Faculdade de Medicina da Universidade de Coimbra

Impact of Removable Prosthodontics on Oral Health-Related Quality of Life and Evaluation of Denture Satisfaction

Mestrado Integrado em Medicina Dentária

Uneiza Ah-Hoy Abdul

June/2019

Orientador: Prof. Doutor Pedro Miguel Gomes Nicolau

Co-orientador: Dr. Filipe André Freire da Fonseca Moreira

Impact of Removable Prosthodontics on Oral Health-Related Quality of Life and Denture Satisfaction at 1 year follow-up

Abdul, U. [1], Moreira, F.[2], Nicolau, P [3]

1) Aluna de Mestrado Integrado em Medicina Dentária da Faculdade de Medicina da Universidade de Coimbra
2) Assistente convidado do Mestrado Integrado em Medicina Dentária da Faculdade de Medicina da Universidade de Coimbra
3) Professor Auxiliar do Mestrado Integrado em Medicina Dentária da Faculdade de Medicina da Universidade de Coimbra

Área de Medicina Dentária, FMUC, Coimbra, Portugal

Avenida Bissaya Barreto, Blocos de Celas

3000-075 Coimbra

Tel.: +351 239 484 183 | Fax.: +351 239 402 910

E-mail: uneizaahhoy@gmail.com

1. TABLE OF CONTENTS

2. LIST OF ABBREVIATIONS

OHRQoL: Oral Health Related Quality of Life

OHIP: Oral Health Impact Profile

DSQ: Denture Satisfaction Questionnaire

RPD: Removable Partial Denture

RCD: Removable Complete Denture

3. ABSTRACT

INTRODUCTION: This study aims to assess the impact of removable rehabilitation on patients' quality of life through the analysis of OHIP-14 questionnaires completed by patients before and after rehabilitation. Secondary objectives were to evaluate patients satisfaction after prosthetic rehabilitation 2-3 weeks post delivery, and compare these outcomes with patients satisfaction at one year follow-up.

METHODS: 259 patients from the Dental Medicine Area of the University of Coimbra, with indication for prosthetic oral rehabilitation, fulfilled the OHIP-14 for the evaluation of OHRQoL. Of these, 147 were rehabilitated with conventional removable prosthesis and, between the 1st and 3rd control visits, they fulfilled the OHIP-14 again in comparison with the previous one, and the Denture Satisfaction Questionnaire (DSQ) to assess satisfaction with their rehabilitation. From the clinical history were collected, age, gender, type of edentulism, previous experience with removable dentures and type of rehabilitation performed. The information was analyzed using SPSS® software.

RESULTS: The study demonstrated good levels of reliability of the OHIP-14 questionnaire, as well as good adequacy of the sample to the factorial analysis. Patients less than 65 years old, females, who were rehabilitated with unimaxillary total prosthesis, followed by bimaxillary prosthesis and RPD were those that most benefited from prosthetic rehabilitation in the OHRQoL. Rehabilitation with partial acrylic denture did not result in a significant improvement in oral health related quality of life. Regarding prosthetic satisfaction, between a rehabilitation with skeletal or acrylic bimaxillary RPD, there was a statistical significant difference.

CONCLUSION: The same treatment can have different impacts on the OHRQoL of partially edentulous individuals depending on their age, kennedy classification and gender. There is no statistical difference related to Denture Satisfaction. Satisfaction levels did not differ for each type of rehabilitation according to sociodemographical factos such as age, gender and previous experience with prosthesis.

KEY WORDS: OHRQoL; OHIP-14; Denture Satisfaction, Removable Partial Denture; Removable Complete Denture.

4. RESUMO

INTRODUÇÃO O objetivo principal deste estudo é avaliar a influência da reabilitação oral protética removível na qualidade de vida dos pacientes através da análise de questionários OHIP-14 preenchidos pelos próprios antes e depois do tratamento. Tem ainda como objetivos secundários avaliar a satisfação dos pacientes quanto às suas reabilitações protéticas 2-3 semanas pós-inserção, comparando-as com os controlos a um ano.

MÉTODOS 259 pacientes da Área de Medicina Dentária da Universidade de Coimbra, com indicação para reabilitação oral protética, preencheram o questionário OHIP-14. Destes, 147 foram reabilitados com prótese removível convencional e, entre a primeira e a terceira consulta de controlo, preencheram novamente o OHIP-14 comparando-o com o anterior, e o QSP para avaliação da satisfação com a reabilitação. Recolheram-se informações como, idade, género, tipo de desdentação, experiência prévia com prótese e tipo de reabilitação realizada. A informação foi analisada utilizando o software SPSS®.

RESULTADOS O estudo demonstrou níveis bons de confiabilidade do questionário OHIP-14, bem como boa adequação da amostra à análise fatorial. Os pacientes com menos de 65 anos, do sexo feminino, reabilitados com prótese total unimaxillar, seguidos dos reabilitados com prótese bimaxillar e prótese parcial removível esquelética foram os que mais beneficiaram com a reabilitação protética segundo o OHRQoL. A reabilitação com prótese parcial acrílica não resultou numa melhoria significativa da qualidade de vida relacionada com a saúde oral. Os níveis de satisfação não diferiram consoante o tipo de reabilitação, idade, género e a experiência prévia com prótese.

CONCLUSÃO O mesmo tratamento pode ter diferentes impactos na OHRQoL de indivíduos parcialmente desdentados, dependendo de sua idade, classificação de Kennedy e género. Não existe diferença estatisticamente significativa entre a satisfação após 1 ano de controlo. Os níveis de satisfação não diferiram para o tipo de reabilitação de acordo com os fatores sociodemográficos estudados: idade, género e antecedentes protéticos.

PALAVRAS-CHAVE OHRQoL; OHIP-14; Satisfação Protética; Prótese Parcial Removível; Prótese total removível.

5. INTRODUCTION

Complete edentulism has a great impact in the quality of life of patients, and represents a therapeutical challenge to the clinician. (1) The prevalence is high worldwide and studies say that this trend will continue to increase. (2) This fact can be related to the increase of he average life expectancy, thus there is a greater need and growing concern in perceiving its impact in the quality of life. (3)

Dental loss is mainly caused by periodontal disease, dental caries, pulpal pathology and trauma. (4) On the other hand, socioeconomic factors such as the cost of rehabilitation treatment, transportation to the dental office, often leads the patient to decide for tooth extraction. (5)

The sequelae of tooth loss can be functional, affecting speech and chewing, and aesthetic. The re-establishment of these functions, comprehends the rehabilitation of these patients. (4) There are several rehabilitation options: fixed denture / implant supported, combinations of fixed and removable elements, conventional acrylic or skeletal removable dentures. (4)

The success of the treatment may depend on several factors such as denture design, and maintenance of the rehabilitation. (6) Other studies also mention that success consists of psychosocial aspects. Aspects such as negative affectivity and self-esteem can influence the quality of life. (7)

Quality of life is increasingly a subject of interest to the scientific community. This is defined by an individual's perception of their position in life, in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.(8)

