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Article

Satisfaction level in dental-phobic patients with implant-supported rehabilitation performed under general anaesthesia in patients with dental phobia: a prospective study

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Abstract: **Background:** Phobic patients with dental phobia avoid dental treatment, impairing their oral health and making it challenging to offer them prosthetic rehabilitation. This study evaluated patients' experience of implant-supported rehabilitation treatment prosthetic treatment after implantation performed under general anaesthesia due to dental phobia and severe pharyngeal reflexes (SPR). The effect of sex gender, age, and implant location of implantation on patient satisfaction was evaluated tested.

Methods: Two hundred five patients underwent implantation under general anesthesia both in one or both the jaws maxilla and mandible, respectively. After a trans-gingival healing period of 6–8 weeks, fixed implant bridges were inserted. Patients completed were administered the Oral Health Impact Profile questionnaire (OHIP-14). An additional set of six special questions was also developed and considered. Analysis of The OHIP-14 total score was made analyzed using logistics regression. The Wald chi-square test was used to analyze analyze the effect of age, sex gender and implant location on patient satisfaction of implantation. Effect sizes were estimated as odds ratios and associated 95% Wald confidence intervals. **Results:** Eighty two of the 205 patients were included after prosthetic treatment. After the start of treatment, 38 patients were excluded (4 died and 34 could not be reached). Forty-three patients were finally included in the OHIP-14 analyses were made by 43 patients (30–90 years), after the exclusion. Sixty-seven percent 67% of patients were totally satisfied with the whole implant rehabilitation (score 0). Mean of total score was 2.5. Only age significantly affected significantly (P=0.014) patients satisfaction. The obtained data indicate that younger patients (30–64 years), especially women, were less satisfied with their treatment (4.95) than older patients (0.3) for age group (65–90 years). Special questions' data showed that 94.5% patients were satisfied with their treatment, 77.3% continued regular check-up after treatment and 96.9% would undergo the same treatment again. 95.5% would recommend implants to a friend of colleague.

Conclusion: Sex Gender and implant location of implantation had no significant influence on patient satisfaction. Younger patients, especially women, were less satisfied than older patients.

Keywords: dental phobia; general anesthesia; implant-supported rehabilitation; patient satisfaction; severe pharyngeal reflexes

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1. Introduction

Anxious patients ~~due to~~with dental phobia or severe pharyngeal reflexes (SPR) show poorer oral health and more decayed and missing teeth than typical individuals [1]. Prosthetic treatments are needed for ~~replacement~~covery of missing teeth in these patients; however, these patients are uncooperative and show poor ~~compliance to~~ dental treatment ~~compliance~~, which complicates any treatment, increases risk of failure, and makes it difficult to perform implant-supported rehabilitation [2–3]. A ~~very~~ long procedure is expected if implantation is considered for these patients. Consequently, local anesthesia ~~is will be~~ insufficient ~~for to perform an~~ adequate operation [4–5]. In such cases, surgery under general anesthesia ~~is could be~~ an option that enables patients undergoing implant treatment to improve their oral health, and well-being.

General ~~anaesthesia~~anesthesia makes it ~~convenient~~possible for patients to have all surgical procedures ~~performed~~carried out in one session, ~~and while then~~ implants can be installed in the maxilla, ~~or~~mandible, or ~~if needed in both the~~ jaws in ~~one another single~~ appointment [6]. ~~As known,~~Rehabilitation with implants prevents continuous alveolar bone resorption, ~~and~~ preserves alveolar ridge height and width, ~~which ensures~~ensuring positive aesthetic outcomes [7–8] ~~and~~, comfort and efficacy of prosthetic reconstruction [9–10,11]. Additional positive factors for patients are increase in self-esteem, and patients' satisfaction [12–13].

When assessing the outcome of implant treatment, it is important to consider both the clinicians' and ~~the~~patients' appraisals [14–15,16]. For ~~the~~clinicians, implant survival, prosthesis longevity, and ~~the~~complications are the most important factors. ~~However~~On ~~the other hand~~, cost effectiveness, ~~benefit,~~ and social and psychological impact of the treatment are more important for ~~the~~patients [17–18]. Patients' satisfaction depends on function, comfort, esthetics, and speech disruption [15–17] and may represent a crucial factor of implant success for the patient [19–20,21,22]. Patient satisfaction is seen ~~as~~ a vital aspect ~~by evaluating of~~ the overall quality of dental rehabilitation and should be ~~made~~ ~~deter-~~mined on a regular basis to allow clinical practitioners to assess their services [23–24,25].

