Cumhuriyet Dental Journal, 27(1): 15-20, 2024
DOI: https://doi.org/10.7126/cumudj.1378172

Cumhuriyet Dental Journal

| cdj.cumhuriyet.edu.tr | Founded: 1998 | Available online, ISSN: 1302-5805 e-ISSN: 2146-2852 | Publisher: Sivas Cumhuriyet Üniversitesi

Evaluation of Quality of Life and Satisfaction in Patients with Implant-Supported Fixed Partial Dentures

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Research Article

History

Received: 18/10/2023
Accepted: 29/01/2024

ABSTRACT

Objectives: This study evaluated the satisfaction level of the dental implant-treated patients using the oral health impact profile-14 (OHIP-14) and VAS scale after 6.5 years (±1.5 years) of the treatment.

Materials and Methods: Fifty-six partial edentulous patients were included in this clinical study. A total of healthy 185 implants were selected according to the dental implant health scale accepted by the International Congress of Oral Implantologists Consensus (ICOI) and 122 fixed implant- supported prosthesis were evaluated for this study. The patient-reported effect was prospectively obtained by measuring oral health impact (OHIP-14) and Visual Analogue Scale (VAS) with a follow-up 6.5 years (±1.5 years) period. The distribution of variables was checked using the 0ne-Sample test. SPSS 22.0 programme was used for the analyses.

Results: The patients were defined with high satisfaction results after 6.5 years (±1.5 years) by implant placement. The mean OHIP score was 2.82 (SD ± 5.44) and the Mean VAS-score for the satisfaction percentage with implant-supported restorations was 87.80 % (SD ± 13.79). The results of OHIP 14 and VAS scores indicate that patient satisfaction with fixed implant-supported prosthesis was high in all patients.

Conclusions: The fixed implant-supported restorations served high satisfaction results according to the OHIP 14 and VAS results. These restorations have a positive effect on the quality of life for oral health (OHRQoL).

Key Words: Dental İmplant, Fixed Partial Denture, Oral Health, Quality of Life

İmplant Destekli Sabit Bölümlü Protez Tedavisi Yapılan Hastalarında Yaşam Kalitesi ve Memnuniyetinin Değerlendirilmesi

Süreç

Geliş: 18/10/2023
Kabul: 29/01/2024

ÖZ

Amaç: Bu çalışmada ağız sağlığı etki ölçeği olan OHIP-14 (Oral health impact profile-14) ve (VAS) Vizüel analog skala kullanılarak implant tedavisi yapılan hastaların 6.5 (± 1.5 yıl) yıllık tedavi süresinden sonraki memnuniyet düzeyi değerlendirildi.

Gereç ve Yöntem: Bu klinik çalışmaya kısmi dişsizliği olan elli-altı hasta dahil edildi. Uluslararası Oral İmplantoloji Konsensus Kongresi (ICOI) tarafından kabul edilen dental implant sağlığı ölçeğine göre toplam 185 adet sağlıklı implant seçildi ve 122 adet implant üstü sabit destekli protez değerlendirildi. Hasta tarafından bildirilen sonuçlar, 6.5 yıl (±1.5 yıl) bir takip süresiyle ağız sağlığı profili (OHIP-14) ve Vizuel Analog Scala (VAS) sonuçları ile prospektif olarak elde edildi. Değişkenlerin dağılımı 0ne-Sample testi kullanılarak kontrol edildi. Analizlerde SPSS 22.0 programı kullanıldı.

Bulgular: Hastalarda implant yerleştirilmesinden, 6.5 yıl (±1.5 yıl) sonra yüksek memnuniyet sonuçları belirlendi. İmplant destekli restorasyonlardan memnuniyet yüzdesine ilişkin ortalama VAS skoru % 87. 80 (SD ± 13.79) idi. Ortalama OHIP skoru 2.82 (SS ± 5.44) idi. OHIP 14 ve VAS skorları sonuçlarına göre sabit implant destekli protezlerden hasta memnuniyetinin tüm hastalarda yüksek olduğu görüldü.

