ORIGINAL ARTICLE

KNOWLEDGE ASSESSMENT ON THE IMPORTANCE OF RESTORING AESTHETICS USING REMOVABLE PARTIAL DENTURES

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Abstract: *Background*: Esthetic rehabilitation represents an essential goal of modern prosthetic therapy. With the increasing demand for esthetic treatments, both dental students and practitioners must understand the factors influencing the esthetics of removable partial dentures (RPDs). *Objective*: The aim of the study was to assess the level of knowledge among students and dentists regarding the importance of restoring aesthetics using composite prosthetic rehabilitation in patients with partial edentulism. *Materials and Methods*: A cross-sectional study was conducted using an online questionnaire consisting of 13 questions, applied to 97 participants (students from the Faculty of Dental Medicine in Craiova and dentists from Dolj County). Data analysis was descriptive, using percentages and distributions. *Results*: Most respondents were students (73.2%), and 56.8% considered that cast RPDs with special attachments provide the best esthetics. Factors perceived as determining the shape, color, and size of artificial teeth included VDO, facial type, age, coffee/smoking habits, and the size of edentulous ridges. *Conclusions*: Students and practitioners show a high level of interest in esthetic restorations using RPDs, considering that special attachment systems offer the best esthetic outcomes. Prosthetic education and the integration of digital tools can significantly improve understanding and clinical application.

Keywords: removable partial denture, dental esthetics, special attachments, composite prosthetic rehabilitation, partial edentulism

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1. Introduction

The increase in life expectancy represents one of the greatest public health challenges, both in developed countries and worldwide [1]. Tooth loss is considered a chronic disability that creates difficulties in performing essential functions of the dento-maxillary system, such as food trituration, swallowing, and breathing. Facial aesthetics may also be affected as a result [2]. The management of patients with partial edentulism always represents a major challenge for dental practitioners [3].

Although digital technologies have evolved steadily and implant-prosthetic techniques in dentistry have undergone significant development, the removable partial denture (RPD) continues to be used in the treatment of patients with various forms of partial edentulism resulting from tooth loss. These RPDs address specific clinical needs for patients who cannot be adequately rehabilitated through other methods [4].

The design of partial dentures is oriented toward fulfilling essential mechanical requirements, namely retention, support, and stability. In recent years, the esthetic component has become equally important, being increasingly integrated into the conception of these restorations. Esthetics represents an important factor that influences patient satisfaction [5].

Considerations and evaluation of facial esthetics should begin as soon as the patient enters the dental office. A good clinician should possess excellent observation and listening skills to accurately interpret these elements and arrive at a precise diagnosis.

Aim: The present study aimed to evaluate the knowledge of both dental students and dental practitioners regarding the importance of restoring the esthetic function in the treatment of partial edentulism using RPD.

2. Materials and method

For this study, the analyzed material consisted of the responses provided by the participants to an online questionnaire. This was a non-interventional cross-sectional study. The study was approved by the Ethics and Deontology Committee of the University of Medicine and Pharmacy of Craiova, approval no. 8/10.01.2025. The study participants included fourth- to sixth-year students from the Faculty of Dentistry in Craiova, as well as dental practitioners from Dolj County.

The study method used was the questionnaire method. The questionnaire was created using Google Forms and included 13 questions addressing the following aspects: belonging to a specific social or professional category, questions about sources of information, and questions about restoring facial esthetics using RPDs. The questions included in the questionnaire were as follows:

1. *What is your professional level?*
   - Student
   - Dentist

2. *If you are a dentist, please specify your years of experience*:
   - 0–5 years
   - 5–10 years
   - More than 10 years

3. *If you are a student, please specify your year of study:*
   - IV
   - V
   - VI

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4. *Please specify your category:*
- Female
- Male

5. *Please specify the sources of information you use:*
- Specialty textbooks
- Artificial Intelligence
- Congresses, Conferences, Workshops
- E-books, Online Webinars
- Others