The Oral Health Impact Profile (OHIP) questionnaire is an instrument developed ~~to be used for use~~ in clinical studies [26–27,28,29,30,31,32,33] to measure ~~Q~~Oral ~~h~~Health-~~re-~~lated ~~q~~Quality of ~~L~~ife (OHRQoL). Several short versions of this tool have been developed, such as ~~the version~~ OHIP-14, which consists of seven subgroups with two questions for each ~~subgroup one~~ [27,28,31].

Most dental satisfaction studies ~~were have been~~ performed on general dental treatment [34], and patients with dental anxiety ~~have been shown to be~~ ~~have been shown to be~~ significantly associated with greater dissatisfaction [35]. ~~Therefore, the present~~the study aimed ~~of the study is therefore~~ to evaluate ~~the~~ satisfaction of partially edentulous patients, ~~experiencing~~suffering from dental phobia and SPR, with their implant-supported rehabilitation ~~performed~~carried out under general anesthesia in one or both ~~the~~ jaws. The effect of ~~sex~~gender, age, and ~~implant~~location ~~of implantation was ill be tested~~evaluated. This study evaluated patients' experience of oral surgical and prosthetic procedures as well as their satisfaction with ~~the~~ treatment outcome. The hypotheses of this study are ~~as follows~~:

- ~~p~~Patients ~~exhibiting~~suffering from dental phobia and SPR will experience good patient satisfaction after implant treatment under general anesthesia;
- age, ~~sex~~gender, and ~~implant~~location ~~of implantation~~ will affect patients' satisfaction;
- success of rehabilitation with ~~fixed~~ implant ~~fixed~~ bridges ~~by in~~ these patients is similar to ~~that in those~~at ~~by patients~~ treated without general ~~anesthesia~~.

2. Materials and Methods

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In this study, the OHIP-14 questionnaire was used to measure patient satisfaction in this investigation. It is a 14-questions survey, grouped into seven domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap (Annex). The OHIP-14 questionnaire has been previously translated into Swedish, and the reliability and validity have been tested and the questionnaire has been recommended for use in studies in the Swedish population [28]. Additionally, a set of six special questions related to patients' dental behaviour and treatment satisfaction (Table 1) was developed and used in Swedish-Sweden and used as well. The study proposal was submitted to the ethical committee of Stockholm in Sweden (No 2014/1811–31/1). The board of the ethical committee did not see any ethical research obstacles to this study.

2.1. Study Population

This prospective study included ~~volved~~ partially edentulous patients who had lost their teeth in one or both the jaws and ~~were~~ treated under general anaesthesia with screw-retained fixed implant bridges between 1 January 2006/2006, to and 31 December 31, 2012/2012, in a private clinic in Stockholm, Sweden. Informed consent was obtained from all individual participants included in the study. All treated patients had to be in a good general health condition to be eligible for general anaesthesia/anaesthesia, which was performed and monitored by an anaesthetist/anaesthetist. The implant surgery itself did not differ from the conventional implant procedure used for non-phobic patients treated without general anaesthesia/anaesthesia.

2.1.1. Inclusion Criteria

Patients were selected according to the following inclusion criteria:

- Patients with dental phobia and ~~SPR~~ severe pharyngeal reflexes.
- patients with In good general health condition.
- patients with edentulous maxilla, mandible, or both.
- patients with edentulous jaws a minimum of 6 months after extraction.
- patients with no bone augmentation prior to or in combination with implant insertion.
- Implantation performed under general anaesthesia/anaesthesia.
- implantation with 4–6 Straumann implants (Straumann AG, Basel, Switzerland) in the maxilla.
- implantation with 4–5 Straumann implants in the mandible.
- implantation with screw-retained fixed implant bridges.

2.1.2. Exclusion Criteria

The following patients were excluded from the study:

- patients Treated without general anaesthesia/anaesthesia.
- patients Treated with an other-implant system other than Straumann.
- patients with other-rehabilitation other than screw-retained fixed implant bridges.
- patients Treated with bone augmentation ~~were excluded~~.