Currently, there are several instruments that aim to determine the quality of life of the individual. (9) The most commonly used concept to measure the general perception of oral health today is the Oral Health Related Quality of Life-OHRQoL. This is a multiple-choice questionnaire, proposed by Locker in 1988, and it’s based on the classification of disability, which attempts to explain the consequences of oral disease on the quality of life. (8)

The Oral Health Impact Profile OHIP-14 is a short version of OHIP-49, created by Slade and Spencer in 1994, based on the model proposed by Locker (2) (9), which was specifically designed to measure the impact of oral health quality of life. (10) This tool had as main objective to investigate the 7 domains of oral health, these are: functional limitation, pain,

psychological discomfort, masticatory incapacity, psychological incapacity, social incapacity and disadvantage in day to day tasks. (11)

In addition to this, the Denture Satisfaction Questionnaire (DSQ) is also used to measure patients' satisfaction with their rehabilitation (2) It was created by Feine in 1994, and consists of 12 items that refer to general satisfaction, retention, stability, comfort and aesthetics of maxillary and mandibular rehabilitation, and in a wider way to occlusion and phonetic capacity. (12)

This study aims to assess the impact of removable rehabilitation on patients' quality of life through the analysis of OHIP-14 questionnaires completed by patients before and after rehabilitation. Secondary objectives were to evaluate patients satisfaction after prosthetic rehabilitation 2-3 weeks post delivery, and compare these outcomes with patients satisfaction at one year follow-up.

6. METHODS

This study was performed in two stages. Firstly, authorization was requested from the Ethics Committee of the Faculty of Medicine of the University of Coimbra. After that, patients from the Removable Partial Denture (RPD) and Complete Denture (RCD) classes, with indication for rehabilitation, were recruited in the Dental Medicine Area of the Faculty of Medicine of the University of Coimbra and were invited to participate in the study. After voluntary acceptance, they all signed an informed consent, and fullfilled the OHIP-14 questionnaire (portuguese version, validated by Andreia Afonso et al) (13). If patients decided on the absence of prosthetic treatment, their participation in this study ended that day. Contrary to the patients that decided to go ahead with their prosthetic rehabilitation, and therefore answered the OHIP-14 questionnaire again at 1-3 weeks post-delivery. Patients satisfaction was also evaluated with a DSQ (portuguese version, validated by Diogo Rodrigues) (14), at 1-3 weeks post-delivery and 1-year follow-up.

Data collection was performed between January 2018 and june 2019. This study is an ongoing study that started with a pilot study (with data from January-June 2018) entitled: “A Qualidade de Vida Relacionada Com a Saúde Oral Em Doentes Desdentados Reabilitados e Não Reabilitado”. (15)

To assess satisfaction with their rehabilitation, from the clinical history was collected data conserning: age; gender; type of partially edentulous arch (according to Kennedy classification) and grouped in patients with (I and II) or without (III and IV) edentulous areas

posterior to the remaining teeth; totally edentulous (uni or bimaxillary edentulism); previous experience with prosthesis and type of rehabilitation performed.

5.1. PARTICIPANTS:

Inclusion and exclusion criteria are shown in Table 1.

Table 1 Inclusion and exclusion criteria

Inclusion Criteria	Adults aged 18+ with indication for prosthetic removable oral rehabilitation
	Good general health
	Intellectual ability to understand and respond to questionnaires
Exclusion Criteria	Patients under 18 years
	Patients who choose another type of rehabilitation
	Patients who are not able to understand the questionnaires

5.2. OHRQOL:

OHRQoL was measured using the **OHIP-14** questionnaire. The OHIP-14 has 14 questions that include problems in the mouth, teeth or prosthesis (speech, taste, discomfort during meals, embarrassment, tension, unsatisfactory diet, meal breaks, relaxing problems, inhibition, irritation, difficulty in usual ocupations, and inability to move). Participants were asked how many times they had expecienced the impact of each item in the previous month using a scale ranging from 0 (never) to 4 (very often).

Each of the 7 domains of OHRQoL consists of two questions: questions 1 and 2 translate functional limitation, questions 3 and 4 relate to physical pain, questions 5 and 6 indicate psychological distress, questions 7 and 8 report physical disability, questions 9 and 10 psychological inability, questions 11 and 12 social incapacity and finally questions 13 and 14 reflect the disadvantage.

The OHRQoL of the patients equals the sum of the points atributed to each question, and therefore ranges from 0 to 56. A higher result means greater impact of the addressed situations in the oral condition of the patient and, consequently, a lower satisfaction and OHRQoL of the individual.

The second questionnaire used was the **DSQ** that assesses the degree of patient satisfaction with their denture. The 12 questions that comprises it cover general satisfaction (items 1 and 2), retention (items 3 and 4), stability (5 and 6), comfort (7 and 8) and aesthetics

of the prosthesis (items 10 and 11), separating between maxillary and mandibular denture in each of the previous factors and also covers the occlusion (9) and the phonetic capacity (12) that the rehabilitation allows.

Again, the responses are coded by a 5-point Likert scale according to the patients' responses ranging from 0 (not satisfied) to 4 (totally satisfied). In the case of patients only rehabilitated one of the arches, the "not applicable" hypothesis was pointed out in the questions related to the unrehabilitated arch, to which no statistical value was attributed.

Thus, for patients who underwent bimaxillary rehabilitation, the questionnaire ranges from 0 to 48 values, where 0 corresponds to total dissatisfaction and 48 corresponds to total satisfaction, and for patients who only rehabilitated one arch, the total value of the DSQ varies between 0 and 28, with 0 being total dissatisfaction and 28 being the total satisfaction of the patient.

5.3. STATISTICAL ANALYSES:

Statistical analysis was performed using SPSS version 23. The level of significance was $p < 0.05$.

Cronbach's alpha was used to evaluate the internal consistency of the OHIP-14 questionnaire.

To compare the answers to each question in the two different groups, a Cross Tabulation analysis was performed. The t-test for independent samples was used whenever it was intended to compare means of results for the study groups or subgroups created from these.

The Bartlett's Sphericity and Kaiser-Meyer-Olkin (KMO) tests were performed to make it evident that the sample is suitable and has a factorial structure. The factorial analysis was performed to compare variables, simplifying the data by reducing the number of variables necessary for the description.

The Wilcoxon Signed Ranks Test was used to make a statistical comparison of the results of the pre and post-rehabilitation questionnaires in the rehabilitated group, and Cross Tabulation was used to analyze the items with a statistically significant difference.

To compare the variation of results of pre and post-rehabilitation questionnaires of the rehabilitated patients among the subgroups, the T-test for paired samples was used followed by a general linear model analysis.

To perform the DSQ analysis the sample had to be divided into patients who performed bimaxillary rehabilitations and patients who performed unimaxillary rehabilitations. The t-test for independent samples was used for all comparisons of means between the different subgroups.

6. RESULTS

6.1. PARTICIPANTS

The OHIP-14 questionnaire was answered by a total of 259 patients. They were split into two groups in order to facilitate the presentation of the results. Their division was made considering the decision to proceed or not with prosthetic rehabilitation. Group 1 corresponds to the non-rehabilitated group (n= 112) and group 2 corresponds to the rehabilitated group. (n= 147) The participants information is shown in table 2.

