderly patients, even if oral hygiene is sub-optimal.

Keywords: implant, edentulous, elderly, long time care.

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Introduction

The ideal oral rehabilitation of edentulous patients may require the installation of endosseous implants to support a fixed or removable prosthesis. Good long-term clinical results have been demonstrated in this group of patients, particularly in cases where conventional prosthodontic treatment has failed, or is unacceptable to the patient¹⁻³.

A regulation was introduced by the Swedish National Dental Health Care Insurance^{4,5} in 1999 which stipulated that increased economic support should be given for the dental care of persons who, due to disease or handicap, were dependent on aid from nursing personnel for their daily activities. This support is intended for all those receiving long-term residential or nursing care (LTC). This includes care given in nursing homes or homes for

the elderly (NH), or high dependency care given in a patient's own home with the assistance of visiting nursing personnel (HC). Being enrolled in this type of care entitles the recipient to an annual, free-of-charge, oral health examination on a voluntary basis. This population group is also entitled to receive whatever is considered as necessary dental treatment on the same economic basis as medical treatment, with a set low fee.

Aim

The aim of this study was to investigate the oral health and oral implant status in a specific group of edentulous patients receiving long-term residential or nursing care as described above. All the patients examined had implant-supported fixed or removable dental prostheses.

Materials and methods

This cohort study was carried out in a county in the south-west of Sweden. The subjects were receiving LTC, either in NH and in municipal HC.

The inclusion criteria were edentulous patients who had been treated with dental implants to achieve full oral rehabilitation. The initial examination was carried out by dental hygienists as part of a visiting oral health examination of patients within LTC; patients who all had accepted the annual free-of-charge, oral health examination on a voluntary basis. Patients, who fitted the inclusion criteria, were enrolled in the study group and a second examination was performed by a single specialist in hospital dentistry. The visual chair-side or bedside oral examinations took place in the patient's own home environment, using a dental mirror and a halogen lamp.

A total of 3310 subjects (1236 male and 2074 female), were assessed in the initial screening examination. From this population 38 patients met the inclusion criteria. Three patients were removed due to severe health problems. The final study group consisted therefore of 35 patients (12 male and 23 female) with a mean age of 84.1 years.

Oral health was estimated by means of a previously reported study protocol which evaluates oral hygiene status, oral mucosal inflammation and oral mucosal friction⁶⁻¹⁰.

Oral hygiene status, recorded for teeth and dentures by means of a modified plaque index, was estimated on a four-level scale as *good*, *acceptable*, *poor* or *bad*^{7,8}, with:

- *good* indicating good oral hygiene, with absence of visible plaque on teeth or dentures

- *acceptable* indicating acceptable oral hygiene, with negligible accumulation of plaque
- *poor* indicating less good oral hygiene, with moderate accumulation of plaque
- *bad* indicating bad oral hygiene, with abundant amount of plaque.

Oral mucosal inflammation, expressed as a mucosal index, was estimated on a four-level scale as *no inflammation*, *mild*, *moderate* or *severe inflammation*^{7,8}, with:

- *no inflammation* indicating a normal appearance of the gingiva and oral mucosa
- *mild inflammation* indicating slight changes in colour and/or form of the gingiva and/or slightly red keratinised mucosa, including red spots indicating inflamed salivary duct orifices
- *moderate inflammation* indicating marked redness and oedematous gingiva, bleeding easily when pressure is applied, and/or marked redness of keratinised mucosa and/or salivary duct orifices and/or ulceration(s) caused by denture(s) and/or hyperplasia caused by denture(s)
- *severe inflammation* indicating severe redness with severe gingival swelling, spontaneously bleeding gingiva and/or severely red and oedematous palatal mucosa; including proliferations, inflamed hyperplasias or bleeding oral mucosa.

Dry mouth was recorded by means of the mucosal friction index, as *none*, *some* or *obvious dryness*¹⁰ with:

- *no dryness* indicating absence of friction between the dental mirror and the buccal mucosa
- *some dryness* indicating some friction between the dental mirror and the buccal mucosa, but no tendency of the mirror to stick to the buccal mucosa
- *obvious dryness* indicating obvious dryness between the dental mirror and the buccal mucosa, where the mirror sticks or shows a tendency to stick to the buccal mucosa.

The number of implants, the type of prosthetic construction, possible implant mobility and other complications were also recorded. In addition, a short questionnaire was completed regarding subjective oral comfort and any oral hygiene procedures performed.

Results

Approximately half of the subjects (17/35) were registered as having no inflammation to mild inflammation with 18 of 35 showing moderate to severe inflammation. Twelve of the 35 patients had good/acceptable oral hygiene and 23 of 35 had poor/bad oral hygiene (Table 1). Twenty-one of the 35 patients were dependent on help from the

Table 1 Oral hygiene (OH) status in relation to oral mucosal inflammation (inflammation) on patient level, registrations in implant-jaw. Eight patients had implant constructions in both jaws, and their worst registered jaw is noted ($n = 35$).

