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Evaluating Knowledge of Complete Denture Fabrication Procedures among General Dentists: A Questionnaire-Based Study

Dr. Shilpi Deshpande[1], Dr. Sandeep Singh[2,*], Dr. Latifa Elbanna[3], Dr. Jayeesha Kothapalle[4], Dr. Manjiri Chakor[5], Dr. Sonali Badve[6], Dr. Ridhi Bhola[7]

[1]BDS, GDC Aurangabad, Maharashtra, India
[2]MDS (Prosthodontics), Post Graduate Institute of Dental Sciences, Rohtak, India
[3](PhD, Prosthodontics) Faculty of Dental Medicine - AlAzhar University, Cairo, Egypt
[4]BDS/MPH. AECS Maaruti Dental College and Research Centre, India
[5]MDS (Oral and Maxillofacial surgery), RD Dental College and Research Center, Nagpur, India
[6]BDS, Bharti Vidyapeeth Dental College, India
[7]MDS, Post Graduate Institute of Dental Sciences, Rohtak, India
*Corresponding author: drsandeepsingh011@gmail.com

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Abstract **Background**: Fabrication of complete dentures is a fundamental prosthodontic skill for restoring function and esthetics in edentulous patients. However, the knowledge and confidence of general dentists in performing each procedural step can vary considerably. **Objective**: To assess the knowledge and self-reported confidence of general dentists regarding complete denture fabrication procedures using a structured questionnaire. **Methods**: A descriptive, cross-sectional survey was conducted among 126 general dentists. The questionnaire comprised demographic details and 15 knowledge-based items covering primary impressions, border molding, neutral zone concept, mandibular retention, facebow transfer, articulator transfer, SPA factors, try-in evaluation, laboratory procedures, post- insertion management, balanced occlusion, follow-up protocols, relining/rebasing, and adequacy of undergraduate training. Responses were recorded on a five-point Likert scale and analyzed using descriptive statistics. **Results:** Most respondents were aged above 40 years (55.6%), with 35.7% having more than 10 years of clinical experience. A majority reported confidence in primary impressions (84.1%), border molding (82.5%), and the neutral zone concept (78.6%). Confidence was moderate for balanced occlusion (64.3%) and facebow transfer (46.0%), but lower for articulator transfer (42.9%). Although 87.3% routinely provided post-insertion instructions, only 68.3% consistently scheduled follow-up appointments. Undergraduate training was considered adequate for complete denture fabrication by 81.7% of participants. **Conclusion**: The study revealed generally high self-reported knowledge in most aspects of complete denture fabrication, but notable gaps were identified in facebow and articulator transfer, balanced occlusion, and follow-up practices. These findings highlight the need for targeted continuing education to strengthen competencies in these critical areas

Keywords: *Complete denture fabrication, General dentists, Knowledge assessment, Prosthodontics*

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1. Introduction

Complete dentures remain an essential treatment modality for the rehabilitation of edentulous patients, restoring not only masticatory function but also speech, facial esthetics, and overall quality of life. Despite advances in implant prosthodontics, conventional complete dentures continue to be widely prescribed, especially in settings where implants are not financially or medically feasible. In 2021, approximately 353 million people worldwide were edentulous, resulting in a global age-standardized prevalence rate of 4.11%. Mastery of complete denture fabrication procedures therefore, remains a core competency for general dental practitioners worldwide. [1,2]

The success of complete dentures depends on accurate execution of each clinical and laboratory step, from primary impressions and border molding to occlusal scheme selection, try-in verification, processing, delivery, and follow-up. [3] Inadequate knowledge or improper application of these principles can result in compromised retention, stability, and

patient satisfaction. [4] Previous studies have shown that deficiencies in prosthodontic training particularly in areas such as balanced occlusion, neutral zone recording, and post-insertion management may contribute to unsatisfactory treatment outcomes. [5,6,7]

Advancements in digital dentistry have introduced alternative workflows for denture fabrication, utilizing technologies such as intraoral scanning, computer-aided design (CAD), and computer-aided manufacturing (CAM). These digital workflows offer potential benefits, including reduced chairside time and enhanced accuracy. Despite these advantages, the adoption of digital workflows among general dentists remains limited. A study found that approximately 60.1% of dentists do not utilize digital workflows, with 27% lacking the necessary equipment. [8]

Given the foundational role of complete dentures in dental practice and the evolving landscape of denture fabrication technologies, it is imperative to assess the knowledge and self-reported confidence of general dentists regarding complete denture procedures. This understanding can inform targeted educational initiatives to enhance competencies and improve patient outcomes.