Sonuçlar: Sabit implant destekli restorasyonlar OHIP 14 ve VAS sonuçlarına göre yüksek memnuniyet sonuçları vermiştir. Bu restorasyonların ağız sağlığı açısından yaşam kalitesi (OHRQoL) üzerinde olumlu bir etkisi vardır.

Anahtar Kelimeler: Dental İmplant, Sabit Protez, Ağız Sağlığı, Yaşam Kalitesi.

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How to Cite: Kecik Buyukhatipoglu I, Ozdemir M. (2024) Evaluation of Quality of Life and Satisfaction in Patients with Implant-Supported Fixed Partial Dentures , Cumhuriyet Dental Journal, 27(1):15-20.

Introduction

Dental implant therapy is fundamental and long-term treatment option for replacing missing teeth.[1,2] Nowadays, it has become a preferable prosthetic treatment method in many conditions because of its high survival percentages over the years.

In the literature, the evaluation of implant treatments was commonly determined by the survival percentages, prosthesis stability, radiographic evaluation, and infection condition in the peri-implant soft tissues.[3-5]

Patient-reported perceptions and evaluations that are deteched with the success reports have become increasingly significant in implant dentistry.[6] The patient outcome measures and clinical findings on implant-supported fixed partial dentures (IFPD) and their evaluation methods and results are still discussed among studies. The varied perspectives and insights from these studies contribute to a better understanding of the efficacy and challenges related to implant-supported fixed partial dentures.

A shortened 14-item questionnaire is used as the oral health impact profile index (OHIP-14).[7] This index has been used to assess the impact of oral health on the quality of life for patient perceptions of success and patient-reported outcome measures. The index reports the patient's perception of the social impact of oral disorders on their well-being. The OHIP-14 determines only negative statements, while some different oral health-dependent quality of life appliances question both positive and negative evaluations. However, it was reported that the best-certificated and commonly used appliance is the OHIP in the literature.[8]

Especially for the IFPD treatment, a few numbers of studies dealt with patients' perceptions of clinical outcomes and level of satisfaction.[9]

This cross-sectional study aimed to evaluate the patients' satisfaction level with the OHIP-14 questionnaire and VAS treated with IFPD in Gaziantep University 6.5 years (±1.5 years) after implant placement.

Materials and Methods

This study was performed after receiving acceptance from the ethics committee of XXX University (2023/110). All patients were informed about the study objectives and protocole.

Study Protocol

The presented study has a retrospective design combined with a prospective long-term re-examination.

All patients were treated at Gaziantep University from 2015 to 2017 by implant placement of at least two-eight by the Straumann® Dental Implant System (Straumann AG, Basel, Switzerland) (185 implants; width 3.5–4.5 mm and length 10–13 mm.) following standardized protocol according to the manufacturer's instructions by specialist clinicians for each for partially edentulous patients with missing single or multiple teeth. All patients were treated by IFDP (n=122) (either being crowns or bridges) with screw-retained or cement-retained metal/zirconia ceramic IFDP.[10]

In the beginning, as a routine treatment protocol, all patients received at least one session of individual hygiene before implants were placed. The specialist clinicians set a peri-implant maintenance recall program. This contained re-instruction and re-motivation to an effective individual plaque control, controlling and obtaining a healthy peri-implanter status. When a peri-implant mucositis or peri-implantitis was detected after implant placement and loading, conventional non-surgical mechanical therapy in conjunction with oral hygiene reinforcement was planned for peri-implant mucositis. If the disease remains after non-surgical therapy, surgical operations were planned.[11]

The partially edentulous with missing single or multiple teeth and implant loaded patients invited from the digital records of the faculty. 6 years (±1.5 years) after implant placement the participiciants (n=56) were re-examined.