	<i>Toothbrushing performed by the patient</i>	<i>Toothbrushing with help</i>	<i>n</i>
Good/accept OH + no/mild inflammation	7	3	10
Good/accept OH + moderate/severe inflammation	1	1	2
Poor/bad OH + no mild inflammation	2	5	7
Poor/bad OH + moderate/severe inflammation	4	12	16
<i>n</i>	14	21	35

nursing personnel for their daily oral hygiene procedures, with the remaining 14 able to perform their own oral hygiene. The latter group scored better in both oral hygiene measures and gingival inflammation than the group who were dependent on nursing help (Table 1). No statistically significant difference was found between patient-performed and staff-performed oral hygiene procedures, regarding degree of oral inflammation. Eleven subjects showed evidence of food impaction at the time of examination.

Implant-supported prostheses in both the upper and lower jaw were noted in eight patients (8/35), where all except one were fixed prostheses. Eight of the remaining 27 patients had fixed implant-supported prostheses in the maxilla only. The remaining 19 patients had mandibular implant-supported prostheses only, of which 17 were fixed and two were removable. In total, 229 implants had been installed in 43 jaws, supporting 40 full arch-fixed prostheses and three implant-borne overdentures.

No mobility or fractures of the implants or prostheses were recorded. One overdenture in the mandible showed inadequate retention.

Fifteen implants exhibited some exposed threads on the buccal aspect, and pus was evident at one implant site. Peri-implant gingival hyperplasia was noted in two patients.

Eight patients recalled having had their fixed, implant-supported prosthesis for more than 15 years, four of these for more than 25 years.

None of the patients were registered as showing obvious oral dryness of the oral mucosa.

When questioned about their subjective experience, 24 of the 35 patients were satisfied with all aspects assessed – namely, they were content with their prosthesis, chewing ability, speech and taste. Two patients, both with fixed prostheses, stated that they were not satisfied when asked about these aspects. The remaining nine gave answers that included both ‘satisfied’ and ‘don’t know’.

Five patients reported smoking. Three of this group showed no inflammation, with moderate inflammation being recorded in two patients.

Discussion

In this study, some patients recalled having had their fixed, implant-supported prostheses for several decades, indicating that this was a good option for treatment in elderly patients. Most of the patients were provided with fixed implant-supported prostheses, with about five–six implants/jaw. The reason for this could be the former (up to July 2008) generous policy from the Swedish Dental Insurance, facilitating this type of restoration with economic subventions in persons aged 65 years or older.

Maintaining acceptable oral function (i.e. mastication, phonetics, oral hygiene, chewing comfort and aesthetics) is important within elderly care in order to prevent deterioration in nutritional status as indicated by low body mass index scores¹¹. Treatment with oral implants is a well-established way to reduce the effect of total edentulism and to improve oral function¹². In addition, self-confidence may be increased¹³. Edentulous patients with diseases affecting motor skills may particularly benefit from implant treatment¹⁴, as may patients prone to infection¹⁵.

One regrettable aspect is the negative opinion of dentists towards a well-organised community approach¹⁶ even if, in Sweden, there are increased resources to meet the oral needs of the elderly^{4,5}. As Bryant *et al.*¹⁷ have expressed:

The dental profession has been so successful in motivating independent adults to improve their oral health that oral diseases are now becoming a problem of old age, particularly for those who have lost the ability to care for themselves.

The elderly population is increasing in the Western world and the future need for supportive care will undoubtedly increase. Before older people

reach this situation the dental profession should prepare them for the future by providing a satisfactory oral environment that they are able to maintain, as concluded by Nordström¹⁸.

If oral hygiene procedures and dental treatment become difficult to perform in an optimal way, some deterioration of oral status might be regarded as unavoidable. However, the vulnerability of persons in need of daily care should be recognised and it should be understood that this group may also have lost the ability to gain access to medical and dental care¹⁹.

With this in mind, the responsibility of dentists to give supportive periodontal therapy²⁰ should continue even if patients become dependent on others for their daily living needs.

Restoring the dental function of elderly patients with implant restorations is one way to maintain or increase oral function and comfort. Even if the patient and/or the nursing staff are unable to maintain ideal oral hygiene this study indicates that good function can be preserved. There is a need to increase the knowledge of nursing staff within LTC regarding the importance of oral care, as maintaining acceptable oral health in this group has long been considered an urgent concern^{21,22}. The maintenance of acceptable oral hygiene is of utmost importance, particularly when general health is decreasing, as oral co-morbidities of many chronic diseases are well recognised^{23–26}. Furthermore, the use of overdenture constructions requiring only a few implants^{27–29} with retention by means of balls, bar attachments or magnets as required, should be considered more often. This concept involves less invasive surgical procedures and removable prostheses allow easier management by patients and/or nursing staff in providing acceptable oral hygiene. This approach is supported by the conclusion in the McGill consensus statement on overdentures³⁰, which states that there is overwhelming evidence that a two-implant overdenture should become the first choice of treatment for the edentulous mandible.

Conclusion

This study indicates that oral implant therapy can be considered as the treatment of choice in elderly patients, even when oral hygiene is not optimal.

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