Assessment of Communication Quality through Work Authorization between Dentists, Prosthodontic Consultants, and Dental Assistants in Fixed and Removable Prosthodontics

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Abstract

Background: Effective communication between dentists, prosthodontic consultants, and dental assistants is fundamental to the success of fixed and removable prosthodontic treatments. Work authorization documents serve as a critical bridge between clinical and laboratory processes, yet studies reveal persistent gaps in clarity, completeness, and standardization. These deficiencies often result in laboratory errors, remakes, and compromised patient outcomes.

Aim: This review aims to analyze the quality of communication and work authorization practices in prosthodontics, identify barriers affecting interdisciplinary collaboration, and explore the potential of digital and artificial intelligence (AI)-based solutions to enhance communication efficiency and accuracy within Saudi dental centers.

Methods: A narrative review approach was employed, synthesizing literature published between 2015 and 2025 from databases including PubMed, Scopus, Web of Science, and ScienceDirect. Studies focusing on dentist–technician communication, documentation quality, interprofessional collaboration, and digital innovation were thematically analyzed following Braun and Clarke's framework.

Results: Findings revealed consistent communication challenges worldwide, with incomplete documentation, ambiguous terminology, and inadequate supervision by prosthodontic consultants identified as key issues. Saudi-based studies reported heavy reliance on handwritten work authorizations and limited use of standardized digital templates. Conversely, international research demonstrated the benefits of CAD/CAM integration, cloud-based laboratory portals, and AI-assisted documentation systems in improving accuracy and traceability.

Conclusion: Enhancing communication quality through digital standardization, AI integration, and interprofessional training is vital for improving prosthodontic outcomes. Empowering dental assistants, formalizing consultant oversight, and implementing smart documentation frameworks will ensure consistency, accountability, and clinical precision. These advancements align with Saudi Vision 2030, fostering an intelligent, data-driven

dental communication model that merges human expertise with technological innovation for sustainable excellence in oral healthcare.

INTRODUCTION

Effective communication is the foundation of quality dental care, particularly within prosthodontics, where precision, interdisciplinary coordination, and detailed laboratory instructions directly determine treatment outcomes. In the context of fixed and removable prosthodontics, the communication chain between dentists, prosthodontic consultants, and dental assistants functions as a critical bridge linking clinical judgment with technical execution. Miscommunication at any point in this continuum—whether through incomplete work authorization, unclear design specifications, or verbal misinterpretation—can result in inaccurate restorations, wasted resources, and patient dissatisfaction (Kumar & Sethi, 2023).

Work authorization, which serves as a formal document transferring clinical information to the dental laboratory, is not merely a procedural requirement but a vital communication tool. It encompasses essential details such as material selection, shade mapping, occlusal scheme, and prosthesis design. However, numerous studies have highlighted persistent challenges: incomplete forms, inconsistent terminology, and lack of clarity in dentist–technician correspondence remain common globally (Afsharzand et al., 2019; Yilmaz et al., 2021). Within Saudi Arabia, the situation mirrors international trends, as recent evidence from tertiary dental centers in Riyadh and Jeddah suggests that documentation practices often rely on informal communication or handwritten authorizations lacking standardized formats (Alqahtani et al., 2022).

Dental assistants play an equally vital role in facilitating this exchange. Positioned between clinicians and laboratories, assistants often coordinate impressions, digital scans, and case documentation. Despite this, their role in communication quality is underrepresented in research, with most studies focusing primarily on dentist–technician interactions (Al-Shehri & Alhaddad, 2020). The inclusion of prosthodontic consultants, who oversee complex restorative and rehabilitative cases, introduces another layer of communication complexity. Successful outcomes depend not only on technical expertise but also on structured, accurate, and reciprocal information exchange among all three professional groups.

In recent years, the increasing digitization of dentistry—through CAD/CAM systems, intraoral scanners, and electronic work authorization software—has opened new opportunities to improve communication quality. Digital workflows allow real-time verification of design parameters, material selection, and occlusal adjustment, reducing the risk of laboratory misinterpretation (Poticny & Klim, 2020). However, technology alone cannot replace the cognitive and professional alignment required for effective collaboration. A mutual understanding of terminology, responsibilities, and clinical expectations remains fundamental.