All patients had to fulfill the following inclusion criteria:

- The presence of the periapical or panaromic radiograph after the time of implant placement
- Over 18 years patiens
- Not pregnant or breastfeeding
- Patients with healthy implants according to the Dental Implant Health Scale[5]

Exclusion criteria

Smokers received implant treatment if the maximum daily dose did not exceed 10 cigarettes/day. Patients were excluded based on motility disorders, cognitive impairment and having uncontrolled diabetes and systemic diseases.[12]

Clinical examination and Data gathering

All patients were informed about the the objectives of the study and signed the informed consent letter. The patients were examined on generalized and localized health conditions. After complete clinical and radiographic re-examination performed by one independent examiner (MÖ) patients, the clinical examination was based on described in detail in Misch *et al.*[5]

The radiological bone loss was determined by comparing the initial and the final digitalized radiographs. After the clinical and radiologic evaluation, the healthy 185 implants were included in the study according to the Dental Implant Health Scale.[5]

Patient-reported outcome measures (PROMs)

OHIP 14 (the Oral Health Impact Profile (OHIP)

The OHIP-14 scale was adapted into Turkish by Mumcu *et al.*[11] and the questionnaire (OHIP-14) was asked to the patients face to face by one clinician after the clinical examination.[14]

The OHIP-14 questionnaire consists of 7 dimensions. Every 7 dimensions includes two items, achieves 14

questiones (OHIP 1-14). The functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicaps creates the seven dimensions. The five level of the scores determines as never (= 0), hardly ever (= 1), occasionally (= 2), fairly often (= 3) and very often (= 4) with the Likert skale. Higher OHIP scores indicate worse, and lower OHIP scores indicate better oral health-related quality of life.

VAS scale

The patients were asked to sign the Visual Analog Scale (VAS) which is a 100 mm straight horizontal line from "not at all satisfied" to "very satisfied" that was marked as 0-100 mm expressed as percentage (10 mm corresponds to 10%, 20 mm 20%, etc.).

In this study, the patients were asked to mark the prosthetic satisfaction score on the VAS scale from 1 (very unsatisfied) to 10 (very satisfied).

Prosthetic complications evaluation

The major prosthetic complications were evaluated due to the loss/need to replace the prosthesis and leading to laboratory-based repair or replacement of the materials as chipping of the prosthetic material, fracture of framework or abutment.[15]

Chairside without replacing the prosthesis such as minor chipping, wear, loss of screw access hole material, fractured screws, screw loosening and wear of the prosthetic screw were reported as minor complications.[16]

Statistical analysis

The one sample statistics were used to evaluate the participants' scores depending on the study variables. Data were processed using the Statistical Package for the Social Sciences (software v.20) (SPSS/PC+, Inc.; Chicago, IL, USA) (statistical significiance; p = 0.05)

Results

Patient's characters were listed in Table 1. There was a total 185 healthy dental implants and 122 prosthetic restorations in this study.

Maxillary 45.40% (n=84) and mandibulary 54.59% (n=101) implants were evaluated. The number of patients and the number of implants for each patient were listed in Table 2.

The loaded 185 implants were positioned 14.59% (n=27) in the anterior region and 85.40% (n=158) in the posterior region.

Totally 122 prosthetic restorations were treated. The percentage of implant-supported single crowns was 49.18% (n=60) and bridges were 50.81 % (n=62). The percentage of screw-retained restorations was 22.13% (n=27) and cement retained restorations was 77.86% (n=95).

All prostheses were in function after a mean observational period of 6.5 years (±1.5 years) leading to a 100% prosthetic survival rate. Only 109 out of 122 prostheses were free of complications (89.34% of all prostheses).

The most frequently observed major complication was major chipping of the prosthetic material 2.45% (n=3). Minor complication rates of IFDP were 2.45% (n=3) abutment /screw loosening, 3.27% (n=4) debonding (loss of retention) and 2.45% (n=3) minor veneer chipping.

Table 1: Patient's descriptive characteristics

Descriptive characteristics (n=56)		n	%
Gender	Male	25	44.64
	Female	31	55.35
Age	18-65	43	76.78
	Upper 65	13	23.21
Level of education/ schooling	Basic education	11	19.64
	Secondary education	30	53.57
	University education	15	26.87

Table 2: The number of patients and number of implants for each patient

Number of implants for each patient (185)	Number of patients (n=56)
1	10
2	13
3	8
4	12
5	6
6	4
7	1
8	2

Prosthetic complications

Statistical results

High satisfaction with IFDP was seen in all 56 patients after 6.5 years (±1.5 years) years implant placement. The mean OHIP score was 2.82 (SD ± 5.44). The mean VAS score for general satisfaction with IFDP was 87.80 % (SD ± 13.79).