2. Materials and Methods

This descriptive, cross-sectional, questionnaire-based study was conducted between January and June 2025 to assess the knowledge and self-reported confidence of general dentists regarding complete denture fabrication procedures. A total of 126 licensed general dentists participated. The inclusion criteria were possession of a Bachelor of Dental Surgery (BDS) or equivalent degree, active clinical practice as a general dentist, and willingness to provide informed consent, while dentists with postgraduate specialization in prosthodontics or those not actively practicing were excluded to minimize bias. Data were collected using a structured online survey (Google Forms), which was divided into two sections. The first section gathered demographic information, including age, gender, years of clinical experience, number of complete denture cases treated, and country of graduation. The second section assessed knowledge and confidence across 15 items covering primary impressions, border molding, the neutral zone concept, mandibular retention, maxillomandibular relationship recording, transfer to a semi-adjustable articulator, SPA factors, try-in evaluation, laboratory procedures, post- insertion management, balanced occlusion, post-insertion instructions, follow-up scheduling, relining/rebasing, and perceived adequacy of undergraduate training. Responses were recorded on a five-point Likert scale, with additional options to accommodate non-standard responses. Participation was voluntary, informed consent was obtained electronically, and the study adhered to the Declaration of Helsinki guidelines. The reliability and validity of the questionnaire were assessed prior to distribution. Survey data were exported to Microsoft Excel for descriptive statistical analysis. Categorical variables were summarized as frequencies and percentages, and responses were illustrated graphically using bar charts. No inferential statistical analyses were performed, as the study focused on identifying descriptive trends.

3. Results

Demographic Characteristics

A total of 126 general dentists participated in the study. Most respondents were aged above 40 years (55.6%), followed by those aged 25-30 years (20.6%), 36–40 years (11.1%), 31-35 years (10.3%), and below 25 years (1.6%). The majority were male (58.7%). Regarding clinical experience, 35.7% had more than 10 years of practice, while 27.8% had 4-6 years, 25.4% had 1-3 years, and 11.1% had less than 1 year. In terms of case exposure, 38.9% had rehabilitated more than 100 complete denture patients, followed by 19.0% with 51-100 cases, 15.1% with 26-50 cases, 15.1% with 10-25 cases, and 11.9% with fewer than 10 cases. Most participants graduated from India (82.5%), followed by Pakistan (14.3%) and other countries (3.2%) (Table 1).

Table 1. Demographic profile of respondents (n = 126)

Variable	Category	n (%)
Age	Below 25	2 (1.6)
	25–30	26 (20.6)
	31–35	13 (10.3)
	36–40	14 (11.1)
	Above 40	70 (55.6)
Gender	Male	74 (58.7)
	Female	52 (41.3)
Clinical experience (post-BDS)	<1 year	14 (11.1)
	1–3 years	32 (25.4)
	4–6 years	35 (27.8)
	>10 years	45 (35.7)
Number of complete denture cases treated	<10	15 (11.9)
	10–25	19 (15.1)
	26–50	19 (15.1)
	51–100	24 (19.0)
	>100	49 (38.9)
Country of graduation	India	104 (82.5)
	Pakistan	18 (14.3)
	Other	4 (3.2)

Knowledge and Confidence Assessment

High self-reported confidence was observed in primary impression making (84.1% agree/strongly agree), border molding (82.5%), and understanding of the neutral zone concept (78.6%). Moderate confidence was noted in balanced occlusion principles (64.3%), while lower confidence levels were reported for facebow transfer (46.0%) and articulator transfer to a semi-adjustable articulator (42.9%).