6. *Have you ever assisted in the fabrication of an RPD?*
- Yes
- No

7. *Which of the following RPD methods is used most frequently?*
- Cast RPD with clasps
- Cast RPD with precision attachments
- Others

8. *Which type of RPD do you consider to be more esthetic?*
- Acrylic RPD
- Cast RPD with clasps
- Cast RPD with precision attachments

9. *Which of the following prostheses do you consider achieves better esthetic rehabilitation for a Kennedy Class IV edentulism?*
- Acrylic RPD
- Cast RPD with clasps
- Cast RPD with precision attachments

10. *Which factors influence the selection of artificial teeth shape in an RPD?*
- Facial type
- Gender
- Age
- Vertical dimension of occlusion (VDO)
- Systemic diseases

11. *Which factors influence the selection of artificial teeth color in an RPD?*
- Facial type
- Smoking habits
- Excessive consumption of coffee or chocolate
- Age

12. *Which factors do you consider influence the selection of artificial teeth size in an RPD?*
- Facial type
- Body height
- Body weight
- Systemic diseases
- Size of the edentulous ridges
- Size of the remaining teeth

13. *Which factors influence the arrangement of artificial teeth in an RPD?*
- Size and shape of the edentulous ridges
- Position of the remaining teeth
- Achieving ideal occlusal relationships
- Achieving stable and functional occlusal relationships

The answers to the questionnaire were centralized and statistically processed using descriptive statistical analysis.

3. Results

A total of 97 participants responded to this study. The first question investigated the professional category of the participants. The results showed that 73.2% of the participants were students (Fig. 1a).

Regarding the distribution of the participating dentists according to years of experience, those with 0–5 years of experience represented the largest group (68.3%), while dentists with more than 10 years of experience represented only 9.8% of the total dentist respondents (Fig. 1b).

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Among the student participants, most were in their 6th year of study, representing 57.7%. Students in the 4th and 5th years showed approximately equal percentages, as follows: 19.7% for the 4th year and 22.5% for the 5th year (Fig. 1c).

Regarding the gender distribution of the participants, the statistical analysis indicated that the respondents were almost evenly divided between female and male (49.5% male, 50.5% female) (Fig. 1d).