Table 2 General Information of participants

	Group I	**Group II**	***p***
Female	74 (66,1%)	78 (53,1%)	0,042
Male	38 (33,9%)	69 (46,1%)	
< 65 years	85 (75.9%)	103 (70.1%)	0.327
≥65 years	27 (24.1%)	44 (29.9%)	
Kennedy class I or II	51 (45.5%)	55 (37.4%)	0.007
Kennedy class III or IV	47(42%)	47 (32%)	
Bimaxillar Edentulism	10 (8.9%)	34 (23,1%)	
Unimaxillar Edentulism	4 (3.6%)	11 (7,5%)	
N	112	147	

Of all the participants, 107 are men and 152 are women, there is a statistically significant difference among them in the distribution by groups.

The patients ages ranged from 24-86 years old, on average 58.5 ± 11.5 years, there is no statistically significant difference between both groups. Within these patients, 71 are over 65 years and 147 are under.

Regarding the type of edentulism of the patients, 106 have posterior uni/bilateral edentulism, 94 have intercalated edentulism, 44 have a bimaxillar edentulism and 15 have a unimaxillar edentulism with a significant difference between both groups.

For group 2, additional information was collected, such as whether the patient had previous rehabilitation experience with a removable prosthesis and what type of rehabilitation was performed. This information is presented in Tables 3 and 4.

Table 3 Characterization of group 2 regarding previous experience with prosthetic rehabilitation

ALREADY USED DENTAL PROSTHESIS	NEVER USED DENTAL PROSTHESIS
62	85

Table 4 Characterization of group 2 regarding the type of rehabilitation performed

SKELETAL RPD	Kennedy Class I or II	34
	Kennedy Class III or IV	37
ACRYLIC RPD	Kennedy Class I or II	21
	Kennedy Class III or IV	10
TOTAL EDENTULISM	Bimaxillar	34
	Unimaxillar	11

Of the 147 rehabilitated patients, 62 had previous experience with removable dentures and the remaining 85 had never performed this kind of rehabilitation.

In this group, 34 of the patients performed bimaxillar RCD and 11 had unimaxillar RCD. Of the 71 patients rehabilitated with skeletal RPD, 34 had posterior uni/bilateral edentulism and 37 had intercalated edentulism. Of the patients rehabilitated with acrylic RPD, these subgroups contain 21 and 10 patients, respectively.

6.2. RELIABILITY OF THE QUESTIONNAIRES

The results from the Cronbach analysis are shown in table 5. The level of reliabity of the tests is good for all groups (Table 5).

Table 5 Cronbach's Alpha results

	Cronbach's Alpha	Nr Items
Pre-rehabilitation and non-rehabilitation	0,896	14
Post-rehabilitation	0,915	14

The results of the Bartletts's Sphericity and Kaiser-Meyer-Olkin (KMO) tests correspond to good factorial adequacy levels. These are presented in table 6.

Table 6 Results of the KMO sample adequacy analysis

Questionnaires		KMO sample adequacy measure
Group 1		0,884
Group 2	Pre-rehabilitation	0,912
	Post-rehabilitation	0,885

6.3. ANALYSIS OF THE RESULTS OF THE OHIP-14 QUESTIONNARAIRE

6.3.1. Analysis between both groups

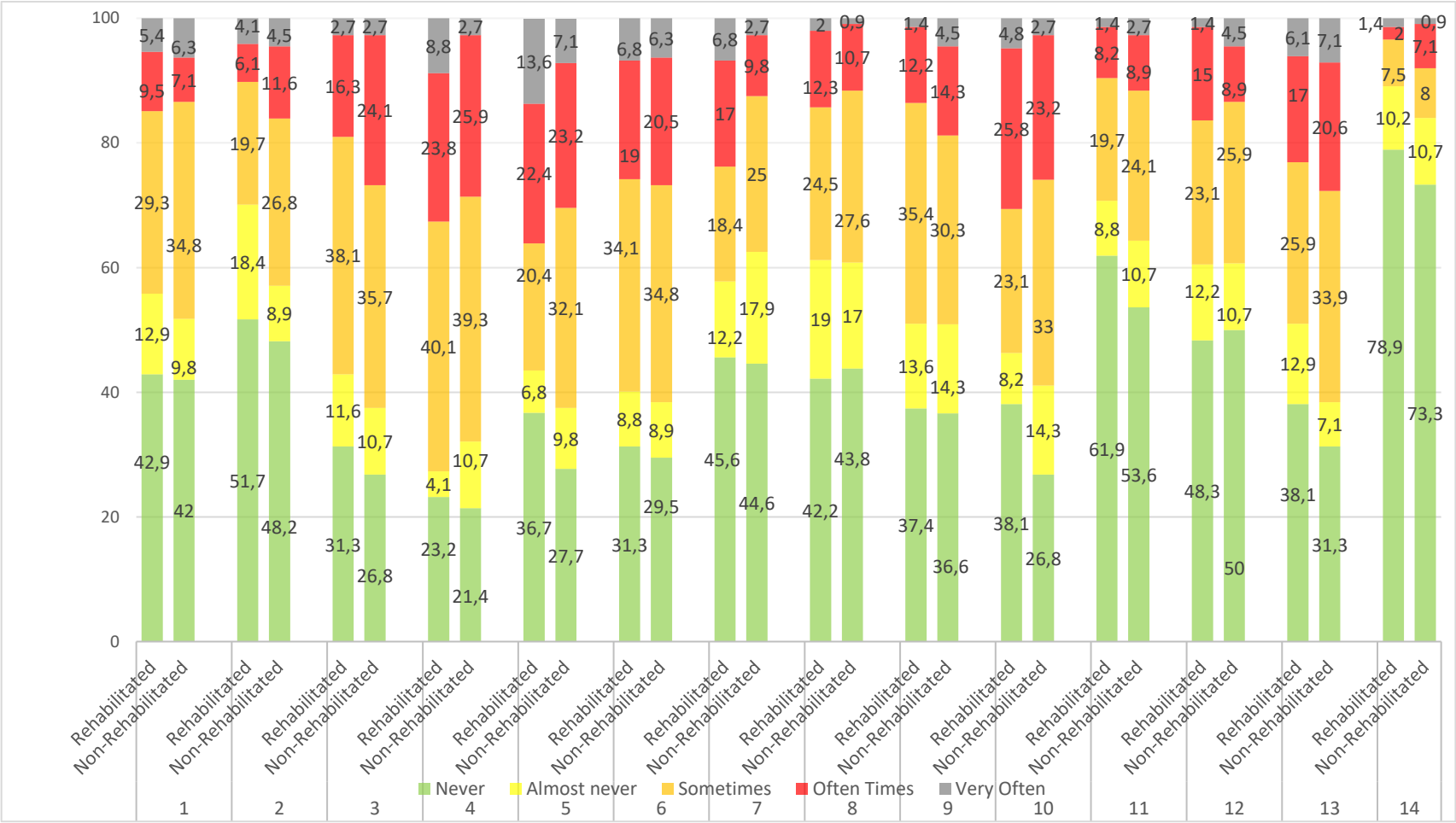
There is no statistical difference between the OHRQoL mean scores of pre-rehabilitated and non-rehabilitated patients questionnaires.

