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RESEARCH ARTICLE
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IMPACT OF TWO DIFFERENT TOOTH-COLOURED RESTORATIVE MATERIALS ON THE ORAL HEALTH PROFILE OF PATIENTS UNDERGOING FULL MOUTH

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ABSTRACT

Background: Patients with severe tooth wear can now benefit from minimally invasive treatment options thanks to fundamental advancements in adhesive technology and material science. The lifespan of the restorations and the maintenance of the original tooth material are crucial in this situation. When associated to conventional restorations with retentive formulation, minimally invasive treatments are recommended for many patients since they result in about 45% reduced tooth material loss.

Objectives: To compare several restorative items (ceramic and experimental CAD/CAM composite) & examine this issue in patients undergoing full-mouth reintegration.

Methodology: The OHIP-20 questionnaire was given to 50 patients (25 men and 25 women) who needed full mouth rehabilitation because of varying levels of tooth wear. They were to complete it both previously (baseline) & thirty days following prosthetic management with ceramic or experimental CAD/CAM composite restorations. The questions were broken down in 5 categories: orofacial discomfort, language restrictions, psychosocial effect, appearance, and oral functions. Differences between the two OHIP surveys for each question and patient were examined independently based on difference values.

Results: There were notable variations ($p < 0.001$) among the five dimensions. The most beneficial findings were seen in the appearance dimension ($p < 0.001$). The factor with the lowest positive scores ($p < 0.001$) was language restrictions. Oral functioning, psychosocial effect, and orofacial discomfort were the other three characteristics that did not differ substantially ($p < 0.007$)

Conclusion: The outcomes of this study highlight the important developments in restorative dentistry, especially in minimally invasive methods for treating extreme tooth deterioration. In addition to maintaining natural tooth structure, these therapies enhance oral health-related quality of life (QoL) in areas including appearance, oral function, and psychological effect by utilizing contemporary materials like ceramics and experimental CAD/CAM composites

Key Word: OHIP, Full mouth reintegration, vertical dimension of the occlusion, Oral health-related quality of life.

INTRODUCTION

Patients with severe tooth wear can now benefit from minimally invasive treatment options thanks to fundamental advancements in adhesive technology & material science.[1] Access to various ceramic materials, hybrid ceramics, & highly filled polymers has been made possible by progressions in CAD/CAM (computer-aided design/computer-aided manufacturing) technology. Further developments in minimally invasive dental care have resulted from the restoration's layer thickness being successfully reduced.[2] The lifespan of the restorations and the maintenance of the original tooth material are crucial in this situation. When compared to conventional restorations with retentive preparation, minimally invasive treatments are recommended for many patients since they result in about 45% reduced tooth material loss.[3] The prolonged functional periods of teeth are a result of improvements in medical treatment, prophylactic measures, and population demographics. Consequently, it may be reasonable to anticipate a rise in full-mouth rehabilitations in the discipline of restorative dentistry.[4] For the dental team, moderate to severe tooth wear that is accompanied by a loss of the vertical dimension of the occlusion (VDO) frequently poses significant issues. Pathological tooth wear is often multifactorial and can be caused by pathological anamnestic causes or physiological wear throughout an attrition/abrasion course.[5]

Prominent bruxism, reflux, bulimia, and dietary practices like consuming acidic meals or erosive beverages (energy or soft drinks) are examples of these pathological and mostly behavioural variables.[5] While moderate to severe tooth loss from attrition & abrasion is typically observed in older individuals, the eating practices are more common in younger people. Tooth wear frequently combines the actions of erosive, attritive, and abrasive materials.[6] The degree of tooth wear and the abrasive nature have a significant impact on the restoration's extent. Patients with severe abrasion conditions may have significant impairments in several areas, including eating habits, oral toothaches, psychological impairments, and external appearance.[7] The most common complaint among patients with a higher degree of tooth wear is aesthetic concerns (70%), which are followed by pain, functional issues (27%), and dental sensitivity (20%).[8] The state of dental health frequently has a significant impact on overall quality of life (QoL). Questionnaires like the Oral Health Impact Profile (OHIP), which offer a variety of specific subjective questions on many aspects of life, are available for examination of the individual oral health-related impact profile. Individual oral health, expectations, and satisfactions with dental treatment, as well as aesthetic, emotional sentiments & functional, are all subjectively evaluated in the questionnaire.[9] This study compared several restorative materials (ceramic and experimental CAD/CAM composite) and examined this issue in patients undergoing full-mouth rehabilitation.