Sampling distributions and one-sample test results of OHİP-14 statements for 56 patients were listed in Table 3 and the one-sample statistics results were listed in Table 4.

Sampling distributions and one-sample test results of VAS Statements for 56 patients were listed in Table 5.

It resulted that the patients were satisfied with their oral health and IFPD due to the OHIP-14 questionnaire and VAS scale and there were no statistically significant differences between patients (p> 0.05).

Table 3. Sampling distributions and one-sample test results of OHİP-14 Statements for 56 patients

Statement (n=56)	Hardly ever 0 (%)	Occasionally 1(%)	Fairly often 2(%)	Very often 3(%)	Often 4(%)
OH1.Had trouble pronouncing any words	49(86)	4(7)	1 (1.8)	2 (3.5)	0
OH2.Felt sense of taste has worsened	46(80.7)	9(15.8)	1(1.8)	0	0
OH3.Had painful aching	45(80.35)	7(12.5)	3(5.35)	0	1(1.78)
OH4.Found it uncomfortable to eat any foods.	38(66.7)	13(22.8)	2(3.5)	2(3.5)	1(1.8)
OH5.Been self-conscious	52(92.85)	1(1.78)	1(1.78)	2(3.57)	0
OH6.Felt sence	43(75.4)	7(12.3)	5(8.8)	1(1.8)	0
OH7.Felt diet has been unsatisfactory	50(87.7)	3(5.3)	2(1.8)	1(3.5)	0
OH8.Had to interrupt meals	47(82.5)	4(7.0)	4(7.0)	1(1.8)	0
OH9.Found it difficult to relax	46(80.7)	5(8.8)	4(7.0)	1(1.8)	0
OH10.Been a bit embrassed	47(83.92)	8(14.28)	1(1.78)	0	0
OH11.Been a bit irritable	51(89.50)	3(5.30)	1(1.80)	1(1.80)	0
OH12.Had a difficulty doing usual jobs	48(84.2)	6(10.50)	1(1.80)	1(1.80)	0
OH13.Felt life less satisfying	45(78.90)	9(15.80)	1(1.80)	1(1.80)	0
OH14.Been totally unable to function	50(87.70)	4(7.00)	1(1.80)	1(1.80)	0

Table 4: The one-sample statistics results

	n= 56	*Mean*	*std. deviation*
1.Question	56	.2143	.65267
2.Question	56	.1964	.44393
3.Question	56	.3036	.73657
4.Question	56	.4821	.87368
5.Question	56	.1607	.62601
6.Question	56	.3571	.72434
7.Question	56	.1964	.64441
8.Question	56	.2679	.67396
9.Question	56	.2857	.67995
10.Questio	56	.1786	.43095
11.Question	56	.1429	.51974
12.Question	56	.1964	.55333
13.Question	56	.2500	.57997
14.Question	56	.1607	.53178
Totally	56	2.8214	5.44763

Table 5: Sampling distributions and one-sample test results of VAS Scores for 56 patients

Vas Scores	Frequency	Percent	Valid Percent	Cumulative percent
40.00	1	1.8	1.8	1.8
50.00	2	3.5	3.6	5.4
60.00	1	1.8	1.8	7.1
70.00	2	3.5	3.6	10.7
75.00	9	3.5	3.6	14.3
80.00	1	15.8	16.1	30.4
85.00	1	1.8	1.8	32.1
90.00	17	29.8	30.4	62.5
95.00	1	1.8	1.8	64.3
99.00	3	5.3	5.4	69.6
100.00	17	29.8	30.4	100.0
Total	56	98.2	100.0	

Discussion

The level of patient satisfaction, methods of evaluations and clinical findings on fixed single- and multiple-unit implant restorations and their effects are still under investigation across various studies. Prosthetic evaluations, implant survival, and patient-related outcomes were only infrequently reported and primary discussed and evaluated findings were about marginal bone levels or loss.[17]

In most of these included studies, the clinical evaluation and a radiographic examination were performed to measure marginal bone level changes. In many cases, merely panoramic radiographs were compared.[18]

According to ICOI Pisa Consensus Criteria, the probing of healthy implants was defined as unnecessary for the periodic controls especially if the presence of other symptoms and/or signs is indicated. It was reported that probing depths were not examined in the success or satisfactory health conditions, but were included in the compromised survival condition [5] and in this study, we included the success health conditions of the implants.