Given the limited body of literature addressing multidisciplinary communication within prosthodontic practice in Saudi Arabia, this narrative review aims to synthesize current evidence, identify prevailing challenges, and explore strategies to enhance the clarity, accuracy, and efficiency of professional communication in both fixed and removable prosthodontics. Emphasis is placed on the roles of dentists, prosthodontic consultants, and dental assistants, as well as on future innovations involving digital platforms and artificial intelligence in communication standardization.

METHODS

This narrative review was designed to synthesize and critically evaluate the published evidence on communication and work authorization between dentists, prosthodontic consultants, and dental assistants within fixed and removable prosthodontics. Rather than following the rigid procedural requirements of systematic reviews, the narrative approach was chosen for its flexibility in exploring conceptual relationships, contextual variations, and technological advancements that influence communication quality in prosthodontic practice. A comprehensive search was conducted across PubMed, Scopus, Web of Science, and ScienceDirect to identify relevant studies published between 2015 and 2025, ensuring inclusion of both traditional and digital communication developments. The search strategy combined Medical Subject Headings (MeSH) and free-text keywords, including "dentist–technician communication," "prosthodontic communication," "work authorization," "dental assistants," "interprofessional collaboration," "digital dentistry," and "Saudi Arabia," using Boolean operators (AND, OR) to refine the results. Eligible studies were those that addressed professional communication in prosthodontics, evaluated the completeness or clarity of work authorizations, or examined factors affecting collaboration and treatment outcomes; only peer-reviewed English-language publications were included, while reports focusing solely on fabrication techniques, patient–dentist communication, or other dental specialties were excluded. Data from selected studies were extracted independently by two reviewers and categorized by study design, professional groups, communication variables, and outcome measures related to restoration accuracy, laboratory errors, and efficiency. Thematic synthesis followed Braun and Clarke's (2021) six-phase analytical model—familiarization, coding, theme identification, review, definition, and reporting—to derive major themes describing communication challenges, digital innovations, and organizational dynamics. To maintain rigor, methodological quality was appraised using adapted elements from the Joanna Briggs Institute Critical Appraisal Checklist, prioritizing clarity, representativeness, and transparency of evidence. Since this review relied exclusively on secondary data from existing literature, no ethical approval was required; all sources were appropriately cited in accordance with APA 7th-edition standards.

RESULTS AND DISCUSSION

The reviewed literature revealed that effective communication through detailed work authorization is a crucial determinant of success in both fixed and removable prosthodontics. Studies consistently emphasized that incomplete instructions, unclear design specifications, and the absence of standardized documentation contribute to clinical inaccuracies, remakes, and inefficiencies in dental laboratories. Across both international and Saudi contexts, recurring deficiencies in communication between dentists, prosthodontic consultants, and dental assistants have been reported.

Table 1. Summary of Key Studies on Dentist–Technician Communication in Prosthodontics (2015–2025)

Relevance to Current Review	Key Findings	Sample/Method	Focus Area	Country	Author (Year)
Highlights the global prevalence of incomplete	64% of work authorizations lacked complete	Survey (n=200)	Dentist–technician	USA	Afsharzand et al. (2019)

Relevance to Current Review	Key Findings	Sample/Method	Focus Area	Country	Author (Year)
authorization forms.	design details; communication often verbal.		communication		
Confirms that clarity and terminology affect final restoration accuracy.	Identified consistent miscommunication in shade selection and material specification.	Systematic review	Removable prosthodontics	Germany	Yilmaz et al. (2021)
Demonstrates the need for digital and standardized systems in Saudi Arabia.	72% of authorizations were handwritten; lack of standardization and poor documentation.	Cross-sectional study (n=210)	Fixed prosthodontics	Saudi Arabia	Alqahtani et al. (2022)
Underlines the underrecognized role of assistants in communication accuracy.	Dental assistants lacked formal training in documentation; relied on verbal coordination.	Questionnaire	Role of dental assistants	Saudi Arabia	Al-Shehri & Alhaddad (2020)
Validates that teamwork directly improves technical outcomes.	Improved collaboration reduced laboratory remakes by 28%.	Mixed-method survey	Interprofessional collaboration	India	Kumar & Sethi (2023)
Supports the integration of digital platforms to minimize miscommunication.	CAD/CAM systems improved accuracy and traceability of design specifications.	Review	Digital communication	USA	Poticny & Klim (2020)

In most Saudi studies, the quality of communication was rated as moderate to poor, primarily due to handwritten documentation, incomplete work authorization forms, and limited supervision by prosthodontic consultants. Dental assistants, although central to case coordination, were seldom included in communication audits. Their indirect participation often led to missing information in laboratory documentation.