Table 7 Mean Ohip-14 scores in the two groups

	N	Mean (±SD)	*p*
Group I	112	18,54(±11,62)	**0,612**
Group II	147	17,79(±12,06)	

In a comparative analysis of each question individually, no statistical difference was found between both groups in any of the 14 questions. Figure I present percentages of response to the 14 items relative to the total of participants in the study.

Figure 1 Percentage of OHIP-14 results for the total sample



Questions 3, 4, 5, 6, 10 present a higher response percentage, which means that pain, discomfort with food, constraint, tension and inhibition due to problems with teeth, mouth or dentures are the problems most often experienced before rehabilitation.

From the factor analysis it was verified that the variance of the results of the two groups is explicitly mainly by three dimensions in each of them. In group 1, the first dimension explains 48,08% of the variance is composed by all of the questions, the second dimension, which explains 8,66% of the variance, is composed of questions 1,2 and 14 (respectively: pain, embarrassment and total inability to move), and the third dimension, which explains 7.66% of the variance, is composed of questions 7 and 8 (respectively: unsatisfactory diet and need to interrupt meals).

In group 2, both dimensions are relative to the OHRQoL and 3 domains. The first one explains 46,44% of the variance and is composed by all of questions and the second one explains 8,61% of the variance and corresponds most of the question 14 (respectively: total inability to move).

Now, dividing the two groups of patients according to the type of edentulism, there was also no statistical difference found (Table 8).

Table 8 OHIP-14 mean score in both groups, by type of edentulous

	Kennedy class I or II		Kennedy class III or IV		Total edentulism		Unimaxillar edentulism		*p*
	N	Mean (±SD)	N	Mean (±SD)	N	Mean (±SD)	N	Mean (±SD)	
Group 1	51	19,80 (±12,38)	47	18,06 (±11,14)	10	13,70 (±7,50)	4	20,25 (±16,21)	0,48
Group 2	55	17,13 (±11,33)	47	15,15 (±11,18)	34	20,24 (±13,79)	11	24,82 (±10,87)	0,055
p		0,248		0,209		0,16		0,536	

6.3.2. Analysis between pre and post-rehabilitation group 2

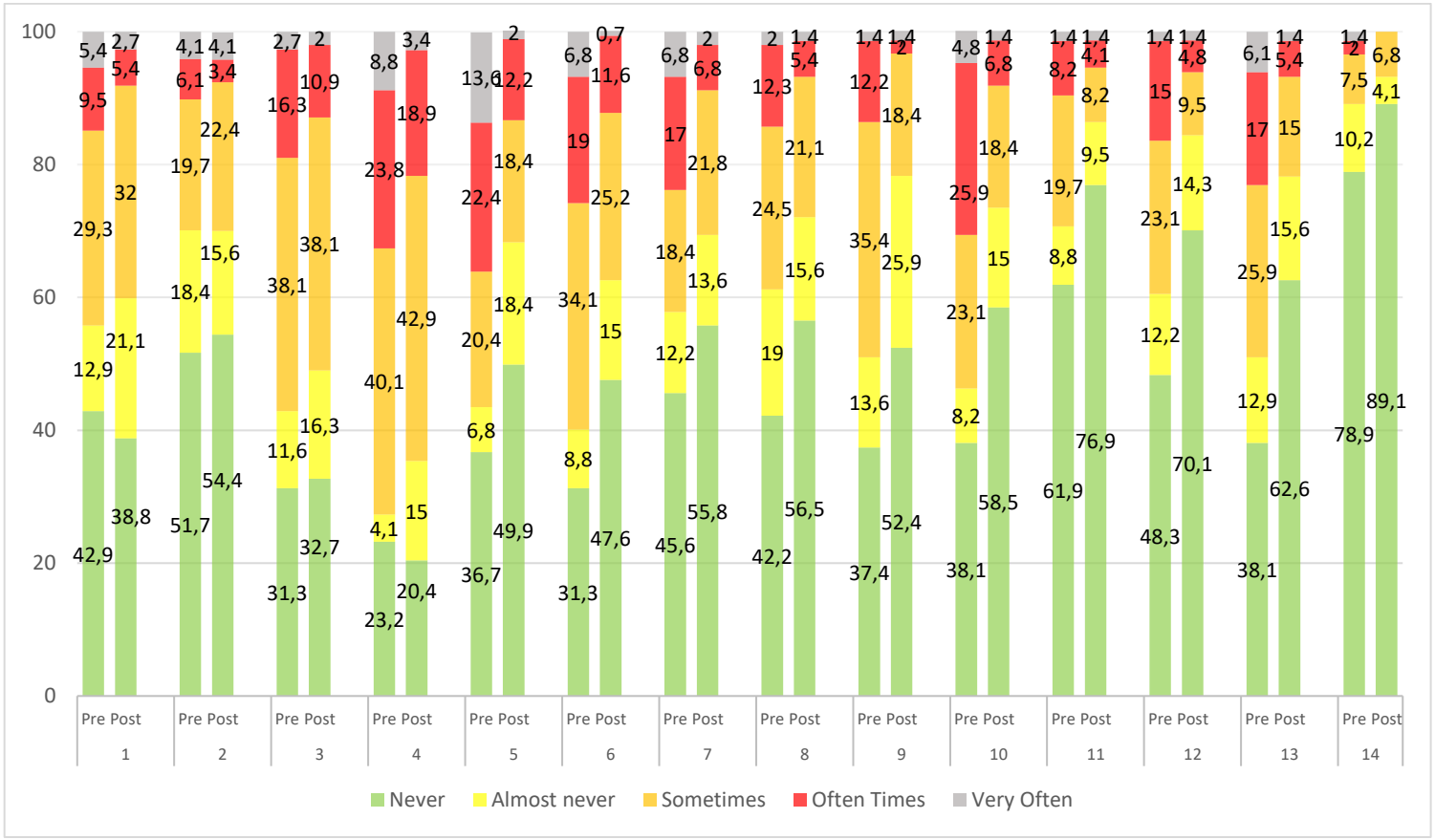
There was a statistically significant decrease between the mean scores of pre and post-rehabilitation questionnaires (Table 9).

Table 9 OHIP-14 mean score for pre and post rehabilitation

OHIP-14	N	Mean (±SD)	***p***
Pre-rehabilitation	147	17.79 (±12.06)	
Post-rehabilitation	147	12.03 (±9.36)	< 0.001

According to figure 2, which shows a comparison between the percentage of pre and post rehabilitation responses, the percentages of response significantly decreased in 10 questions, leaving 4 questions with no change.

Figure 2 Comparison of response averages between OHIP-14 pre and post-rehabilitation



In table 10, questions 5 to 14 presented a significant difference between the results before and after rehabilitation, which means that these are the items whose response value most changed between one questionnaire and another.