The implant based dentures can be treated by a screw-retained or cement- retained dentures for fixed partial dentures.[19] Castillo-Oyagüe at all compared the screw-retained and cement-retained IFDP and resulted that the retention system did not affect the OHRQoL[20] and the Ohip 14 and Vas scores were not affected by the retention system in our study.

A recent 5-year retrospective study classified the major or minor prosthetic complications depending on the need to perform the repair by removing the prosthesis.[15] The loss of screw access hole material (5.18%/year) was reported more frequently seen as a minor complication and the wear of the prosthetic material (5.85%/year) was the major complication. In this study, the percentage of the cemented restorations was higher than screwable prosthesis and the chipping was the most frequently observed complication for all restorations.

In implant dentistry, patient's perceptions and psychological parameters are turning into more important issues in determining the treatment outcomes in implant tretaments.[21,22]

In the literature, Tonetti and Palmer[23] suggested that implant dentistry should not only determine the biological and technical problems but also focus on patient's satisfaction and aesthetic consequences at the VIII. European Workshop on Periodontology. For example, Wang *et al.*[24] in a cross-sectional study in 2021 resulted that patients XIVE and Frialite implants treated with mostly IFPD restorations served a very high patient satisfaction concerning the functional and aesthetical parameters 10-year after implant treatments in 95 patients. The percentage of VAS scores for general satisfaction for IFDP was 93.0% (SD ± 9.4) and mean OHIP score was 11.3 (SD ± 10.8). In our study we investigated 6.5 (±1.5 years) after Straumann implants loading and patient satisfaction and oral health-related quality of life supporting the results with this study.

Pjetursson *et al.'s*[25] prospective cohort study asked to apply a questionnaire containing 13 expressions and to mark a VAS after 5-15 years after ITI implant treatment. More than 90% of the patients were highly satisfied with their implant treatment functionally and esthetically as the supporting results for our study.

Simonis *et al.*[26] investigated the degree of satisfaction of 55 patients with 131 implants. The patients were examined by clinically and radiographically after 10-16 years after implant treatment and questioned for degree of satisfaction. The general satisfaction percentage was 93.48% and the esthetic results were 91.31%. The complications were biological (16.94%) and technical (31.09%) complications.

Filius *et al.*[27] treated oligodontia patients with IFPD and at the 10-year follow up, clinical and radiographic data were collected. Patients completed the OHIP-NL49 to rate OHQoL and patients' satisfaction (8.3 ± 1.5) and OHIP-NL49 scores (32.6 ± 30.1) were served favourable results although peri-implant mucositis and peri-implantitis are commonly reported.

The OHIP-14 questionnaire results in this study were similar in the John *et al.*'s[28] cross-sectional study that investigated German population with natural teeth without dentures also considered a positive deal with the implant-supported restorations for patients.

The patient's data were collected in a single university dental clinic and more classification parameters are needed for further investigations.

Limitations

The major limitation in this cross-sectional study is the absence of the baseline data to assess changes due to the treatment 'implant placement'. The patient's expectation at baseline regarding the treatment outcome may also affect satisfaction.[29]

To overcome these limitations, prospective studies may be investigated in the future.

Conclusions

This study showed that the patients had high satisfaction levels according to the OHİP- 14 and VAS scores with implant-supported fixed partial dentures. More research is needed to comprehensively understand the outcomes, benefits, and potential concerns associated with this type of dentures.