Digital transformation emerged as a consistent theme among more recent publications, with studies showing that AI-based and CAD/CAM communication systems improved record completeness and enhanced mutual understanding between dentists and technicians. Despite these advancements, the integration of digital systems remains partial

across Saudi dental institutions, primarily limited to prosthodontic teaching hospitals and private centers with higher resource availability.

Table 2. Comparative Overview of Traditional vs. Digital Communication Models in Prosthodontics

Impact on Clinical Outcome	Digital / AI-Enabled Systems	Traditional (Manual)	Parameter
Digital systems improve accuracy, eliminate transcription errors.	Electronic forms, digital scans, cloud-based authorization	Handwritten forms, verbal instructions	**Medium of Communication**
Enhances clarity and accountability between clinical and lab teams.	Auto-check for completeness; standardized terminology	Inconsistent; often missing design or material details	**Information Completeness**
Reduces turnaround time and misinterpretation.	Real-time updates and approvals via integrated platforms	Slow; dependent on physical document transfer	**Feedback and Approval Loop**
Improves quality assurance and medico-legal compliance.	Centralized digital storage and audit trails	Poor archival consistency	**Traceability and Record Keeping**
Improves professional competence but needs capacity building.	Requires digital literacy and AI awareness	Low; relies on manual skills	**Training and Adaptation Needs**
Better restoration fit, reduced chairside adjustments.	Significantly reduced through automated validation	Higher due to human error	**Error and Remake Rate**

These findings collectively demonstrate that communication efficiency is both a technical and organizational challenge. While traditional methods remain dominant in many clinics, particularly in public settings, the shift toward digital workflows offers measurable improvements in documentation quality, turnaround time, and patient satisfaction. Interprofessional training remains a crucial missing link—especially for dental assistants and technicians, who play critical intermediary roles but often lack formal inclusion in communication audits or digital system training.

AI-assisted platforms, currently under pilot implementation in advanced dental centers, show potential for automating the verification of prosthetic design inputs, detecting incomplete data, and ensuring compliance with prosthodontic standards. Future adoption of such systems across Saudi specialized centers could standardize communication, support national accreditation efforts, and align prosthodontic practice with Vision 2030's healthcare digitization goals.

Table 3. Comparative Analysis of Communication Practices in Prosthodontics: Saudi Arabia vs. International Contexts (2015–2025)

Comparative Insight	International Studies	Saudi Arabia (Local Evidence)	Dimension
Saudi practice remains largely manual, with digital	Increasing reliance on electronic communication and	Predominantly handwritten work authorization forms;	**Communication Method**

Comparative Insight	International Studies	Saudi Arabia (Local Evidence)	Dimension
systems adopted only in select teaching and private institutions.	digital platforms (Poticny & Klim, 2020; Yilmaz et al., 2021).	limited use of standardized templates (Alqahtani et al., 2022; Al-Shehri & Alhaddad, 2020).	
Highlights training gap and lack of inclusion in formal communication structures in Saudi clinics.	Dental assistants actively involved in data management and electronic case submission (Afsharzand et al., 2019).	Frequently engaged in administrative and procedural coordination but undertrained in documentation accuracy.	**Role of Dental Assistants**
Consultant-led communication protocols abroad enhance quality assurance; locally, oversight is inconsistent.	Active consultant involvement and interdepartmental meetings reported in university-based centers (Kumar & Sethi, 2023).	Irregular consultant oversight; communication often limited to dentist–technician interactions (Alqahtani et al., 2022).	**Supervision by Prosthodontic Consultants**
Saudi centers rely on variable institutional templates, leading to inconsistencies.	Adoption of international standards (ISO, ADA) for prosthodontic documentation.	Absence of national templates or unified documentation system.	**Standardization of Work Authorization Forms**
Digital adoption gap remains significant; localized policy support needed for expansion.	Full integration of CAD/CAM workflows, intraoral scanning, and electronic authorizations.	Partial implementation; barriers include cost, limited training, and resistance to workflow change (Alharbi et al., 2024).	**Digital Transformation**
Communication quality is closely tied to digitization level and interprofessional collaboration.	Moderate to high; improved through electronic systems and team feedback (Yilmaz et al., 2021).	Moderate to poor; frequent omissions in shade, material, and design instructions (Alqahtani et al., 2022).	**Quality of Communication**
Urgent need for continuing education programs in Saudi dental centers.	Ongoing CPD programs integrating interprofessional communication and digital workflow literacy (Afsharzand et al., 2019).	Limited structured training on communication protocols for assistants and technicians.	**Training and Continuous Education**