Table 10 P-values for OHIP-14 pre and post rehabilitation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
p	0,513	0,846	0,201	0,073	<**0,001**	**0,001**	**0,001**	**0,003**	<**0,001**	<**0,001**	<**0,001**	<**0,001**	<**0,001**	**0,018**

The factorial analysis for the results of the post-rehabilitation questionnaires showed that the variance of the data was mainly explained by 3 domains: the first one explains 44,7% of variance consists by all of questions except question 3 (pain), the second explains 8,33% of variance one consists of questions 2 and 3 (respectively: palate and pain), and the third explains 7,27% of variance is composed by question 3 (respectively: pain).

6.3.3. Analysis of 4 subgroups of group 2

For patients rehabilitated with **bimaxillar RCD**, there was a statistically significant decrease in the mean post-rehabilitation responses compared to pre-rehabilitation (Table 11).

Table 11 OHIP-14 mean scores between pre and post-rehabilitation in bimaxillar RCD rehabilitation

	OHIP-14 pre-rehab	OHIP-14 post-rehab	*p*
N	34	34	
Mean (±SD)	20,2 (±13,8)	13,59 (±11,08)	0,004

The differences were found in questions 5, 7, 9, 10, 11, 12 and 13 (respectively: embarrassment, unsatisfactory diet, difficulty in relaxing, inhibition, irritation towards others, difficulties in habitual occupations and dissatisfaction with life in general). These were the was a significant improvement after rehabilitation.

For patients rehabilitated with **unimaxillar RCD**, there was also a statistically significant decrease in mean compared to the pre-rehabilitation value (Table 12).

Table 12 OHIP-14 mean scores between pre and post-rehabilitation in unimaxillar RCD rehabilitation

	OHIP-14 pre-rehab	OHIP-14 post-rehab	*p*
N	11	11	
Mean (±SD)	24,8 (±10,87)	15,55 (±12,56)	0,021

There was a statistically significant improvement in the results of items 5, 6, 10, 12 and 13 (respectively: embarrassment, tension, inhibition, difficulty in daily occupations and dissatisfaction with life in general).

Patients who were rehabilitated with **skeletal RPD** also had a statistically significant mean decrease (Table 13).

Table 13 OHIP-14 mean scores between pre and post-rehabilitation in skeletal RPD rehabilitation

	OHIP-14 pre-rehab	OHIP-14 post-rehab	*p*
N	71	71	
Mean (±SD)	16,97 (±12,25)	9,70 (±8,09)	<0,001

There was a statistically significant improvement in results in all questions, except for questions 1, 2 and 4 (respectively: pain, embarrassment, unsatisfactory diet). This was the group in which there was a significant difference in more responses.

It was also possible to evaluate according to the type of edentulism and it was verified that there is a statistically significance difference in the two types of edentulism presented before and after the rehabilitation, but there is no statistically significant difference between the two groups of edentulism in the pre-rehabilitation group (Table 14).

Table 14 OHIP-14 mean scores between pre and post-rehabilitation in skeletal RPD, according to type of edentulous

	OHIP-14 pre-rehab		OHIP-14 post-rehab		*p*
	N	Mean (±SD)	N	Mean (±SD)	
Kennedy Class I or II	34	18,32 (±12,83)	34	7,73 (±7,34)	0,01
Kennedy Class III or IV	37	15,73 (±11,72)	37	11,51 (±8.42)	0,022
p		0,376		0,049	

As for patients rehabilitated with **acrylic RPD**, the mean difference was not statistically significant (Table 15).

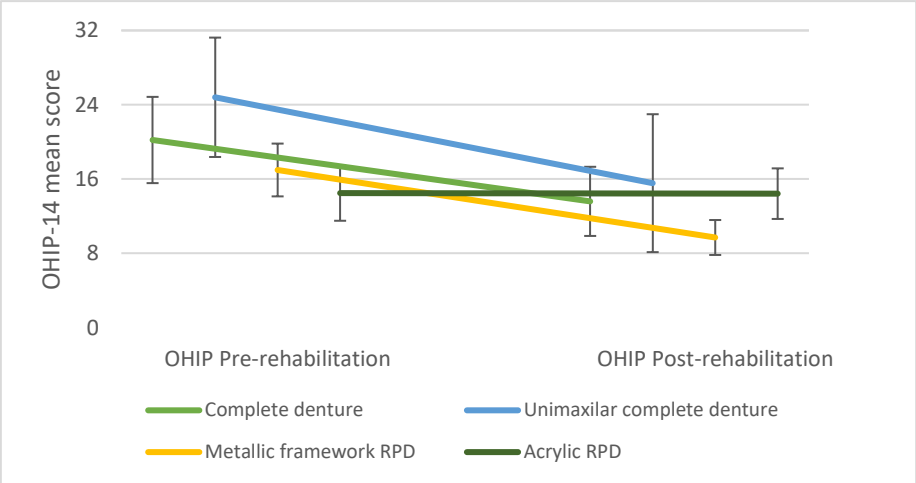
Table 15 OHIP-14 mean scores between pre and post-rehabilitation in acrylic RPD rehabilitation

	OHIP-14 pre-rehab	OHIP-14 post-rehab	*p*
N	31	31	
Mean (±SD)	14,48 (±8,47)	14,42 (±7,76)	0,975

Although there was a decrease in the values of the questionnaire, there is no question with a statistically significance difference.

Graph 3 shows the variation of OHRQoL values of the 4 subgroups corresponding to the 4 types of rehabilitation performed. It is possible to observe that the patients rehabilitated with acrylic prosthesis are the only ones that present a minimal decrease in the impact of the oral condition after rehabilitation and the remaining had more expressive values.

Figure 3 Variation of OHIP-14 averages according to the type of rehabilitation



6.3.4. Sociodemographic factors

Regarding the **age** of rehabilitated patients, there was a statistically significant difference in both groups before and after rehabilitation. However, there is no statistically significant difference between the pre and post rehabilitation groups.

Table 16 Comparison of OHIP-14 results according to age

	N	OHIP pre-rehabilitation	OHIP post-rehabilitation	Difference	*p*
≥65 years	44	15,69 (±12,70)	11,20 (±10,19)	4,36 (±13,25)	0,034
<65 years	103	18,54 (±11,38)	12,39 (±9,01)	6,15 (±11,67)	<0,001
p		0,163	0,485		

Gender analysis was also carried out, it was observed that the rehabilitation was statistically significant for both samples. It was also found that there is a statistically significant difference between pre and post rehabilitation results.

Table 17 Comparison of OHIP-14 results by gender

	N	OHIP pre-rehabilitation	OHIP post-rehabilitation	Difference	*p*
Female	78	19,87 (±12,46)	13,88 (±10,08)	5,99 (±12,44)	<0,001
Male	69	15,14 (±10,61)	9,94 (±8,04)	5,20 (±11,88)	0,001
p		0,015	0,01		

The same type of analysis was performed according to **previous rehabilitation experience** and it was found that there was a statistically significant difference in the two post-rehabilitation groups.