2.2. Treatment Protocol

Patients were treated according to the following protocol:

- 1) Total extraction due to caries or periodontitis or both was done under general anaesthesia/anaesthesia, followed by at least a 6-month healing period.
- 2) Interim removable dentures were fabricated/produced in advance and used by the patient during the healing period.
- 3) Straumann implants were placed in the edentulous maxilla, mandible, or both the jaws (4–6 implants in the maxilla and 4–5 implants in the mandible) while patients were under general anaesthesia/anaesthesia in the edentulous one jaw or in both (4–6 implants in maxilla, 4–5 implants in mandible).

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4). A trans-gingival healing period of a minimum of 6 to 8 weeks was maintained before continuing the treatment (delayed loading).

5). Final restoration with Fixed implant bridges was performed. treatment was the final restoration.

2.3. Protocol for General anaesthesia Anesthesia

Premedical evaluation of each patient was performed by the anaesthetist anaesthetist. General anesthesia was induced Induction starts preoperatively in through a peripheral venous line with 4 mg bBetamethasone (Celestone, Merck & Co. Inc., Whitehouse Station, NJ USA), 0.5 mg aAtropine sulphate (Myian AB, Stockholm, Sweden), and 2 g bBenzylpenicillin (Meda AB, Solna, Sweden). In case of allergy to bBenzylpenicillin, clindamycin was used (Clindamycin Orifarm, Stockholm Sweden). Fluid with glucose, rRehydrex 500 mL (Fresenius Kabi, Halden Norway)l, was administered during anaesthesia anaesthesia (Fresenius Kabi, Halden Norway).

2.4. Protocol for Surgical Procedure Under General anaesthesia Anesthesia

Xylocaine/adrenaline (Dentsply Pharmaceutical, ONY, United Kingdom) was used as local anaesthesia anaesthesia. A Surgical flap was designed individually allowing good inspection of the bone and surrounding area. Further, 4–6 or 4–5 Straumann implants 4 to 6 and 4 to 5 were placed in the maxilla and mandible, respectively. The implants were inserted with external saline cooling of the drills. Healing abutments were applied were placed for external healing. Wound closure was done with Vicryl 3–0 (Ethicon, Johnson & Johnson, Diogen, Belgium). The patients were allowed to use their soft relined removable dentures directly after implant insertion. A minimum of 6 to 8 weeks of healing time was maintained before taking an impression taking for prosthetic restoration.

2.5. Data Collection

Data of from the OHIP-14 questionnaire and the set of special questions were collected through follow-up visits at least 3 years after prosthetic treatment. The patients filled the patient consent form and the questionnaires at the recall examination under the supervision of one of the authors who was is not involved in the treatment to avoid bias and any effects of interpersonal reactions. The individuals patients expressed their level of satisfaction by answering questions. These answers hav could have a score from 0 to 5.

2.6. Data Analysis/Statistical Methods

The nNumber of included patients, sex gender, age, number of installed implants placed, and date of implant surgery were are summarised summarized using descriptive statistics, including mean, standard deviation (SD), median, range, frequency, and percentage. Analysis of the OHIP-14 total score was done using logistic regression. The Wald chi-square test was used to analyze the effect of age, sex, and implant location. Effect sizes were estimated as odds ratios and associated 95% Wald confidence intervals.

3. Results

Eighty-two patients who were treated with implants under general anesthesia between January 1, 2006, and December 31, 2012, 01.01.2006 to 31.12.2012 were and included and treated in this study. Subsequently After start, 38 patients were excluded (four 4 died and 34 could not be reached to complete the were lost to follow-up follow up after prosthetic treatment). One patient had missing data on several OHIP-14 items. The total patients number of patients included in the analyses of the OHIP-14 analyses was was 43 (30–90 years). Table 2 shows the distribution of sex gender, age, and implant location of implantation among these patients. The majority of patients were women

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females (63.6%). Of all the implants inserted, 47.7% of the implants were inserted in the maxilla and 31.8% of the patients had implants were installed inserted in both the jaws.