METHODOLOGY

All patients who participated in the investigation gave their verbal consent after the IRB of the institution where the study was conducted granted ethical authorization. The following standards for inclusion were used: The patient must not have any past medical conditions or intolerances to dental materials, be at least eighteen years old, and have minimally invasive tooth-colored restorations installed throughout the lower & upper jaw. The OHIP-20 questionnaire was given to 50 patients (25 men and 25 women) who needed full mouth rehabilitation because of varying levels of tooth wear. They were to complete it both before (baseline) and 30 days following prosthetic treatment with ceramic or experimental CAD/CAM composite restorations. The questions were broken down into 5 categories: orofacial discomfort, language restrictions, psychosocial effect, appearance, and oral functions. Differences between the two OHIP surveys for each question and patient were examined independently based on difference values. The Kolmogorov-Smirnov, Cronbach's alpha, Wilcoxon's signed-rank, Kruskal-Wallis, & Mann-Whitney tests were used to analyze the data ($p = 0.01$). Between August 2024 and October 2024, all patients had prosthetic rehabilitation. Every full-mouth

rehabilitation included both the actual prosthetic management phase and the pre-prosthetic phase, which included the required pre-treatment & testing of the intended VDO lifting.
The OHIP surveys' difference values for each question and patient, as well as the questions pertaining to the five dimensions, were examined independently. This indicates that in order to see the absolute difference between the baseline and the final questionnaire, each of the five potential answers has to have a specific number. The Mann-Whitney test was used to look into any significant differences between the five groups, and the Kruskal-Wallis test demonstrated the dependencies between the various groups. Dimensions as well as the various materials used for repair. Cronbach's alpha test, an additional statistical reliability study, was used to ensure that the questions pertaining to the five dimensions were compiled securely. SPSS version 26.0 was used to analyse the data. A significance threshold of $p = 0.05$ was established.

RESULTS

Overall, 25 female patients (50%) and 25 male patients (50%) took part in the survey. comparisons of the sociodemographic characteristics of the two material categories. Participants who answered both questions were counted. For a more thorough statistical analysis, the authors separated the 20 questions on the OHIP-20 into 5 dimensions: (i) appearance, (ii) linguistic confines, (iii) psychosocial impact, (iv) oral functions, and (v) orofacial pain. Table 1 provides a summary of how each topic relates to the five dimensions.

Table 1: All the five dimensions with associated queries OHIP

Dimension	Question	Median Difference	Pre-prosthetic median ± SD	Post-prosthetic median ± SD
Appearance	"Have you ever had issues with your mouth, teeth, or dentures that have changed the way you look??"	0.68	3.8±1.1	4.4±0.1
	"Have issues with your teeth, mouth, or denture prevented you from smiling??"	0.15	1.7±0.1	2.1±1.9
	"Have you spotted a tooth that doesn't seem to be in good condition??"	0.47	1.9±1.7	2.9±1.2
	"Have you ever been self-conscious about the way your mouth, teeth, or dentures look??"	0.99	2.9±2.1	4.1±1.7
Psychological impact	"Have you experienced difficulty pronouncing any words because of issues with your mouth, teeth, or dentures??"	1.61*	1.7±1.0	2.7±1.1
	"Have issues with your mouth, teeth, or dentures made it difficult for you to get along with others??"	0.6	0.8±1.1	1.8±1.9
	"Have you had any monetary losses as a result of issues with your mouth, teeth, or dentures??"	0.68*	1.2±1.3	1.2±1.3

	"Have you experienced tension due to issues with your mouth, teeth, or dentures??"	0.88	1.7±1.1	1.7±0.9
Oral Function	"Have issues with your mouth, teeth, or dentures made it impossible for you to chew any food??"	0.77	1.4±2.1	0.8±0.1
	"Have you noticed that issues with your teeth, mouth, or dentures have made it harder for you to digest food??"	1.88*	2.7±1.9	4.8±2.1
	"Have issues with your mouth, teeth, or dentures made it difficult for you to consume anything??"	2.14	1.4±1.9	0.8±0.1
	"Have issues with your mouth, teeth, or dentures caused you to eat an inadequate diet??"	1.18*	0.1±1.0	0.9±1.1
Orofacial Pain	"Do you suffer from toothaches??"	0.08	1.1±0.1	0.1±0.9
	"Have you had gum pain??"	0.04	1.1±0.2	1.1±0.1
	"Have you experienced terrible dry mouth symptoms??"	0.71	1.8±1.0	1.2±1.0
	"Have you experienced tooth sensitivity, for instance, as a result of hot or cold meals or beverages??"			
Linguistic Limitation	"Have you had issues with your mouth, teeth, or dentures that caused others to misinterpret some of your words??"	0.11	1.1±0.1	1.6±0.1
	"Have issues with your teeth, mouth, or dentures prevented you from properly brushing your teeth??"	0.45*	1.3±1.2	0.4±1.0
	"Do you have trouble pronouncing some words??"	0.18	1.4±1.9	0.8±1.0
	"Have you had headaches as a result of oral, dental, or denture issues??"	1.68	0.2±0.1	3.8±0.1