Table 18 Comparison of OHIP-14 results by previous experience with prosthetic rehabilitation

	n	OHIP pre-rehabilitation	OHIP post-rehabilitation	Difference	*p*
Already used a prosthesis	62	18,02 (±13,39)	12,97 (±9,36)	5,05 (±13,72)	0,005
Never used a prosthesis	85	17,62 (±11,08)	11.35 (±9,36)	6,27 (±11,43)	<0,001
p		0,846	0,303		

6.4. ANALYSIS OF THE RESULTS OF THE DSQ QUESTIONNAIRES

6.4.1. RCD rehabilitation

Within the rehabilitations with bimaxillar and unimaxillar RCD, there was no statistically significant difference.

Table 19 Mean DSQ results in rehabilitated patients with bimaxillary and unimaxillar RCD

	N	Mean (±SD)	*p*
Bimaxillar RCD	30	31,10 (±7,22)	
Unimaxillar RCD	15	27,73 (±9,02)	0,182

6.4.2. RPD rehabilitation

Regarding **bimaxillary rehabilitations**:

There was statistically significant diferences between satisfaction in rehabilitation with skeletal or acrylic bimaxillary RPD (table 20).

Table 20 DSQ mean scores in rehabilitated patients with bimaxillary RPD

	N	Mean (±SD)	*p*
Bimaxillar skeletal RPD	54	35,76 (±8,82)	
Bimaxillar acrylic RPD	20	30,50 (±6,60)	0,018

It was possible to make a comparison between the classes of Kennedy, not being verified differences between the classes neither in acrylic nor skeletal RPD, but it was found statistical difference between Kennedy class III or IV (table 21).

Table 21 Mean of DSQ in rehabilitated patients with skeletal and acrylic RPD according to type of edentulism

	Kennedy class I or II		Kennedy class III or IV		
	N	Mean (±SD)	N	Mean (±SD)	*p*
Bimaxillar skeletal RPD	27	35,48 (±8,49)	27	36,04 (±9,29)	0,819
Bimaxillar acrylic RPD	12	31,17 (±6,46)	8	29,50 (±7,11)	0,594
p		0,126		0,076	

Regarding to **unimaxillar rehabilitations:**

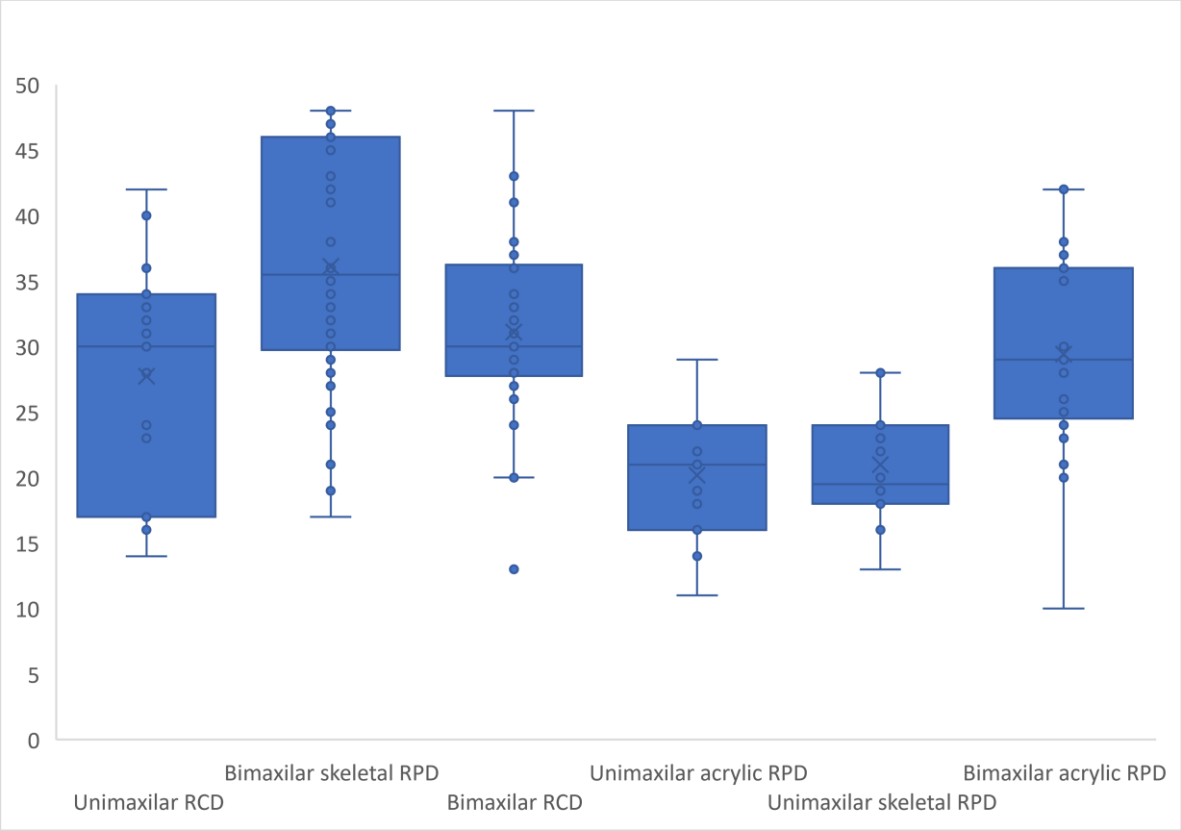
There was no statistically significant difference between skeletal and acrylic unimaxillary RPD (table 22).

Table 22 Mean DSQ results in rehabilitated with unimaxillar skeletal and acrylic RPD

	N	Mean (±SD)	*p*
Unimaxillar skeletal RPD	18	21,33 (±4,45)	
Unimaxillar acrylic RPD	11	18,45 (±5,14)	0,12

Figure 4 presents the summary of the level of satisfaction with the rehabilitation of the various subgroups analyzed statistically.

Figure 4. Variation of DSQ results according to each type of rehabilitation performed



6.4.3. Sociodemographic factors

There was no statistical difference in any of the subgroups analyzed. The results are presented in table 23

Table 23 Variation of DSQ results according to socio-demographic factors

			N	DSQ Mean (±SD)	*p*
Age	RCD uni/bimaxillar	≥65 years	29	31.03 (±8.67)	0.233
		<65 years	16	28.06 (±6.16)	
	Bimaxillar Skeletal RPD and Acrylic RPD	≥65 years	55	34.82 (±8.12)	0.775
		<65 years	18	34.17 (±9.04)	
	Unimaxillar Skeletal RPD and Acrylic RPD	≥65 years	19	21.05 (±4.61)	0.220
		<65 years	10	18.70 (±5.14)	
Gender	RCD uni/bimaxillar	Female	23	28.13 (±8.57)	0.111
		Male	22	31.91 (±6.87)	
	Bimaxillar Skeletal RPD and Acrylic RPD	Female	39	33.03 (±8.58)	0.072
		Male	34	36.53 (±7.66)	
	Unimaxillar Skeletal RPD and Acrylic RPD	Female	16	20.88 (±5.07)	0.445
		Male	13	19.46 (±4.63)	
Previous rehabilitation experience	RCD uni/bimaxillar	Yes	22	29.45 (±8.47)	0.670
		No	23	30.48 (±7.53)	
	Bimaxillar Skeletal RPD and Acrylic RPD	Yes	29	33.59 (±8.13)	0.374
		No	44	35.36 (±8.42)	
	Unimaxillar Skeletal RPD and Acrylic RPD	Yes	11	20.73 (±5.83)	0.681
		No	18	19.94 (±4.29)	

There is no statistically significant difference between the groups at one year. The results are presented in table 24.