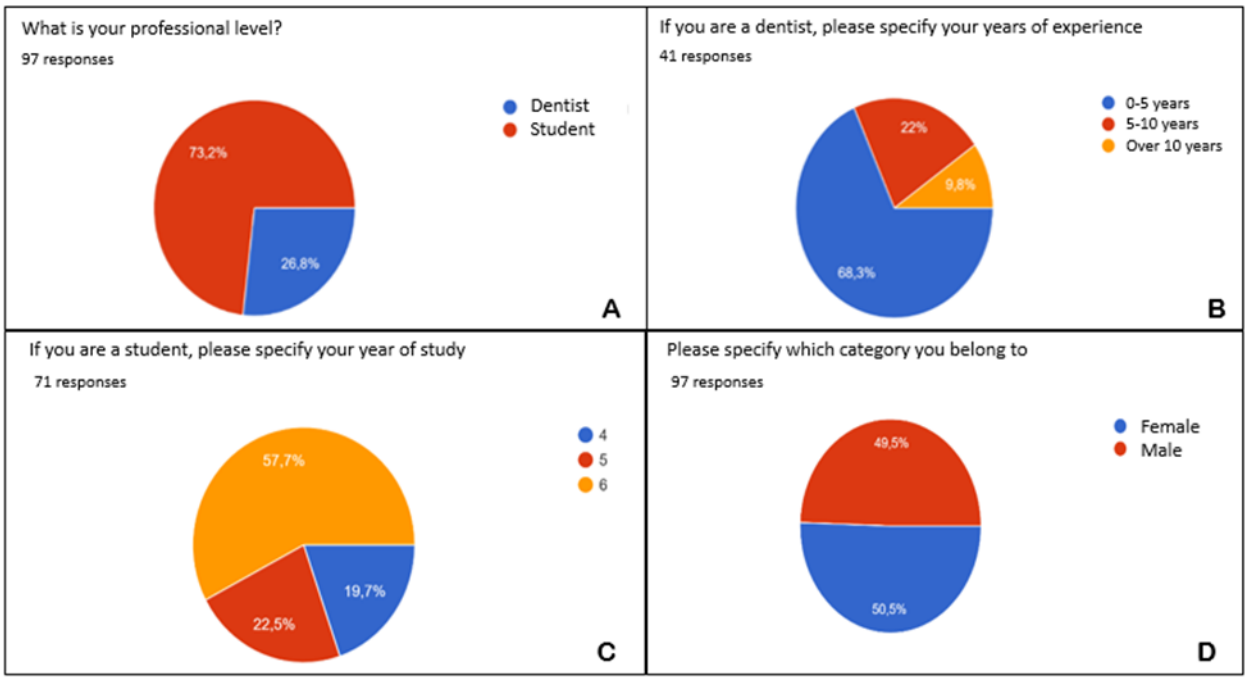

Figure 1. Distribution according to professional level (1A), Distribution according to the number of years of clinical experience (1B), Distribution of students according to year of study (1C), Gender distribution (1D).

In our study, it was highlighted that most participants used specialty textbooks as their primary source of information (61.9%). Other preferred sources of information included congresses, conferences, and workshops, while a high percentage was also observed regarding the use of artificial intelligence (Fig. 2a).

Regarding participation in the fabrication of an RPD, 61.9% of the respondents stated that they had taken part in the fabrication of a removable partial denture (Fig. 2b).

The investigation of respondents' opinions on the frequency of using different types of RPDs showed an approximately equal distribution of answers between prosthetic rehabilitation with clasp-retained RPDs and prosthetic rehabilitation with RPDs using precision attachments (Fig. 2c).

A total of 56.8% of the study participants considered that the RPD with precision attachments represents the most aesthetic treatment option among removable prostheses (Fig. 2d).

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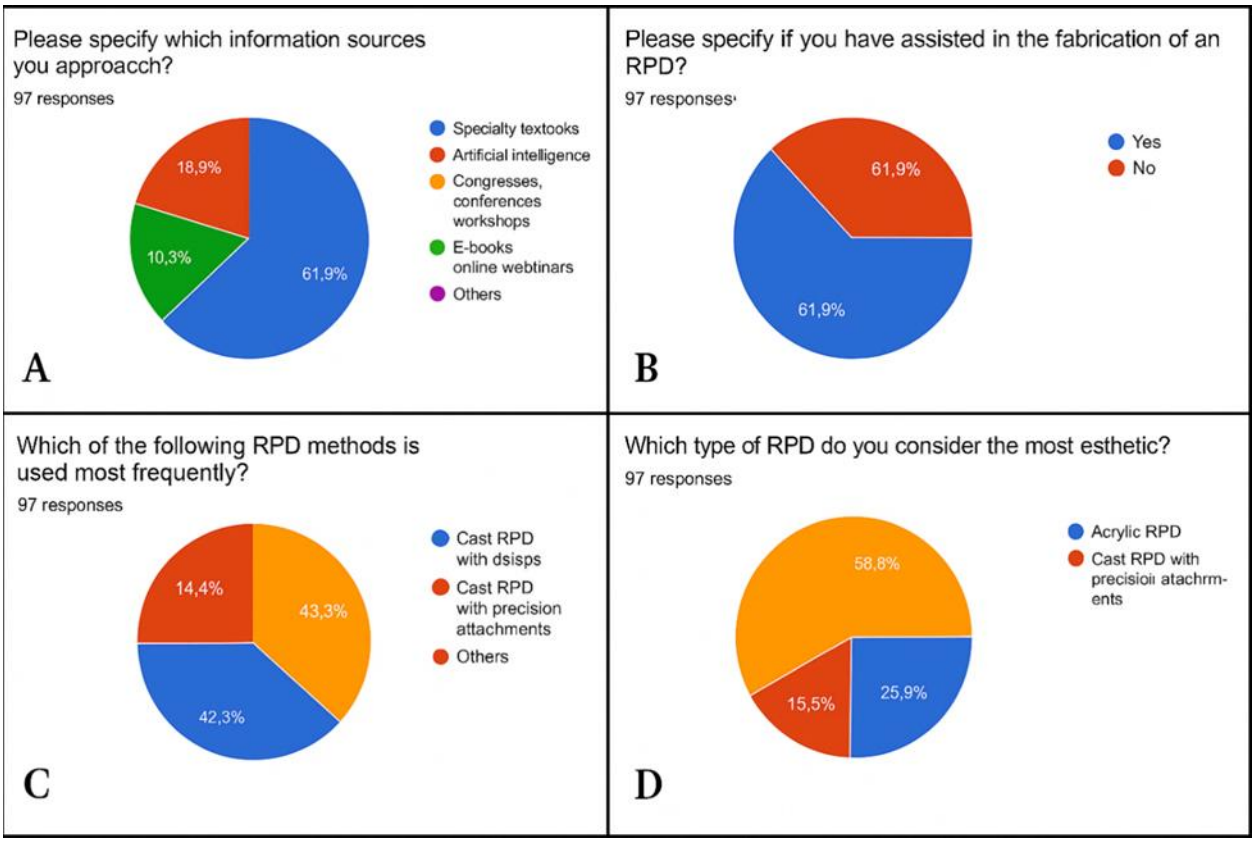