Acknowledgments

Author contributors

Conception or design of the work: Isil Kecik Buyukhatipoglu; Data collection: Melek Ozdemir; Drafting the article: Isil Kecik Buyukhatipoglu, Melek Ozdemir; Critical revision of the article: Isil Kecik Buyukhatipoglu; Final approval of the version to be published: Isil Kecik Buyukhatipoglu

Ethical approval for this study was obtained from the ethics committee of XXX University (2023/110).

Written informed consent was obtained from all subjects before the study.

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

The authors declare that there is no conflict of interest.

Literature

1. Loza-Herrero MA, Rivas-Tumanyan S, Morou-Bermudez E. Success and complications of implant-retained prostheses provided by the post-doc- toral prosthodontics program, University of Puerto Rico: A cross-sectional study. J Prosthet Dent 2015;114(5):637–643.

2. Gervais MJ, Wilson PR. A rationale for retrievability of fixed, implant-supported prostheses: a complication-based analysis. Int J Prosthodont 2007;20(1):13-24.

3. Albrektsson T, Zarb G, Worthington P, Eriksson AR. The long-term efficacy of currently used dental implants: a review and proposed criteria of success. Int J Oral Maxillofac Implants 1986; 1:11-25.

4. Albrektsson T, Zarb GA. Determinants of correct clinical reporting. Int J Prosthodont 1998; 11:517-521.

5. Misch CE, Perel ML, Wang HL, Sammartino G, Galindo-Moreno P, Trisi P, Steigmann M, Rebaudi A, Palti A, Pikos MA, Schwartz-Arad D, Choukroun J, Gutierrez-Perez JL, Marenzi G, Valavanis DK. Implant success, survival, and failure: The International Congress of Oral Implantologists (ICOI) Pisa Consensus Conference. Implant Dent 2008;17(1):5-15.

6. Duong HY, Roccuzzo A, Stähli A, Salvi GE, Lang NP, Sculean A. Oral health-related quality of life of patients rehabilitated with fixed and removable implant-supported dental prostheses. Periodontol 2000. 2022;88(1):201-237.

7. Slade GD. Derivation and validation of a short-form oral health impact profile. Community Dent Oral Epidemiol 1997;25(4):284-90

8. Strassburger C, Heydecke G, Kerschbaum T. Influence of prosthetic and implant therapy on satisfaction and quality of life: a systematic literature review. Part 1--Characteristics of the studies. Int J Prosthodont 2004;17(1):83-93.

9. Geiballa GH, Abubakr NH, Ibrahim YE. Patients' satisfaction and maintenance of fixed partial denture. Eur J Dent 2016;10(2):250-253.

10. Preciado A, Del Río J, Lynch CD, Castillo-Oyagüe R. Impact of various screwed implant prostheses on oral health-related quality of life as measured with the QoLIP-10 and OHIP-14 scales: a cross-sectional study. J Dent 2013;41(12):1196-1207.

11. Renvert S, Hirooka H, Polyzois I, Kelekis-Cholakis A, Wang HL; Working Group 3. Diagnosis and non-surgical treatment of peri-implant diseases and maintenance care of patients with dental implants-Consensus report of working group 3. Int Dent J. 2019;69:12-17.

12. Lee K, Dam C, Huh J, Park KM, Kim SY, Park W. Distribution of medical status and medications in elderly patients treated with dental implant surgery covered by national healthcare insurance in Korea. J Dent Anesth Pain Med. 2017;17(2):113-119.

13. Mumcu G, Inanc N, Ergun T, Ikiz K, Gunes M, Islek U, Yavuz S, Sur H, Atalay T, Direskeneli H. Oral health related quality of life is affected by disease activity in Behçet's disease. Oral Dis 2006;12(2):145-151.

14. Oh SH, Kim Y, Park JY, Jung YJ, Kim SK, Park SY. Comparison of fixed implant-supported prostheses, removable implant-supported prostheses, and complete dentures: patient satisfaction and oral health-related quality of life. Clin Oral Implants Res. 2016;27(2):31-37.

15. Chochlidakis K, Einarsdottir E, Tsigarida A, Papaspyridakos P, Romeo D, Barmak AB, et al. Survival rates and prosthetic complications of implant fixed complete dental prostheses: an up to 5-year retrospective study. *J Prosthet Dent*. 2020; 124: 539–546.