Comparative Insight	International Studies	Saudi Arabia (Local Evidence)	Dimension
Saudi Arabia shows emerging readiness but requires institutional support for AI infrastructure.	Advanced implementation of AI-based case-checking systems in laboratory workflows (Abduo et al., 2024).	Pilot stage; interest in AI validation tools but limited clinical integration (Alharbi et al., 2024).	**AI and Smart Solutions Adoption**

The comparative analysis underscores a clear divergence between Saudi and international prosthodontic communication frameworks. While Saudi studies demonstrate growing awareness of the importance of structured documentation and interdisciplinary collaboration, actual implementation remains constrained by institutional habits, paper-based systems, and insufficient digital training. Conversely, international models have transitioned toward digitally integrated ecosystems, where communication, quality assurance, and feedback occur within interconnected CAD/CAM and electronic record systems.

The absence of nationally standardized authorization templates in Saudi Arabia has resulted in variability among institutions, leading to miscommunication and inconsistent prosthetic outcomes. This highlights the need for national regulatory intervention — particularly from the Saudi Commission for Health Specialties and the Ministry of Health — to establish uniform documentation and communication protocols across all dental centers. Furthermore, the consistent underutilization of dental assistants and prosthodontic consultants within the communication chain weakens collaborative efficiency. Empowering these professionals through structured training and role integration could substantially elevate communication clarity and workflow coordination.

On the global level, advanced institutions now employ AI-assisted validation systems, cloud-based laboratory communication portals, and 3D visualization tools that enable live prosthesis previews and instant feedback loops. Adapting such innovations to the Saudi healthcare infrastructure represents a strategic step toward achieving the Vision 2030 objective of intelligent, paperless, and data-driven healthcare delivery.

Table 4. Recommendations and Future Directions for Enhancing Communication Quality in Prosthodontics

Expected Outcome / Benefit	Strategic Implementation Approach	Proposed Smart / AI-Based Solution	Current Challenge	Domain
Reduction in communication errors, improved restoration accuracy, and enhanced accountability.	Mandate electronic documentation in specialized centers; incorporate AI to auto-check form completeness and terminology accuracy.	Develop standardized **digital work authorization templates** integrated with AI-assisted validation tools.	Incomplete or unclear work authorization forms leading to misinterpretation and remakes.	**Clinical Communication and Documentation**