Figure 2. Sources of information used (2A). Participation in the fabrication of an RPD (2B). Type of RPD considered to be most frequently used (2C). Type of RPD considered being the most aesthetic (2D).

According to the results of the present study, the factors that may influence the selection of artificial tooth color included age, smoking habits, and excessive consumption of coffee and chocolate. Among the responses obtained, the highest percentage was represented by those referring to age, accounting for 46.4% (Figure 3).

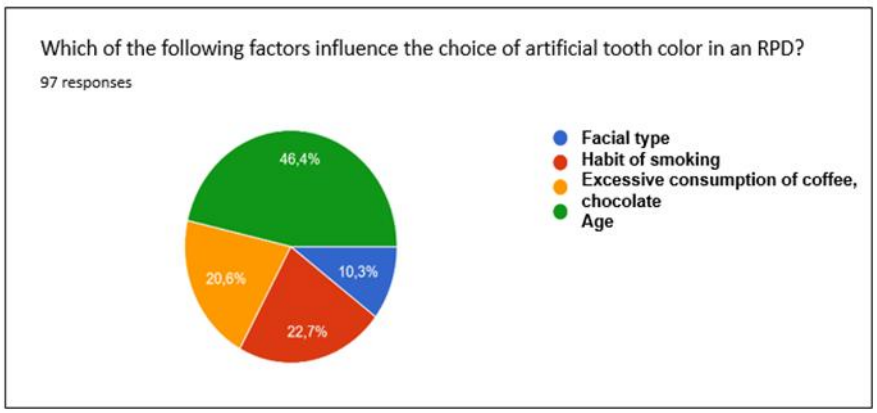

Figure 3. Choosing artificial teeth colors in making a PPM.

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The following question addressed the aesthetic rehabilitation of Kennedy Class IV edentulism using a RPD. The largest percentage (48.5%) corresponded to those who stated that Kennedy Class IV edentulism can be more aesthetically rehabilitated with a RPD using precision attachments (Fig. 4a).

According to the responses provided by the study participants, the factors influencing the selection of artificial tooth shape included the vertical dimension of occlusion (VDO), facial type, and age (Fig. 4b).