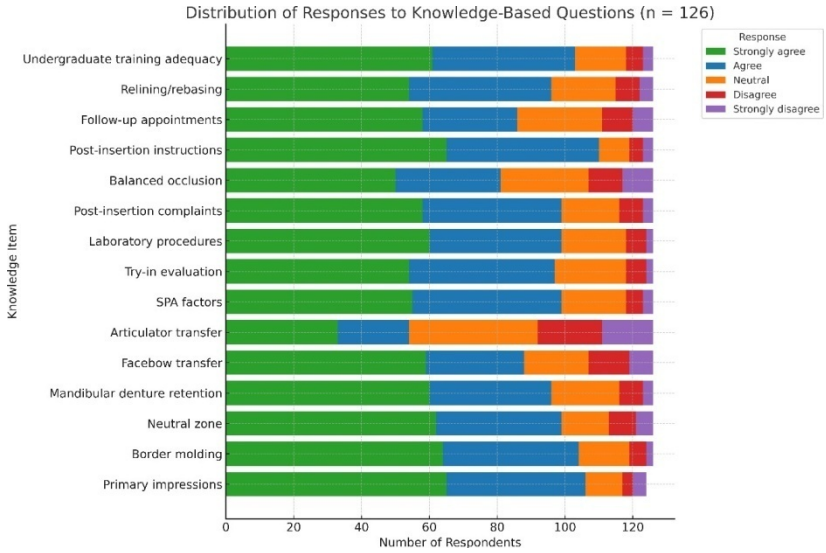
Most respondents routinely provided post-insertion instructions (87.3%); however, only 68.3% consistently scheduled follow-up appointments. Overall, 81.7% of participants considered their undergraduate training in complete denture fabrication to be adequate.

Table 2. Distribution of responses to knowledge-based questions (n = 126)

Knowledge item	Strongly agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly disagree n (%)
Primary impressions	65 (51.6)	41 (32.5)	11 (8.7)	3 (2.4)	4 (3.2)
Border molding	64 (50.8)	40 (31.7)	15 (11.9)	5 (4.0)	2 (1.6)
Neutral zone	62 (49.2)	37 (29.4)	14 (11.1)	8 (6.3)	5 (4.0)
Mandibular denture retention	60 (47.6)	36 (28.6)	20 (15.9)	7 (5.6)	3 (2.4)
Facebow transfer	59 (46.8)	29 (23.0)	19 (15.1)	12 (9.5)	7 (5.6)
Articulator transfer	33 (26.2)	21 (16.7)	38 (30.2)	19 (15.1)	15 (11.9)
SPA factors	55 (43.7)	44 (34.9)	19 (15.1)	5 (4.0)	3 (2.4)
Try-in evaluation	54 (42.9)	43 (34.1)	21 (16.7)	6 (4.8)	2 (1.6)
Laboratory procedures	60 (47.6)	39 (31.0)	19 (15.1)	6 (4.8)	2 (1.6)
Post-insertion complaints	58 (46.0)	41 (32.5)	17 (13.5)	7 (5.6)	3 (2.4)
Balanced occlusion	50 (39.7)	31 (24.6)	26 (20.6)	10 (7.9)	9 (7.1)
Post-insertion instructions	65 (51.6)	45 (35.7)	9 (7.1)	4 (3.2)	3 (2.4)
Follow-up appointments	58 (46.0)	28 (22.2)	25 (19.8)	9 (7.1)	6 (4.8)
Relining/rebasing	54 (42.9)	42 (33.3)	19 (15.1)	7 (5.6)	4 (3.2)
Undergraduate training adequacy	61 (48.4)	42 (33.3)	15 (11.9)	5 (4.0)	3 (2.4)

Table 3. Summary of Previous Studies on Knowledge, Awareness, Confidence, and Education in Complete Denture Prosthodontics

Author (Year)	Country/Setting	Sample Size & Population	Focus Area	Key Findings
Luo et al. (2024)[9]	China	63 dental interns	Online learning in complete denture rehabilitation	Students valued the flexibility and accessibility of online learning; gaps remained in confidence/preparedness; VR and blended methods are recommended.
Nono et al. (2024)[10]	Uganda (Makerere University)	25 clinicians & technologists (qualitative)	Experiences with complete denture services	Patients had high expectations but also fears (comfort, swallowing); conventional dentures dominant; need better communication and consent.
Lone et al. (2023)	Pakistan (40 colleges)	Prosthodontics department heads	Complete denture education trends	65% colleges required students to fabricate 2–4 dentures; live demonstrations in 100% institutions; common use of impression compound and ZOE.
Elagra et al. (2022)	Saudi Arabia (19 universities)	419 senior students	Stress during complete denture procedures	Highest stress during jaw relation and border molding; stress higher
				among females; need for targeted training.
Abualsaud et al. (2022)	Saudi Arabia	344 students & interns	Role of phonetics in removable prostheses	Awareness varied across levels; females scored higher in general knowledge ($p = 0.023$); interns scored highest overall; need to improve the curriculum.
Vialli et al. (2021)	India (3 colleges, Tamil Nadu)	202 dental interns	Awareness of jaw relation procedures	83% awareness; significant association between number of complete dentures done and awareness ($p < 0.001$).
Sampaio- Fernandes et al. (2020)	Portugal	176 dental students (3rd–5th year)	Self- confidence & quality of prosthodontics education	Confidence increased with progression; 5th-year students most confident; education rated "Good/Very Good"; students suggested more clinical exposure.
Puryer et al. (2018)	UK (University of Bristol)	203 undergraduates (Years 3–5)	Confidence & perceptions of prosthodontic education	Confidence improved across years ($p < 0.001$); more cases were treated with progression; students wanted more clinical, less lab teaching.
Ozkurt et al. (2013)	Turkey (17 dental schools)	Faculty survey (100% response)	Predoctoral prosthodontic curricula	Similar materials used (alginate, ZOE, impression compound); limited teaching of overdentures; implant-retained prostheses not taught.