Expected Outcome / Benefit	Strategic Implementation Approach	Proposed Smart / AI-Based Solution	Current Challenge	Domain
Empowered assistants capable of active participation in digital workflows, improving communication flow and efficiency.	Incorporate into national CPD requirements and undergraduate dental assistant curricula.	Introduce **training modules and certification programs** focused on digital communication, design terminology, and case coordination.	Limited participation in documentation and interprofessional communication.	**Role of Dental Assistants**
Ensures expert oversight, clinical precision, and standardized prosthesis outcomes.	Integrate real-time feedback features in communication software; require consultant sign-off for complex cases.	Implement **digital review dashboards** allowing consultants to approve, annotate, and audit cases remotely.	Inconsistent involvement in reviewing work authorizations or supervising laboratory communication.	**Prosthodontic Consultant Oversight**
Strengthened teamwork, traceable feedback, and reduced information silos.	Encourage interdepartmental communication through secure, centralized portals.	Deploy **cloud-based communication platforms** linking all professionals with case progress tracking.	Fragmented communication between dentists, technicians, and assistants.	**Interdisciplinary Collaboration**
Enhanced decision support, reduced human error, and alignment with Vision 2030's digital health goals.	Pilot implementation in leading Riyadh and Jeddah centers; expand via national funding initiatives.	Adopt **AI-powered systems** that analyze prosthesis designs, flag inconsistencies, and generate real-time alerts.	Limited digitization of prosthodontic workflows in Saudi centers.	**Digital Transformation and AI Integration**
Consistent, regulated communication framework ensuring uniform quality	Establish by collaboration between SCFHS, MOH, and dental schools.	Develop **Saudi National Communication Standards for Prosthodontic Work**	Absence of national guidelines for communication documentation	**Quality Assurance and Policy Development**

Expected Outcome / Benefit	Strategic Implementation Approach	Proposed Smart / AI-Based Solution	Current Challenge	Domain
across all institutions.		**Authorization (SNCS-PWA)**.	in prosthodontics.	
Cultivates a digitally literate generation of dentists and assistants proficient in smart prosthodontic communication.	Collaborate with universities to integrate communication assessment in OSCE exams and postgraduate programs.	Embed **simulation-based and AI-enhanced training** in dental schools focusing on clinical–laboratory coordination.	Scarcity of interprofessional communication modules in dental curricula.	**Education and Research**
Sustained professional competence, innovation culture, and alignment with evolving digital standards.	Conduct annual CPD events integrating AI case simulation exercises.	Establish **mandatory digital communication workshops** accredited by professional councils.	Lack of ongoing skill enhancement in documentation and digital communication.	**Continuous Professional Development (CPD)**

Collectively, these recommendations propose a comprehensive, intelligent framework for advancing communication quality in prosthodontics. At the clinical level, transitioning from manual to digital, AI-supported authorization systems will address long-standing documentation deficiencies and ensure real-time case verification. At the organizational level, empowering dental assistants and enforcing consultant oversight will promote teamwork and data integrity. At the policy level, introducing national communication standards and AI readiness programs will unify prosthodontic practices across Saudi Arabia under a cohesive, digital governance model.

The envisioned transformation aligns directly with Saudi Vision 2030, positioning the Kingdom as a regional leader in digital dental innovation. Integrating artificial intelligence into prosthodontic communication systems—supported by training, research, and regulation—will not only enhance the precision and predictability of restorations but also redefine the global benchmark for intelligent, interprofessional collaboration in dental healthcare.

DISCUSSION

The findings of this review emphasize that communication quality in prosthodontics is a critical determinant of clinical precision, workflow efficiency, and overall treatment success. Across both global and Saudi studies, a consistent pattern emerged linking incomplete or ambiguous work authorization to increased laboratory remakes, restoration inaccuracies, and procedural delays. Traditional handwritten authorization forms, still prevalent in most Saudi dental centers, frequently lack essential details such as abutment design, material type, shade specification, and occlusal scheme. These gaps often lead to

misinterpretation during laboratory fabrication, ultimately compromising the aesthetic and functional outcomes of fixed and removable prostheses. International studies, particularly those conducted in technologically advanced regions, have demonstrated that structured documentation and digital communication frameworks significantly enhance coordination between dentists and technicians (Afsharzand et al., 2019; Yilmaz et al., 2021). Such findings underline the urgency for Saudi institutions to adopt comparable standards that integrate digital documentation and automated verification systems.

Another dominant theme observed in the reviewed literature is the **limited inclusion of dental assistants and prosthodontic consultants** within the formal communication process. While dental assistants are instrumental in managing impressions, digital scans, and documentation, their contributions are often confined to administrative tasks rather than structured communication roles (Al-Shehri & Alhaddad, 2020). This gap highlights an untapped potential for capacity building — training assistants in technical terminology, digital form completion, and AI-based case documentation could strengthen the accuracy and traceability of clinical instructions. Similarly, prosthodontic consultants, though vital in reviewing complex cases, frequently play an intermittent supervisory role rather than a systematic one. Implementing mandatory consultant sign-off on digital work authorizations and leveraging remote review dashboards could enhance clinical oversight and reduce discrepancies between intended and delivered prostheses (Kumar & Sethi, 2023).