Regarding the main factors influencing thechoice of artificial tooth size, the most frequently selected options were: the size of the remaining natural teeth (30.9% of responses), the facial type (29.9%), and the size of the edentulous ridges (21.6%) (Fig 4c)

According to the conducted study, 41.2% of the participants considered that achieving stable and functional occlusal relationships, and 30.9% believed that the position of the remaining teeth, represent factors influencing the arrangement of artificial teeth. Additionally, smaller percentages of responses referred to the size and shape of the edentulous ridges as factors that may influence the arrangement of artificial teeth (Fig. 4d).

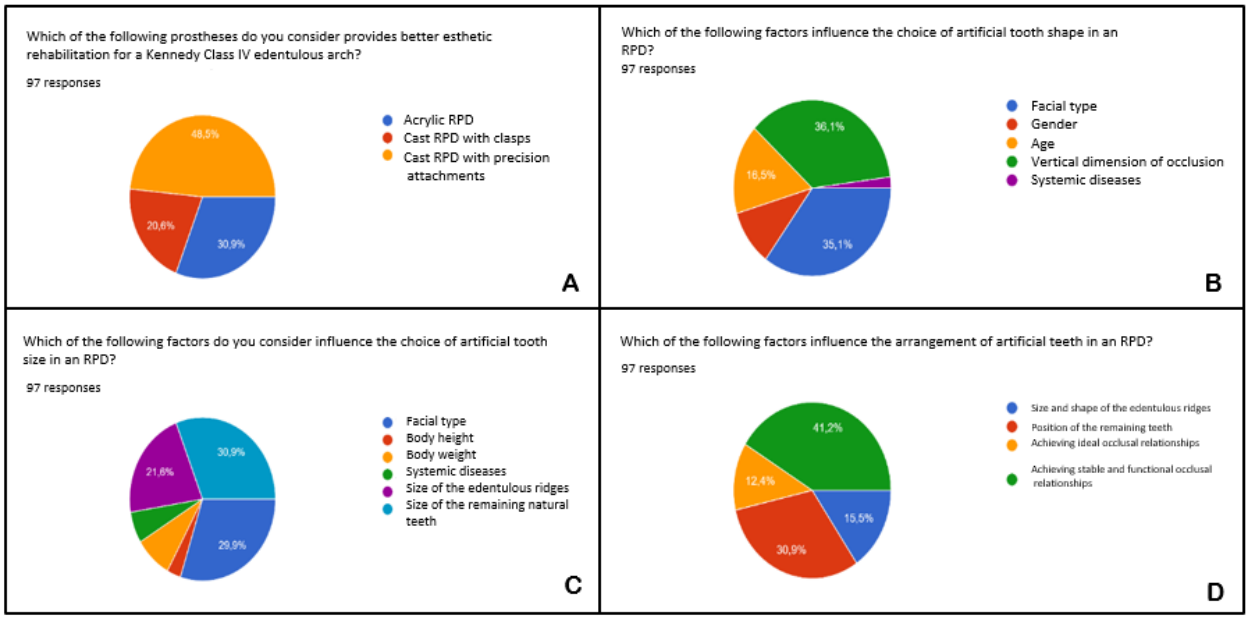

Figure 4. Aesthetic rehabilitation of Kennedy Class IV edentulism (4A); Factors influencing the shape of artificial teeth (4B); Factors influencing the color of artificial teeth (4C); Factors influencing the size of artificial teeth (4D).

4. Discussion

The findings of this study demonstrate a strong interest in esthetic rehabilitation using RPDs, particularly among dental students in advanced clinical years. This is consistent with previous research showing that students and young practitioners express a growing awareness of RPD design principles and improved confidence in applying contemporary prosthodontic concepts as their clinical exposure increases [6, 7]. Such alignment with existing literature highlights the importance of continuous and structured

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prosthodontic education. Participants in this study reported using traditional prosthodontic textbooks as their main learning resource; however, a notable proportion also relied on digital content and artificial intelligence tools. This shift mirrors recent reports indicating that technology-enhanced educational platforms—especially artificial intelligence—positively influence knowledge acquisition and critical reasoning within prosthodontic training [8]. The combination of classical sources with modern interactive tools reflects a global transition toward hybrid learning models in dental education.