The implant treatment of all 43 patients included in this study was successful with regard to as far as function and comfort. The follow-up period after the prosthetic reconstruction ranged from 3 to 9 years. Figure 1 shows the OHIP-14 total score distribution for all patients. The OHIP-14 total score was low for the majority of the patients with 67% scoring 0 and with a mean value total score of 2.5. The OHIP-14 total score by subgroups i.e., sex, gender, age, and type of intervention group, are is shown in Figures 2, 3, and 4, respectively. The graphs seem to suggest some differences. However, the data indicate that younger patients (age group 30–64 years), especially young women, were are less satisfied (mean = 4.95 ± 9.81) than older patients (age group 65–90 years;) with (mean = 0.3 ± 0.76). Logistic regression analysis (Table 3) was used to investigate the relationship between these background variables and the OHIP-14 total score.

4. Discussion

The literature shows that patients satisfaction has been considered as an important criterion for treatment success since it is associated with compliance and in turn, anticipated treatment quality [9,10,11, 37]. The first hypothesis of this the current study was confirmed because the results clearly demonstrated that the included patients were are generally satisfied with their treatment and had we good OHRQoL after treatment. The overall of patients showed have even changes d in their dental behaviour behavior, which and continued even after the performed oral rehabilitation, and they to visited a dentist or an oral hygienist for regular check-ups. The second hypothesis was confirmed in partly because the obtained data showed that only age significantly affected patient satisfaction. Younger patients are were less satisfied than older patients. However, But patients' sex gender and implant location of implantation did not influence patient satisfaction. Evaluation of the results showed that the implant-supported bridges were successfully maintained in all patients after 3 to 9 years of function, which confirmed the third hypothesis. The s Success was measured as the retention of the original screw retained bridges over time. Patient satisfaction is an important criterion for treatment success since it is associated with compliance and, in turn, anticipated treatment quality [9–11,37]. Similar results of success have been shown reported in several studies on patients treated without general anesthesia [9,10,37–38,39].

The OHIP-14 questionnaire used in this investigation was previously validated and recommended for use in clinical studies [27,28,31]; it covers a wide range of oral health-related problems, i.e., functional limitation, physical discomfort, psychological discomfort, physical disability, psychological disability, social disability, and handicap [26,29–30,31].

Precise evaluation of the results indicated s that only age has a statistically significant effect ($p < 0.05$) on patients' satisfaction, reflecting and that the number of patients viewing themselves as "problem free" increased with age. Analyses of data by subgroups indicate that younger patients, especially women, show more psychological discomfort and are less satisfied than older patients (Figs. 2 and 3). This is an interesting observation and may reflect suggests that aesthetics has become an important issue in modern society [40] and that the social life style and attitude of younger peoples' social life style and attitude differ from those of older individuals' people. These results are in line with those of a previous study [28], which also shows that oral discomfort has different influences on life depending on sex gender and age. In the current study, the sex Gender of patients and location of the intervention showed in this study no significant influence on patients' satisfaction ($P > 0.05$). However, a remarkably aspect is that, in all age groups presented in the graph 2, there are less satisfied women were less satisfied with their treatment than men.

These data are in accordance with the findings of Pjetursson et al. [41] who (41) finding; they reported find that more than 90% of patients treated with crowns or implant-

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supported fixed partial dentures are completely satisfied. The obtained results confirmed that 77.3% of the included patients in this study visited a dentist or an oral hygienist for regular check-up after treatment check-up. Most patients (93.9%) did not regret this kind of treatment and (96.6%) were willing to have the same treatment performed again if needed required.

The findings of this the current study indicate that the preoperative psychological factors due to dental phobia and SPRs have no effect on post treatment patients' satisfaction with their implant treatment performed under general anesthesia.

5. Conclusions

From the results we conclude, with regard to the problem addressed that it is recommended to perform implant treatment under general anesthesia on patients with dental phobia and SPR under general anesthesia. Consequently, implant-supported prostheses can become a treatment option for these patients who otherwise refuse dental treatment, because of the availability of general anesthesia become a treatment option for these patients who otherwise would stay refusing any. Furthermore, contact to the dental professionals, who in turn, have usually excluded implant treatment in in cases involving patients with phobia or SPRs.

Various studies have evaluated investigations were made to study patient satisfaction with implant treatment [41,42]. But to the best of our the knowledge of the authors of this study, there is no study has investigated satisfaction of patients experiencing suffering from dental phobia or SPR after with implant treatment under general anesthesia. Therefore, this study fills an important gap in the academic field and should be used to promote a debate.

Author Contributions:

Funding:

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Stockholm in Sweden (No 2014/1811–31/1).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement:

Acknowledgments:

Conflicts of Interest:

References

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