

## FIXED PROSTHODONTIC PATIENT SATISFACTION SURVEY

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### SUMMARY

**Background:** This study aimed to assess the level of satisfaction with fixed prosthodontic work among patients in Croatia and investigate the level of awareness about maintaining oral hygiene and the importance of regular check-ups.

**Subjects and methods:** The study included 235 participants from Croatia, 163 women, and 72 men. As a data source, we used a questionnaire previously filled in by patients. The questions asked were short and simple to understand. 25 patients were in the preparation phase of prosthetic therapy, 34 in the middle of the process, and 176 already had the whole procedure done.

**Results:** Most study patients were satisfied with fixed prosthodontic work's aesthetic and functional parameters. Aesthetic aspects such as the color and appearance of the prosthodontic work positively affected the patient's self-confidence and further quality of life. Most of the environment noticed the patient's new smile after prosthodontic work.

**Conclusion:** Patients must be aware of the importance of maintaining proper oral hygiene because it directly affects a fixed prosthetic replacement's lifespan and indirectly affects the subjective impression and level of patient satisfaction with the overall work.

**Key words:** fixed prosthodontics - patient satisfaction - oral hygiene

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### INTRODUCTION

"The dentist should meet the mind of the patient before he meets the mouth of the patient (De Van 1942)". The patients want prosthodontics therapy to rehabilitate, improve oral health and restore masticatory function, aesthetics and phonetics. At the same time, prosthodontic therapy aims to satisfy a patient (Petricevic et al. 2012, Sharma & Tabbasum 2018). Patient satisfaction and perception of dental care is a multidimensional concept (Hakestam et al. 1997). The difference between the patient's and the doctor's perception and expectations of therapy is variable. Even if the prosthetic treatment is done at a remarkable clinical level, there will always be some patients who express a certain degree of dissatisfaction (Sondell et al. 2004). With the proper diagnostics and strict clinical protocol, respecting the original agreement between the doctor and the patient, long-term results are guaranteed (De Van 1942). Tooth loss, as one of the first signs of early aging or a consequence of caries, periodontitis or trauma, causes emotional trauma to many people (AlZarea 2016). It impairs aesthetics, facial harmony and masticatory function. People who have suffered tooth loss were more likely to feel less confident, inhibited in carrying out everyday activities and less able to accept the inevitable change in facial shape (Fiske et al. 1998). They disliked their appearance, were unable to discuss the tooth loss topic and tried to keep the tooth loss a secret (Davis et al. 2000).

Expectations may vary. Usually, the patients are interested in replacing a missing tooth, whether it is for aesthetics or function (Carr & Brown 2015). Today, there are many prosthetic options for replacing a missing teeth or changing the appearance of existing

teeth, such as veneers, crowns, bridges, partial or complete dentures, and implants (De Bruyn et al. 1997). The dentist's main goal should not only be to achieve function and aesthetics but also to satisfy a patient. Moreover, the dentist's assessment of the therapy is not often aligned with the patients' expectations, including the function, aesthetics, and psychosocial adjustment (Sondell et al. 2004). Therefore, a clinician should recognize and understand the patient's expectations during the early consultations in the pretreatment phase, explain the therapy's main goal, possible unwanted complications and advise a patient to maintain oral hygiene thoroughly.

This research aims to assess satisfaction with the fixed prosthodontic treatment in Croatia. The goal was to research the level of awareness regarding oral hygiene and the importance of recall appointments for earlier mentioned patients.

### SUBJECTS AND METHODS

#### Research participants

235 patients, from which 163 women and 72 men, answered 39 questions in the survey. When filling the survey, patients from the School of the Dental Medicine University of Zagreb, Dental Clinic Zagreb, Clinical Hospital Center Dubrava, Clinical Hospital Center Rebro, in addition to some private dental offices, were included. The criteria for inclusion of patients in this study were patients in the phase of preparation of fixed prosthetics, in the middle of fixed prosthetics, or after the completion of fixed prosthetics. This research is approved by the Ethics committee of the School of Dental Medicine, University of Zagreb no. 05-PA 30-XVIII-6/2020. It conforms to the provisions of the Declaration of Helsinki in 1995. Before they entered the

survey, all the participants were presented with the research's primary goal. With their acceptance, they authorized involvement in the research and gave informed consent before getting involved in the process. The survey was conducted willingly and in complete anonymity. Gathered data was used only for research purposes and will not be published separately.