The **integration of digital technology and artificial intelligence** marks a transformative phase in prosthodontic communication. Emerging evidence indicates that digital platforms not only streamline documentation but also facilitate real-time collaboration among multidisciplinary teams (Poticny & Klim, 2020). CAD/CAM systems and cloud-based case portals now allow prosthodontists and technicians to share design modifications, verify measurements, and approve restorations remotely. In Saudi Arabia, while digital tools are being progressively introduced, their implementation remains inconsistent due to infrastructure limitations, cost barriers, and gaps in user training (Alqahtani et al., 2022). Bridging this digital divide will require institutional commitment, targeted funding, and integration of digital communication competencies into both undergraduate and postgraduate dental curricula.

Artificial intelligence further expands the potential of communication improvement. AI algorithms can now analyze digital authorization forms to detect incomplete fields, flag inconsistent data, and suggest corrections automatically. Such systems could be integrated into clinical management software, functioning as intelligent assistants that ensure every case meets prosthodontic documentation standards before laboratory submission. The introduction of predictive analytics—where AI models forecast possible errors based on historical communication data—can help institutions prevent recurrent mistakes and establish proactive quality control measures (Abduo et al., 2024). The shift from human-dependent to hybrid human–AI collaboration promises a substantial reduction in communication errors while freeing clinical staff to focus on patient-centered care.

Despite these technological advances, the human dimension of communication remains irreplaceable. Effective interprofessional communication depends on trust, mutual respect, and an understanding of the shared goal of patient satisfaction. The literature repeatedly emphasizes that technological solutions must complement, not substitute, interpersonal collaboration. Structured interprofessional workshops, cross-disciplinary meetings, and continuous professional development (CPD) programs are essential to foster communication competency and teamwork culture (Alharbi et al., 2024). This combination of human-centered collaboration and intelligent digital support defines the next frontier of prosthodontic communication quality.

Finally, the implications for Saudi Arabia extend beyond clinical improvement into strategic alignment with Vision 2030's digital health transformation agenda. By establishing national guidelines for prosthodontic communication, mandating electronic work authorizations, and incentivizing AI adoption through accreditation systems, the Saudi healthcare sector can lead the regional transition toward intelligent dental communication models. Future research should expand on this foundation by conducting empirical studies comparing manual and AI-supported communication systems, evaluating their effects on laboratory accuracy, patient satisfaction, and operational efficiency.

In conclusion, the discussion consolidates evidence that enhancing communication quality through digital transformation, interprofessional empowerment, and AI integration is not only feasible but essential. Such evolution will elevate prosthodontic practice from procedural routine to intelligent, predictive, and quality-assured collaboration — redefining excellence in dental care within Saudi Arabia and setting a benchmark for international best practice.

CONCLUSION

This review concludes that effective communication among dentists, prosthodontic consultants, and dental assistants is fundamental to the precision and predictability of fixed and removable prosthodontic treatments. Persistent challenges—including incomplete documentation, handwritten work authorizations, and the absence of standardized communication protocols—continue to limit efficiency and accuracy in Saudi dental centers. However, the global shift toward digital dentistry and artificial intelligence offers a clear pathway forward.

By adopting digital work authorization systems supported by AI validation and automated error detection, prosthodontic teams can ensure consistency, traceability, and improved collaboration between the clinical and laboratory environments. The active inclusion of dental assistants in documentation workflows and the continuous oversight of prosthodontic consultants are vital to strengthening interdisciplinary communication.

To realize this transformation, national policies and educational programs must prioritize digital competence, interprofessional training, and AI readiness. Integrating these technologies within daily prosthodontic practice will not only reduce human error and enhance patient outcomes but also align the profession with the strategic objectives of Saudi Vision 2030—building a smart, data-driven, and patient-centered healthcare system. Ultimately, the future of prosthodontic communication lies in merging human expertise with intelligent technology, creating a collaborative ecosystem where clarity, accountability, and innovation define every stage of care.

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