More than half of the respondents had previously participated in the fabrication of an RPD, which reflects moderate clinical exposure. Similar studies have demonstrated that although theoretical understanding of RPD design is generally adequate, students frequently report limited hands-on training and insufficient opportunity to apply design principles clinically [6,7]. This suggests a need to strengthen the clinical component within prosthodontic curricula to better support the transition from theoretical knowledge to practical competence.

A significant outcome of this study was the respondents' preference for precision-attachment RPDs over clasp-retained designs when esthetics was the primary concern. This corresponds with the literature showing that attachment-retained RPDs provide superior esthetic outcomes by eliminating visible metal clasps and enhancing smile harmony [9-11]. Studies have reported higher patient satisfaction, improved retention, and better overall acceptance of attachment-retained RPDs, particularly in the anterior esthetic zone, where visibility is critical [9-11]. These findings are in line with the responses obtained for Kennedy Class IV cases in the present study.

The selection of artificial tooth shape was influenced predominantly by the VDO, facial morphology, and age. These determinants are widely supported in prosthodontic literature, where anterior tooth selection guidelines emphasize facial-type matching, age-related esthetic considerations, and the importance of dento-facial harmony [12–14]. Furthermore, maintaining an appropriate VDO has been shown to affect both esthetics and function, reinforcing its relevance in prosthetic planning [12].

Artificial tooth color selection was most strongly associated with age, smoking, and dietary staining factors such as coffee and tea consumption. These associations are corroborated by studies demonstrating that natural tooth shade tends to darken with age and that both tobacco use and pigmented beverages significantly contribute to extrinsic discoloration [15–17]. Such evidence aligns with the respondents' understanding of factors influencing shade selection for prosthetic restorations. Regarding tooth size, respondents highlighted the dimensions of remaining natural teeth, facial morphology, and ridge anatomy as the most influential factors. These considerations reflect established prosthodontic principles indicating that tooth size must be adapted to facial proportions, arch form, and available prosthetic space to achieve an esthetically and functionally harmonious result [13, 14, 18]. Research also demonstrates that the morphology and volume of the edentulous ridge directly affect tooth placement and may require modifications in tooth size or

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arrangement to maintain prosthesis stability [18]. Finally, respondents correctly identified occlusal stability, the position of remaining teeth, and ridge morphology as key determinants of artificial tooth arrangement. These findings are strongly supported by Goodacre [19], who emphasized that RPD occlusion must exhibit bilateral posterior contacts, absence of deflective interferences, and physiologic distribution of occlusal forces. Their review also highlights the importance of respecting ridge anatomy, occlusal plane orientation, and the patient's existing occlusal scheme to optimize function and long-term prosthesis performance [19]. The high concordance between participants' responses and established occlusal recommendations suggests a solid conceptual understanding of functional design principles among the surveyed population.

Overall, the results align with international trends emphasizing esthetic-driven prosthetic rehabilitation, increased preference for precision attachments, and a comprehensive approach to artificial tooth selection and occlusal planning. Enhancing clinical training opportunities and integrating digital learning tools may further strengthen competence among dental students and young practitioners.

Limitations: Because the study relied on self-reported data from a geographically restricted sample, results may not fully represent all educational environments. Future studies should incorporate broader populations and objective clinical assessments.

5. Conclusions

The questionnaire-based study revealed that most participants were students, indicating a high level of interest in composite prosthetic rehabilitation using fixed prostheses and removable partial dentures (RPDs).

The evaluation of participants' knowledge regarding the factors influencing facial aesthetics through composite prosthetic rehabilitation showed that the majority considered that cast RPDs with precision attachments provide a more aesthetic rehabilitation.

The combination of fixed and removable restorations represents a very good treatment option for partially edentulous patients, especially for those with bilateral distal-extension edentulism, in whom implant-prosthetic treatment options are limited, offering very good masticatory efficiency.