### Survey of research respondents

The survey was conducted in two forms. One was the online version conducted through the Google form, while the other was printed form and was handed to patients in dental offices all around the city of Zagreb. The survey contains 4 parts and has been conducted from January 2020. to March 2020. All questions in the survey were thoroughly formulated in advance. They were short, concise, and understandable to all participants. The first part of the survey succinctly reviews general information about the patients (gender, age, place of residence, level of education, frequency of the dental appointments). The second part of the survey collected data on patient satisfaction with medical staff and the institution where they performed fixed prosthetic therapy, the quality of information on therapeutic options, future apparatus, possible side effects and complications during therapy, the need for a regular examination, and maintenance of oral hygiene. In the third part of the survey, patients evaluated fixed prosthodontic appliances (they expressed their content with looks, color, and price-quality ratio, grading ability to talk, masticate and maintain oral hygiene and effect appliance on the quality of life and confidence). Also, they had to choose the type of fixed (crown/s, bridge/s, crown/s, or bridge on dental implants or veneers) or removable prosthodontic therapy (complete or partial denture). Besides, they chose the prosthodontic therapy phase, preparation stage, middle or end-stage. The last part of the research was explicitly about given health care.

### Oral health maintenance of research respondents

In the second part of the survey, all 235 subjects were questioned specificity and quantity of given oral health maintenance information during the specialist examination in a dental office.

Patients should have been instructed to remove all deposits mechanically and thoroughly, wash all the tooth surfaces at least twice a day – in the morning and the evening. However, it would be ideal for cleaning the teeth after every meal. It is advised to use a middle-hard toothbrush and toothpaste with fluorides. Except for the periodontology patients, as for them is recommended a soft toothbrush and toothpaste with less abrasive particles. The teeth are being cleaned with gentile pressure and in a circular motion. Half of the toothbrush fibers

should be pressed to the tooth and the other half on the gums. The toothbrush must be placed under a 45-degree angle to simultaneously clean soft and hard dental tissues. Interdental toothbrushes and dental floss should be used to clean the interdental spaces. Additionally, tooth showers and chemical substances with chlorhexidine, known for their antibacterial properties, can be used for rinsing the oral cavity.

In the third part of the survey, the participants were grading the ease of conducting the oral hygiene after a fixed prosthodontic appliance.

### Statistical analysis

Statistical analysis was conducted using Statistic Package for Social Sciences (SPSS) for Windows. Descriptive statistics were used for establishing frequency and percentages for categorical variables and visual representation of the data (charts).

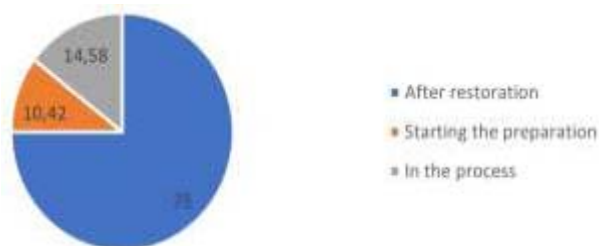
Before conducting the statistical tests, categorical variables containing five groups (1 - strongly disagree, 2 - disagree, 3 - don't know, 4 - agree, 5 - strongly agree) were regrouped into three (1 - strongly disagree or disagree, 2 - don't know, 3 - agree or strongly agree). Categorical variables containing multiple groups (<2 years, 2-5 years, 5-10 years, 10-15 years, >15 years) were regrouped into a new three (<2 years, 2-10 years, >10 years). Categorical variables that bridge, crown, implant-supported bridge, implant-supported crown, partial denture, and complete denture were regrouped into three (bridge, implant-supported bridge = bridge, crown, implant-supported crown = crown, partial denture, complete denture = denture). The Chi-square test and Fisher's exact test were used to assess each demographic variable's correlation and the overall patient's satisfaction. Also, the same tests were used to evaluate the correlation between patient satisfaction (appearance, color, pronunciation, chewing) and the institution where the prosthetic work was done. The level of significance was set at  $\alpha = 0.05$ .