16. Nikellis T, Lampraki E, Romeo D, Tsigarida A, Barmak AB, Malamou C, Ercoli C, Papaspyridakos P, Kotsailidi EA, Chochlidakis K. Survival rates, patient satisfaction, and prosthetic complications of implant fixed complete dental prostheses: a 12-month prospective study. J Prosthodont. 2023;32(3):214-220.

17. Sailer I, Barbato L, Mojon P, Pagliaro U, Serni L, Karasan D, Cairo F. Single and partial tooth replacement with fixed dental prostheses supported by dental implants: A systematic review of outcomes and outcome measures used in clinical trials in the last 10 years. Clin Oral Implants Res. 2023;34 Suppl 25:22-37.

18. Kern JS, Kern T, Wolfart S, Heussen N. A systematic review and meta-analysis of removable and fixed implant-supported prostheses in edentulous jaws: post-loading implant loss. Clin Oral Implants Res 2016;27(2):174-195.

19. Zarauz C, Pitta J, Pradies G, Sailer I. Clinical Recommendations for Implant Abutment Selection for Single-Implant Reconstructions: Customized vs Standardized Ceramic and Metallic Solutions. Int J Periodontics Restorative Dent 2020;40(1):31-37.

20. Castillo-Oyagüe R, Río-Highsmith JD, Preciado-Uribe A, Lynch CD, García-Minguillán G. Role of the modulating factors on the self-perceived OHRQoL of fully dentate subjects and wearers of screw-retained and cement-retained implant-supported FPDs: A cross-sectional study. J Dent. 2022;117:103887.

21. Calvert M, Kyte D, Mercieca-Bebber R, Slade A, Chan AW, King MT; the SPIRIT-PRO Group; Hunn A, Bottomley A, Regnault A, Chan AW, Ells C, O'Connor D, Revicki D, Patrick D, Altman D, Basch E, Velikova G, Price G, Draper H, Blazeby J, Scott J, Coast J, Norquist J, Brown J, Haywood K, Johnson LL, Campbell L, Frank L, von Hildebrand M, Brundage M, Palmer M, Kluetz P, Stephens R, Golub RM, Mitchell S, Groves T. Guidelines for Inclusion of Patient-Reported Outcomes in Clinical Trial Protocols: The SPIRIT-PRO Extension. JAMA 2018;319(5):483-494.

22. Wyrwich KW, Norquist JM, Lenderking WR, Acaster S. Industry Advisory Committee of International Society for Quality of Life Research (ISOQOL). Methods for interpreting change over time in patient-reported outcome measures. Qual Life Res. 2013;22(3):475-483.

23. Tonetti M, Palmer R. Clinical research in implant dentistry: study design, reporting and outcome measurements: consensus report of Working Group 2 of the VIII European Workshop on Periodontology. J Clin Periodontol 2012;39 Suppl 12:73-80.

24. Wang Y, Bäumer D, Ozga AK, Körner G, Bäumer A. Patient satisfaction and oral health-related quality of life 10 years after implant placement. BMC Oral Health 2021;14: 21(1):30.

25. Pjetursson BE, Karoussis I, Bürgin W, Brägger U, Lang NP. Patients' satisfaction following implant therapy. A 10-year prospective cohort study. Clin Oral Implants Res 2005;16(2):185-193.

26. Simonis P, Dufour T, Tenenbaum H. Long-term implant survival and success: a 10–16-year follow-up of non-submerged dental implants. Clin Oral Implant Res. 2010;21(7):772–777.

27. Filius MAP, Vissink A, Cune MS, Raghoebar GM, Visser A. Long-term implant performance and patients' satisfaction in oligodontia. J Dent 2018; 71:18-24

28. John MT, LeResche L, Koepsell TD, Hujoel P, Miglioretti DL, Micheelis W. Oral health-related quality of life in Germany. Eur J Oral Sci 2003;111(6):483-491.

29. Yao J, Tang H, Gao XL, McGrath C, Mattheos N. Patients' expectations to dental implant: a systematic review of the literature. Health Qual Life Outcomes. 2014;12:153