References

1. WHO, Ageing and health 2024, https://www.who.int/news-room/fact-sheets/detail/ageing-and-health
2. Kahn DM, Shaw RB. Overview of current thoughts on facial volume and aging. Facial Plast Surg. 2010;26(5):350–355).
3. Rich B, Goldstein GR. New paradigms in prosthodontic treatment planning: a literature review. J Prosthet Dent. 2002;88(2):208–214. doi:10.1067/mpr.2002.127886).
4. Kim JJ. Revisiting the Removable Partial Denture. Dent Clin North Am. 2019 Apr;63(2):263-278. doi: 10.1016/j.cden.2018.11.007. Epub 2019 Jan 30. PMID: 30825990.)

5. Chu CH, Chow TW. Esthetic design of removable partial dentures.Gen Dent. 2003;51(4):322–324].
6. Khan MF, Khan FN, Lone MA, Bokhari NM, Lone MA, Khan AN. Knowledge and attitude regarding designing removable partial denture among interns and dentists. J Pak Dent Assoc. 2020;29(2):66–70.
7. Nassief S, Sharka R, Marghalani A, Faramawy A, Elsisi HA, Alsaggaf A. Assessment of removable partial denture design skills among undergraduate dental students: A cross-sectional study. Open Dent J. 2025;19:e18742106360337.
8. AlShehri R, AlShamrani M, AlQahtani S, et al. Knowledge, attitudes, and perceptions of artificial intelligence in fixed prosthodontics. J Contemp Dent Sci. 2024.
9. Shala K, Dula L, Pustina-Krasniqi T, Bicaj T, Ahmedi E, Lila-Krasniqi Z. Patient's satisfaction with removable partial dentures. Open Dent J. 2016;10:656–664.
10. El-Khamisy A, Khella A, Mohamed M. Esthetic evaluation of attachment-retained removable partial dentures: A comparative clinical study. J Prosthodont. 2023. doi:10.1111/jopr.13648
11. Öwall B, Käyser AF, Carlsson GE. Principles of removable partial denture design and precision attachments. J Prosthet Dent. 1998;79(3):301–308.
12. Kumar M, et al. Guidelines for anterior tooth selection in prosthodontics. J Prosthet Dent. 2011;105(4):267–274.
13. Melilli D, Rallo A, Cassaro A, Pizzo G. Esthetic criteria for selection of anterior artificial teeth. Int J Prosthodont. 2016.
14. Constantinescu C, et al. Facial morphology and anterior tooth selection: An esthetic perspective. J EsthetRestor Dent. 2018;30(2):E15–E22.
15. Martín-Martín J, García JA, Balboa-Castillo T, et al. Age-related changes in natural tooth color: A spectrophotometric analysis. J Dent. 2024;139:104707. doi:10.1016/j.jdent.2023.104707
16. Ness L, Reimann S, et al. Smoking-related extrinsic tooth staining: A clinical evaluation. Clin Oral Investig. 2023;27:1223–1231. doi:10.1007/s00784-022-04556-6
17. Islam MJ, Rahman M, et al. Color stability of restorative materials exposed to coffee and tea. J Prosthodont Res. 2024. doi:10.2186/jpr.JPR_D_23_00123
18. Lemos CAA, Verri FR, Gomes JML, et al. Influence of edentulous ridge anatomy on prosthetic tooth arrangement: A systematic analysis. J Oral Rehabil. 2020;47:1–9. doi:10.1111/joor.12990
19. Goodacre CJ, Goodacre BJ. What occlusal scheme should be used with removable partial dentures? J Prosthodont. 2021;30:78–83. doi:10.1111/jopr.13313.

Author contributions

Authors read and approved the final manuscript. All authors have equally contributed to this work.

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Conflict of interest statement

The authors declare no conflicts of interest concerning this study.

Data availability statement

Will be provided on request.

Ethics statement

This study was approved by the Ethics Committee of the University of Medicine and Pharmacy of Craiova (approval data no. 8/10.01.2025).

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