## RESULTS

The study included 235 patients, 69.4% being female and 30.6% male. Most patients (37.9%) were between 18 and 30 years old (89), 36.2% were between 46 and 67 (85), 24.3% were between 31 and 45 (57), and only 1.7% of participants were aged 67 or more (4).

Upon questionnaire submission, 10.42% of patients started the prosthetic restoration preparation, 14.58% were in the process, and 75% already had their prosthetic restoration done (Figure 1).

The most common prosthetic work was a bridge (27%) and crown (27%). A lower percentage of participants had an implant-supported crown (12.5%) and aesthetic veneers (11.5%). Other remaining prosthetic restorations were in the minority (Figure 2).



**Figure 1.** Phase of restoration

The patients' demographic background distribution (gender, age, place of residence, educational level) and their response to their overall satisfaction with the obtained P – values are summarized in the table (Table 1).

There was no significant difference in patient's overall satisfaction within age groups, residence, or education level, but there is a difference in overall satisfaction within the gender group.

The distribution of satisfaction (appearance, color, correct pronunciation, a sense of comfort, difficulty with

chewing, self-confidence, price-quality ratio, maintaining hygiene, quality of life, the experience of others) and patients' response about the institution where the prosthetic work was done with the obtained P – values are summarized in the table (Table 2).

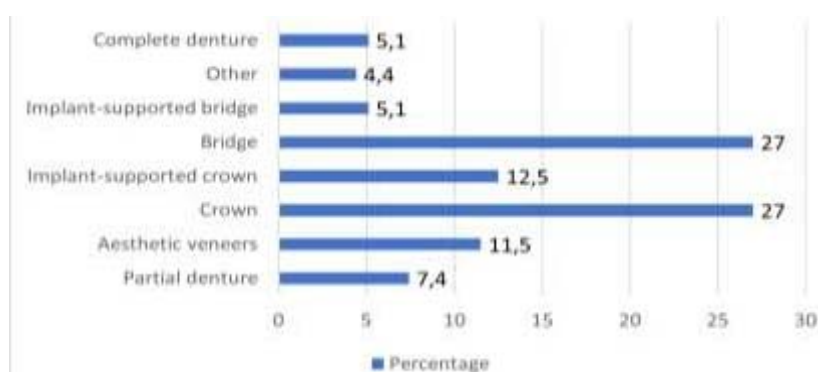
There was no statistically significant difference between the institution where the prosthetic work was done and satisfaction (appearance, color, correct pronunciation, a sense of comfort, difficulty with chewing, self-confidence, maintaining hygiene, quality of life, the experience of others). Satisfaction with the price-quality ratio depended on the institution where the work was done.

The distribution of satisfaction with the prosthetic work's appearance and the patient's response about the work duration with the obtained P – values are summarized in the table (Table 3).

There was no statistically significant difference between the satisfaction with the appearance of the work and its age ( $p=0.446$ ).

**Table 1.** Correlation between demographic background and overall satisfaction

	Provided medical care was within my expectations			p
	I partially agree	I disagree	I agree	
Age				0.793
> 67 years old	1	0	3	
18-30 years old	15	4	69	
31-45 years old	16	2	41	
46-67 years old	19	3	61	
Gender				0.050
M	20	0	51	
F	31	9	123	
Place of residence (population)				0.493
< 5000	12	2	41	
> 100 000	19	1	72	
20 - 50 000	5	1	20	
5 - 20 000	11	3	29	
50 - 100 000	4	2	12	
Education level				0.444
Doctoral degree	1	0	4	
Lower secondary education	16	2	68	
Professional Master	4	0	9	
Bachelor's degree	11	0	25	
Master's degree	18	6	64	
Primary education	1	1	4	



**Figure 2.** Type of prosthetic work

**Table 2.** Satisfaction with the institution where the prosthetic work was done (1 = strongly disagree or disagree, 2 = don't know, 3 = agree or strongly agree)