* Questions represent validity

There were notable variations ($p < 0.001$) among the five dimensions. The most beneficial findings were seen in the appearance dimension ($p < 0.001$). The factor with the lowest positive scores ($p < 0.001$) was language restrictions. Oral functioning, psychosocial effect, and orofacial discomfort were the other three characteristics that did not differ substantially ($p < 0.007$) as shown in (Table 2).

Table 2: Findings from statistical analysis using the five dimensions' median and IQR (interquartile range) with pooled questions.

Variable	Appearance	Psychological impact	Oral Function	Orofacial Pain	Linguistic Limitation
Median	1.100	0.445	0.254	0.300	0.001
IQR	1.01	0.72	0.57	0.46	0.39

DICUSSION

In dental practice, severe tooth wear can happen in a variety of ways. The dental team frequently faces a difficult dilemma when deciding whether direct or indirect restorative/prosthetic therapy is required. It is crucial to consider the VDO's loss quantity as well as each patient's unique suffering and pain condition. According to Komandla et al[10], 61% of patients with significant tooth wear cited aesthetic impairment as their primary justification for visiting the dentist. Additional causes were discomfort (19%), functioning issues (20%), and hypersensitivities (39%).

Dental patients' treatment effects should be examined using oral health-related QoL measures, which often yield results that are easy to understand. The OHIP-20 questionnaire was selected for the current study to gain a more thorough validity. Other writers, like Loo[11] attested to the shorter surveys' same significance while saving patients' time. To examine the results worldwide, efforts were undertaken in the current study to allocate the individual questions to five dimensions. Therefore, the authors' selection of specific dimensions—such as looks, language restrictions, and orofacial pain could provide more fruitful outcomes. The long-term results, counting the OHIP-14 questionnaire earlier & after prosthetic therapy, were also examined in one similar research Mikeli et al[12] in patients who had experienced full reintegration with a single-tooth ceramic (lithium disilicate or silica) restorations. According to the authors, compared to patients with amelogenesis imperfecta, for instance, these restorations offered a vaguely increased botch peril in patients with high-risk profiles because of bruxism or tooth wear, but they maintained a good clinical quality for up to 16.5 years.

The subjectivity of each patient's reaction is one of the study's limitations. Patients' feelings, which might vary broadly from one another, are crucial in this situation. The severity of the abrasion and, thus, the starting circumstances, may have had a substantial impact on the outcomes and differed considerably across the patients. In addition to gender disparities in psychological sensitivity during dental treatment, another investigation unequivocally revealed that patients of different ages had varied attitudes regarding prosthetic procedures. Furthermore, the degree and kind of oral welfare limitations prior to prosthetic therapy have a significant impact on the psychological impact on the patient. Patient traits may therefore affect how dental procedures affect a patient's mental health. Another study by Inokoshi et al [13] examined the impact of retests on 21 patients' evaluations of OHIP surveys. According to the authors, patients' perceptions of their dental health might alter quickly after repeated evaluations over brief periods of time. Furthermore, acute symptoms associated with dental procedures frequently have the potential to drastically and instantly alter the evaluation of quality of life. A greater difference between the two restorative materials ceramic and CAD/CAM composites may lead to lengthier evaluation times, particularly in the cosmetic dimension.[14] In the literature, CAD/CAM composites showed higher rates of abrasion and discoloration than ceramics because, despite their industrial production, composites only absorb a small amount of water. This allows dye molecules to enter the material's deeper layers and may result in intrinsic discolorations.[15]

CONCLUSION

The results of this study highlight the important developments in restorative dentistry, especially in minimally invasive methods for treating extreme tooth deterioration. In addition to maintaining natural tooth structure, these therapies enhance oral health-related quality of life (QoL) in areas including appearance, oral function, and psychological effect by utilizing contemporary materials like ceramics and experimental CAD/CAM composites. The study emphasizes the efficacy of full-mouth rehabilitations in addressing functional and cosmetic difficulties, despite several limitations, including

patient subjectivity and the brief evaluation time. To further advance the area of restorative dentistry, future studies should concentrate on longer-term assessments to get a better understanding of material performance, especially regarding wear resistance and aesthetic results.

Conflict of Interest: None

Authors' Contribution

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Acquisition, Analysis or Interpretation of Data: Abdul Ahad Khurshid, Hamna Tariq

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