Table 24 DSQ mean scores after a year follow up

	N	Mean (±SD)	P
Post-rehabilitation DSQ	33	31.91 (±7.84)	0.577
1 year follow up DSQ	33	32.85 (±9.06)	

7. DISCUSSION

This study showed, in terms of gender, that although most individuals are female, there is a statistical difference between the two groups. This result is in concordance with other studies that state that women have a greater concern about their health, including their oral health. (16) But that does not mean that they are always desire a oral rehabilitation. In the population of this study, the decision to be rehabilitated or not may be due to several factors. Studies show that the cost of rehabilitation and socioeconomic factors are the most important ones for making this decision. (17)

When it comes to the age of the patients, the vast majority is less than 65 years old, which indicates that in the area of Dental Medicine at the University of Coimbra are treated mostly young individuals.

This study demonstrated that tooth loss has an impact on OHRQoL, which is demonstrated by the results of the OHIP-14 mean score questionnaire, which was 18,54 for those who choose to be rehabilitated and 17,79 for those who decided not to undergo rehabilitation (Table 7). These values indicate that both groups perceive the changes that took place in the oral cavity, being important an intervention that will contribute to an improvement in the quality of life.

Patients may perceive changes in one of the dimensions of OHRQoL which reinforces the idea that each of the domains of OHRQoL is important. In addition, this study strenghtens that the impact of edentation on OHRQoL is due to a combination of several domains and not only one.

The questions that explain the variance of more than 48% of the results in the group of unrehabilitated subjects refer to all domains, which means that in these fields a greater disparity of responses between the unrehabilitated patients was verified.

In the group of patients who agreed to be rehabilitated, most of the variance is explained by the same domains. This means that, although no differences were found between the two groups, the rehabilitated patients had their responses better distributed, and in turn, a considerable impact on OHRQoL.

There was a greater impact on OHRQoL in the total number of edentulous patients in the rehabilitated group. Although this difference is not statistically significant (p=0,612), this shows that there are no differences in the perception of OHRQoL among patients in both groups. This may indicate that even if these domains are affected, they do not always lead to rehabilitation (Table 7).

As for group 2, there is a statistically significant decrease after rehabilitation ($p<0,001$), which suggests that prosthetic rehabilitation decreases the impact that tooth decay represents in individuals, traducing into an improvement of OHRQoL, and then having a positive influence on quality of life (Table 9).

The items with significantly lower values were in the domains of psychological discomfort, physical incapacity, psychological incapacity, social incapacity and disadvantage. It should be noted that the three domains related to disability, be it physical, psychological or social, saw a decrease in results deriving from a positive impact. The remain did not present a significant difference, and this may be due to the adaptation period that is not equal in all individuals.

The post-rehabilitation questionnaires of group 2, a factorial analysis of 3 domains explains a greater variance of the results, making all the questions important to explain a variance of results.

As for the patients in group 2 rehabilitated with bimaxillar RCD there was a statistically significant reduction ($p=0,02$), indicating that this type of rehabilitation brings improvements in the OHRQoL (Table 11). The placement of bimaxillary RCD brings a great benefit to the patients since it allows them to see reduced situations that had a great impact on the quality of life. However, the rehabilitation of these patients is a major challenge for anatomical, technical or even clinical reasons, requiring a period of adaptation that according to Stober can last up to 2 years. (18) This improvement can be explained by the decrease in the frequency and severity with which patients perceive the pre-treatment problems, denoting a therapeutic benefit. (6) (19) (20)

Regarding rehabilitation with unimaxillary RCD, the decrease in post-rehabilitation values is also significant and this can be explained by the fact that the total unimaxillary patients still have natural teeth in the mouth, having a better sense of the impact of their lack.

Patients rehabilitated with skeletal RCD also showed a significant improvement in their OHRQoL in 5 out of 7 domains. This can be explained since this type of prosthesis is indicated in smaller edentulous spaces.

Finally, patients rehabilitated with acrylic prosthesis showed a non-significant decrease in post-rehabilitation values, indicating that rehabilitation with acrylic RCD does not present any benefit to the patient.

In this study, more significant improvements in patients rehabilitated with unimaxillary RCD are observed, followed by patients with bimaxillar RCD, then those rehabilitated with skeletal RPD and finally acrylic RPD. These results are expected since patients with bigger edentulous

spaces take better advantage of rehabilitation. This result is in line with the Yen study in which patients rehabilitated by RPD have a less positive impact than patients with RCD. (21)

Regarding the socio-demographic factors analyzed, gender analysis showed that women feel the most impact. This result agrees with other studies, such as Ozhayat's in 2012. (22)(23)

Age is another important factor in this study because, as the population ages, it is expected that the quality of life changes with tooth loss. In an isolated analysis of the age factor in OHRQoL, the older population seems to perceive less of the negative impact of their oral condition on their overall life than the younger population.

In pre-rehabilitation patients, OHIP values were higher in patients younger than 65 years, indicating that they had worse OHRQoL before rehabilitation. After rehabilitation, the group that showed significant improvements was the youngest one, the same is true in other studies. (24) This can be explained due to their greater social needs and concern with facial aesthetics and oral function. On the other hand, older patients may be more indifferent to treatment because they have lower aesthetic and social demands. (25)

There was a significant difference of OHRQoL post-rehabilitation in both patients with previous rehabilitation experience and those who did not use a prosthesis. For patients without previous rehabilitation experience, the improvement can be justified by the consequences of the toothache experienced by them. In patients with previous rehabilitation experience the improvement may result from the fact that the old prosthesis was in dissatisfaction conditions. And therefore, the replacement prosthesis caused improvements in their quality of life.

Regarding prosthetic satisfaction, between a rehabilitation with skeletal or acrylic bimaxillary RPD, there was a statistical significant difference (p= 0,018). Showing that skeletal options are preferred by the patients, probably because of their biomechanical advantages, concerning the support and retentive elements they provide.

Within the bimaxillary rehabilitations, the group that appears to have the greatest satisfaction is rehabilitated with bimaxillary skeletal RPD and the least satisfied is the group with unimaxillar RCD, this may be because they have natural teeth tending to compare the denture teeth with these. In addition to the occlusal contacts that are more pronounced in the teeth of the prosthesis, transmitting greater masticatory forces to certain areas of the ridge.

Finally, regarding the sociodemographic variables (table 23), none showed significant differences in any of the groups, indicating that the levels of satisfaction did not differ according to these variables, but were associated with factors inherent to the prosthesis and the quality of rehabilitation perceived by the patient.

Regarding the comparison of DSQ results 2-3 weeks post-delivery and 1-year follow-up, no statistically significant difference was found. This may indicate that in a short period, patients were equally satisfied with their prosthetic rehabilitation.