Step	Prosthetic work was done at the:				p
	Health center	Office with a contract with Croatian institute for health insurance	Private office	School of Dental Medicine	
I am satisfied with the appearance of the prosthetic work					0.193
1	1	6	3	1	
2	3	8	11	0	
3	20	46	109	11	
I am satisfied with the color of the prosthetic work					0.420
1	3	3	5	1	
2	2	7	9	0	
3	18	49	109	11	
I maintained proper pronunciation					0.285
1	1	2	1	1	
2	2	3	7	1	
3	21	53	115	10	
I feel comfortable with prosthetic work					0.092
1	1	2	3	1	
2	5	6	7	2	
3	18	50	113	9	
I don't have difficulties with chewing					0.470
1	2	3	3	0	
2	2	5	8	2	
3	20	51	112	10	
The new prosthetic work has a positive impact on my confidence					0.086
1	3	5	3	1	
2	4	9	11	1	
3	17	44	109	10	
I am satisfied with the price-quality ratio					0.025
1	3	7	5	1	
2	8	9	18	0	
3	13	43	101	11	
I have no problem with maintaining oral hygiene					0.074
1	1	5	5	1	
2	5	4	5	0	
3	18	48	114	11	
Others noticed my new smile					0.528
1	4	9	15	1	
2	6	11	22	0	
3	14	37	85	11	
I think that the new prosthetic work improved my quality of life					0.164
1	2	4	3	1	
2	6	8	13	1	
3	16	47	106	10	

**Table 3.** Satisfaction with the appearance considering the age of prosthetic work

Step	Age:			p
	<2 years	2 – 10 years	>10 years	
I am satisfied with the appearance of the prosthetic work				0.446
1	2	1	6	
2	11	3	7	
3	62	19	81	

## DISCUSSION

More important data were obtained by analyzing the level of satisfaction regarding gender and the institution in which the fixed prosthetic work was performed. Modern dentistry is paying more attention to the individual's aesthetic components than ever before. Aesthetic parameters such as color, shape, size, and position of the teeth and their harmony with other orofacial structures, the whole physical appearance, and the individual's characteristics affect the overall image of the patient as an individual. These factors are influenced by cultural and sociodemographic factors and individual preferences (Akarslan et al. 2009). Regarding satisfaction with the appearance of teeth, analyzing the data obtained by our study, a more significant number of women were satisfied with fixed prosthetic work than the group of men ( $p < 0.05$ ). However, many other researchers report that females are more critical (Maghaireh et al. 2016). In previous studies, women rated the degree of satisfaction with the entire orofacial system's appearance worse than men (Geiballa et al. 2016, Meng et al. 2007). Our study results show that the differences in the established degree of satisfaction with prosthetic work between younger and older groups of patients are not statistically significant compared to the results of a study conducted in 2017 (Gavranović-Glamoč et al. 2017), which showed that younger patients are more satisfied than older ones. No significant difference in satisfaction assessment was found between patients with different education levels. The results obtained correspond to Akarslan and co-workers, who also described that the level of education did not significantly affect dissatisfaction with the appearance of prosthetic work (Akarslan et al. 2009).

Furthermore, the conducted research established that residence does not affect the overall satisfaction with the dental service. Statistical limit values show data on the ease of maintaining the degree of oral hygiene and the positive effect of fixed prosthetic work on the patient's self-confidence. The patient's motivation and ability to maintain an adequate degree of oral hygiene are of great importance for the long-term prognosis of prosthetic restorations and the prevention of potential unwanted complications (Louropoulou et al. 2015). Fixed prosthetic rehabilitation commonly requires significant financial investment and long-term patient maintenance. The level of oral hygiene will directly determine the success of the overall prosthetic rehabilitation (Myers Kracher & Schmelling Smith 2010). Dentists should be required to educate and advise patients on how to maintain their oral hygiene properly, even after making a fixed prosthetic work, and insist on regular check-ups (AlQabbaa & Rayyan 2018). Frequent complications recorded in patients with fixed prosthetic works are gingivitis and perio-