4. Discussion

The present study assessed the self-reported knowledge and confidence of general dentists in complete denture fabrication, revealing strong competence in several procedural areas, but notable deficiencies in others. Most respondents demonstrated high confidence in primary impression making, border molding, and neutral zone recording, findings consistent with previous surveys among general dentists and dental graduates. [19,20] This may be attributed to the fact that these skills are traditionally emphasized during undergraduate prosthodontics training and are considered essential for achieving retention, stability, and support in complete dentures. [21]

However, fewer respondents reported confidence in articulator transfer (42.9%) and balanced occlusion principles (64.3%). Similar gaps have been reported in studies from Ireland, the United Kingdom, and the Middle East, where dentists often delegate articulator mounting to dental technicians or adopt simplified occlusal schemes. [22,23] Rehmann et al. reported that balanced occlusion may enhance patient adaptation during the early phase of denture use due to improved stability, while also contributing to greater masticatory efficiency by engaging larger grinding surfaces. [24,25] Trapozzano similarly observed improved masticatory efficiency in nine of twelve patients, although the differences were clinically significant in only two, suggesting that the benefit may be patient-dependent. [26] Pound proposed that balanced occlusion helps protect residual ridges by centralizing occlusal forces and promoting symmetrical stress distribution, potentially reducing bone resorption. However, it has been argued that since no balancing contacts occur during mastication, the protective effect may be limited. [27] Collectively, these studies highlight the importance of balanced occlusion in complete denture fabrication, underscoring the need for its continued inclusion and emphasis in both undergraduate and continuing dental education programs.

Post-insertion management was generally well addressed in our study, with 87.3% routinely providing instructions. Nevertheless, only 68.3% consistently scheduled follow-up appointments, a practice essential for identifying sore spots, occlusal adjustments, and evaluating tissue adaptation. [28] This suggests that while theoretical knowledge exists, clinical protocols for long-term patient monitoring may not be universally applied.

Interestingly, 81.7% of participants felt that their undergraduate training adequately prepared them for complete denture fabrication. This contrasts with some reports that have highlighted insufficient clinical exposure to edentulous cases at the undergraduate level. [28,29] The discrepancy could be due to differences in curriculum structure between institutions, as well as varying patient demographics in teaching hospitals.

The study's strengths include its reasonable sample size (n = 126) and comprehensive coverage of all major steps in denture fabrication. However, the limitations should be acknowledged. Firstly, the self-reported nature of the responses may not accurately reflect actual clinical competence, introducing potential response bias. Secondly, the sample was drawn primarily from India and Pakistan, which may limit the generalizability of the findings to other regions.

Thirdly, no objective skills assessment was conducted, which would have provided a more accurate picture of competence levels. Despite these limitations, this study provides a contemporary benchmark of the knowledge of Complete Denture Fabrication Procedures among General Dentists.

Recommendations

Based on the findings, we recommend:

1. Incorporating more hands-on training for articulator use and balanced occlusion principles in both undergraduate and CDE programs.
2. Emphasizing the importance of structured follow-up visits post-denture delivery.
3. Introducing simulation-based learning modules for complete denture fabrication in dental curricula.

Conclusion

This study shows that while general dentists demonstrate strong knowledge and confidence in several key steps of complete denture fabrication, particularly primary impressions, border molding, and the neutral zone concept, gaps remain in areas such as articulator transfer, facebow use, balanced occlusion, and structured follow-up practices. If these issues are not addressed, they may affect the functional and aesthetic success of complete dentures. Strengthening these skills will not only improve clinical outcomes but also boost patient satisfaction and quality of life for edentulous patients.

Conflicts of Interest: All authors declare no conflicts of interest.

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