CONCLUSION

Within the limitations of this study, the following conclusions could be drawn:

- All prosthodontic treatments produced improvements in the patients OHRQoL except for the ones with acrylic RPD;

- The same prosthodontic treatment can have diferente impacts on the OHRQoL of partially edentulous individuals depending on their age and Kennedy classification;

- The type of rehabilitation that has shown more positive results in terms of improvement of the patients' OHRQoL is the unimaxillar RCD, followed by the bimaxillar RCD and the skeletal RPD. Also, it was verified that acrylic RPD does not present significant benefits in the quality of life related to oral health of the patients;

- Satisfaction levels did not differ for each type of rehabilitation according to sociodemographical factos such as age, gender and previous experience with prosthesis.

8. BIBLIOGRAPHY

1. Anas El-Wegoud M, Fayyad A, Kaddah A, Nabhan A. Bar versus ball attachments for implant-supported overdentures in complete edentulism: A systematic review. Clin Implant Dent Relat Res. 2018;20(2):243–50.

2. Albaker AM. The oral health-related quality of life in edentulous patients treated with Conventional complete dentures. Gerodontology. 2013;30(1):61–6.

3. 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):e31–7.

4. Shaghaghian S, Taghva M, Abduo J, Bagheri R. Oral health-related quality of life of removable partial denture wearers and related factors. J Oral Rehabil. 2015;42(1):40–8.

5. Thalji G, McGraw K, Cooper L. Maxillary Complete Denture Outcomes: A Systematic Review of Patient-Based Outcomes. Int J Oral Maxillofac Implants [Internet]. 2017;31:s169–81. Available from: http://quintpub.com/journals/omi/abstract.php?iss2_id=1379&article_id=16354&article=17&title=Maxillary Complete Denture Outcomes: A Systematic Review of Patient-Based Outcomes#.WPYxIv1JmG8

6. Gurevich K, Fabrikant E, Hassan M, Aqou S. Oral Health–Related Quality of Life in Partially Edentulous Patients Treated with Removable, Fixed, Fixed-Removable, and Implant-Supported Prostheses. Int J Prosthodont [Internet]. 2014;27(4):338–47. Available from: http://www.quintpub.com/journals/ijp/abstract.php?iss2_id=1245&article_id=14609&article=7&title=Oral Health%96Related Quality of Life in Partially Edentulous Patients Treated with Removable, Fixed, Fixed-Removable, and Implant-Supported Prostheses#.U_-kU0

7. Özhayat EB, Gotfredsen K. Oral health-related quality-of-life in patients to be treated with fixed or removable partial dental prostheses. Acta Odontol Scand. 2013;71(1):113–9.

8. Tan H, Peres KG, Peres MA. Retention of teeth and oral health-related quality of life. J Dent Res. 2016;95(12):1350–7.

9. John MT, Reißmann DR, Feuerstahler L, Waller N, Baba K, Larsson P, et al. Factor analyses of the Oral Health Impact Profile - Overview and studied population. J Prosthodont Res. 2014;58(1):26–34.

10. Sischo L, Broder HL. Oral health-related quality of life: What, why, how, and future implications. J Dent Res. 2011;90(11):1264–70.

11. Awad M, Al-Shamrany M, Locker D, Allen F, Feine J. Effect of reducing the number of items of the Oral Health Impact Profile on responsiveness, validity and reliability in edentulous populations. Community Dent Oral Epidemiol. 2008;36(1):12–20.

12. Santucci D, Camilleri L, Attard N. Development of a Maltese Version of Oral Health–Associated Questionnaires: OHIP-14, GOHAI, and the Denture Satisfaction Questionnaire. Int J Prosthodont [Internet]. 2014;27(1):44–9. Available from: http://www.quintpub.com/journals/ijp/abstract.php?iss2_id=1165&article_id=13792&article=5&title=Development of a Maltese Version of Oral Health%96Associated Questionnaires: OHIP-14, GOHAI, and the Denture Satisfaction Questionnaire#.UssLHRaOi6E

13. Afonso A, Silva I, Meneses R, Frias-Bulhosa J. Oral Health-Related Quality of Life: Portuguese Linguistic and Cultural Adaptation of Ohip-14. Psicol Saúde Doença. 2017;18(2):374–88.

14. Rodrigues DG. Adaptação para a população portuguesa de instrumentos de avaliação do impacto da saúde oral na qualidade de vida. Masters [dissertation]. Faculdade de Medicina da Universidade de Coimbra; 2015.

15. Roxo ID. A Qualidade de Vida Relacionada Com a Saúde Oral Em Doentes Desdentados Reabilitados e Não Reabilitados. Masters [dissertation]. Faculdade de Medicina da Universidade de Coimbra; 2018.

16. Cohen-Carneiro F, Souza-Santos R, Rebelo MAB. Quality of life related to oral health: contribution from social factors. Cien Saude Colet [Internet]. 2011;16(suppl 1):1007–15. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-81232011000700033&lng=en&tlng=en

17. McGrath C, Bedi R. Severe tooth loss among UK adults - Who goes for oral rehabilitation? J Oral Rehabil. 2002;29(3):240–4.

18. Stober T, Danner D, Lehmann F, Séché AC, Rammelsberg P, Hassel AJ. Association between patient satisfaction with complete dentures and oral health-related quality of life: Two-year longitudinal assessment. Clin Oral Investig. 2012;16(1):313–8.

19. Baran I, Nalcaci R. Self-reported problems before and after prosthodontic treatments according to newly created Turkish version of oral health impact profile. Arch Gerontol Geriatr. 2011;53(2).

20. Aarabi G, John MT, Schierz O, Heydecke G, Reissmann DR. The course of prosthodontic patients' oral health-related quality of life over a period of 2 years. J Dent [Internet]. 2015;43(2):261–8. Available from: http://dx.doi.org/10.1016/j.jdent.2014.09.006

21. Yen Y, Lee H-E, Wu Y, Lan S, Wang W-C, Du Je, et al. Impact of removable dentures on oral health-related quality of life among elderly adults in Taiwan. BMC Oral Health [Internet]. 2015;15(1):1. Available from: http://bmcoralhealth.biomedcentral.com/articles/10.1186/1472-6831-15-1

22. Özhayat EB. Influence of negative affectivity and self-esteem on the oral health related quality of life in patients receiving oral rehabilitation. Health Qual Life Outcomes. 2013;11(1):1–7.

23. Leles CR, Morandini WJ, Da Silva ÉT, De M, Freire MCM. Assessing perceived potential outcomes of prosthodontic treatment in partial and fully edentulous patients. J Oral Rehabil. 2008;35(9):682–9.

24. Jenei Á, Sándor J, HegedUs C, Bágyi K, Nagy L, Kiss C, et al. Oral health-related quality of life after prosthetic rehabilitation: A longitudinal study with the OHIP questionnaire. Health Qual Life Outcomes. 2015;13(1):1–7.

25. Viola AP, Takamiya AS, Monteiro DR, Barbosa DB. Oral health-related quality of life and satisfaction before and after treatment with complete dentures in a Dental School in Brazil. J Prosthodont Res [Internet]. 2013;57(1):36–41. Available from: http://dx.doi.org/10.1016/j.jpor.2012.08.003