dontitis. Gingivitis is the mildest form of periodontal disease that involves inflammation of the gums (gingiva). The supporting bone is not affected by the disease, but untreated gingivitis in susceptible patients develops into periodontitis. On the contrary, periodontitis is a more extensive inflammation of the tooth's supporting apparatus. Unlike gingivitis, it affects the bone, periodontal ligament and cementum. Untreated periodontitis can ultimately cause tooth loss and increase the risk of some systemic diseases. These inflammatory conditions can be prevented by a careful hygienic regimen and regular check-ups (Bidra et al. 2016). The balance between prosthetic work and the periodontium is crucial. Otherwise, esthetics, the continuance of the prosthetic work, and the periodontium will be compromised. Therefore, a close interdisciplinary approach between periodontics and prosthodontics is necessary to avoid treatment failure that leads to long-lasting and expensive retreatments (Abduo & Lyons 2000). It is essential to distinguish provocations easily in patients with single crowns, patients with bridges, or fixed prostheses maintained by high oral needs. As far as maintaining oral hygiene is concerned, it is very important to differentiate between the ease of performing it in patients with single crowns, patients with bridges, or fixed prostheses. A 2015 study, which dealt exclusively with maintaining oral hygiene and gingival health in patients with fixed prosthetic works, found that hygiene was significantly better in patients with single crowns than in patients with fixed prostheses (Kc Basnyat et al. 2015). Satisfaction with fixed prosthetic work positively affects a person's social and psychological behavior and self-confidence. Placing a prosthetic restoration, which improves dental experience and perception, results in a positive effect on the patient's self-esteem and life quality (Shaista et al. 2013, Sghaireen & Al-Omiri 2016). Several authors have come to a conclusion that patients with fewer dental diseases are more socially involved, show greater intellectual characteristics and achievements, and have a better psychologic adjustment (Newton et al. 2003). At the same time, Feng et al. concluded that orofacial appearance may affect social interactions and contribute to social selection and the associations between health and socio-economic status (Feng et al. 2001).

Given that in our study, the value of  $p = 0.086$  was slightly borderline, it can be assumed that the prosthetic works in the anterior segment of the dentition had a more significant impact on self-confidence than those in the posterior segment. That remains to be explored. Indeed, more attention should be paid to satisfaction with the ratio of price and quality of prosthetic work ( $p = 0.025$ ). The most significant number of patients satisfied with the above is a group of patients who did the work as part of private dental practice. Dissatisfaction is growing among patients who have done office work with a Croatian Health Insurance Fund contract.



It still remains unclear why many patients make conflicting statements – some report high, others low degree of satisfaction with their prosthetic work. Layton and associates claim that the dissatisfaction, as a very complex fact, may be a result of dental treatment aspects that have not been taken into consideration so far. Here we can classify the overall discomfort during therapy, general inconvenience, connection with the doctor, and other psychosocial factors (Layton & Walton 2011). Data related to color, masticatory function, and phonation did not show statistically significant results. Satisfaction data can be a good source of information for dentists and their future prosthetic treatments. Therapists can use it as a guidance to help improve current treatment protocols and meet patients' expectations, which are growing day by day. Early prosthodontic patient satisfaction studies focused mostly on removable prostheses, while most current studies have focused on implant treatment for the edentulous patient (Layton & Walton 2011). Therefore, this research can be the basis for future studies and analyzes an individual patient's satisfaction level and quality of life with fixed prosthetic works in the Republic of Croatia and beyond, thus contributing to the international literature.

## CONCLUSION

Patients should be aware that the care of a prosthetic replacement requires effort and care. Regardless of the material from which the replacement is made, its lifespan largely depends on the patient's hygiene. This indirectly affects the subjective impression and patient satisfaction with the overall fixed prosthetic work.

Regular check-ups can help find potential health issues or diseases before becoming a problem. Early detection gives the best chance for getting the proper treatment quickly, avoiding further complications.

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**Conflict of interest:** None to declare.

### Contribution of individual authors:

Andreja Carek, Bruna Brkić & Marija Cigić: manuscript writing, design of the study.

Iva Jelavić: manuscript writing, literature searches.

Ana Kurilić: statistical analysis, interpretation of data.

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