REVIEW ARTICLE

Evaluation of Professional Role and Impact of Dental Assistants in Pediatric Dental Imaging

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ABSTRACT

The role of dental assistants in pediatric dental radiology is critically important yet under-explored. Dental radiography in children presents unique anatomical, developmental and radiation-safety challenges, and dental assistants provide essential support in patient preparation, image acquisition, radiation protection, equipment operation, and workflow efficiency. This review examines the current evidence on pediatric dental radiology (techniques, safety, diagnostic applications) together with the evolving roles of dental assistants in radiography and general dental practice. A systematic search of major databases was undertaken (PubMed, Scopus, Web of Science, Google Scholar) for articles published upto 2025, combining keywords such as “dental assistant”, “dental radiography”, “pediatric”, “child”, “radiology”, “dental assisting”. Results indicate that dental assistants contribute significantly to image quality, safety protocols, workflow optimisation and patient communication; in paediatric contexts they also play a role in behavioural management and age-appropriate positioning. However, gaps exist in training, formal role definition, and quality assurance specific to paediatric radiographic environments. The discussion outlines practical implications for education, practice protocols, and future research. In conclusion, dental assistants should be formally integrated into paediatric radiology workflows, receive targeted training and be included in quality-assurance systems to optimise imaging outcomes and patient safety.

KEYWORDS: Dental assistant; pediatric dental radiology; intraoral radiography; extraoral radiography; radiation safety; image quality; paediatric dentistry; workflow efficiency.

INTRODUCTION

Pediatric dental imaging plays a pivotal role in the diagnosis, treatment planning, and long-term oral health management of children. As imaging technologies have advanced from conventional intraoral radiography to digital sensors, panoramic systems, and emerging three-dimensional modalities the workflow within pediatric dental practices has grown more complex and demands high levels of technical competence, patient management skills, and adherence to radiation-safety principles. Within this evolving landscape, dental assistants have emerged as indispensable members of the dental care team, contributing not only to clinical efficiency but also to the overall quality and safety of imaging procedures performed on young patients (1).

Children present unique challenges during dental imaging due to their varying developmental stages, limited attention spans, heightened anxiety, and greater sensitivity to ionizing radiation. Successful image acquisition therefore requires a combination of technical precision and behavioral guidance skills that dental assistants are uniquely positioned to provide. Their responsibilities often extend beyond simple image capture to include patient preparation, equipment calibration, infection control, radiation protection compliance, and communication with both children and caregivers. In many practices, dental assistants also serve as key facilitators of child-friendly environments, reducing fear and improving cooperation, which in turn enhances diagnostic yield and reduces the need for repeated exposures (2).

Despite their central role, the full impact of dental assistants on the quality, safety, and efficiency of pediatric dental imaging remains under-recognized in scholarly literature. Variability in training standards, scope of practice regulations, and utilization across different regions further complicates understanding of their professional contribution. As pediatric dentistry continues to emphasize minimally invasive imaging, ALARA- and ALADA-based radiation safety principles, and digital workflow integration, it becomes increasingly important to evaluate how dental assistants influence these domains and how their roles can be optimized (3).

AIM

This review aims to synthesize existing evidence on the professional responsibilities, competencies, and measurable impact of dental assistants in pediatric dental imaging. By examining their contributions to image quality, workflow efficiency, radiation safety, patient experience, and interdisciplinary collaboration, we seek to highlight current best practices and identify gaps that warrant further research. Ultimately, a clearer understanding of the dental assistant’s role will support evidence-based workforce development, enhance pediatric imaging outcomes, and strengthen the overall framework of patient-centered dental care.

MATERIALS AND METHOD

A literature search was conducted across multiple databases such as PubMed, Scopus, Web of Science, up to August 2025. Keywords used included combinations of: “dental assistant”, “dental radiography”, “paediatric dentistry”, “child dental radiology”, “dental assistant radiology”, “intraoral radiograph pediatric”, “extraoral radiograph children”, “radiation safety pediatric dentistry”. Inclusion criteria: peer-reviewed articles in English, focusing on dental radiography in paediatric settings, or the role/responsibilities of dental assistants in radiography or general dental practice. Exclusion criteria: articles exclusively on adult radiology without reference to paediatric or assistant roles,

or non-dental radiology. Titles and abstracts were screened first, followed by full-text review for eligible articles. Data were extracted on responsibilities of dental assistants in radiography, paediatric imaging challenges, image quality/technique, safety/radiation protocols, and educational/training issues. A narrative synthesis approach was used because of heterogeneity and limited paediatric-specific assistant literature.

RESULTS

The database search yielded 974 records. After removing 312 duplicates, 662 unique titles and abstracts were screened. Of these, 630 records were excluded as they did not meet the relevance criteria. The full texts of 32 articles were assessed for eligibility. Following full-text review, 26 articles were excluded for reasons such as insufficient data (n = 10), inappropriate study design (n = 7), population mismatch (n = 5), and other methodological issues (n = 4). Ultimately, 6 articles met the inclusion criteria and were selected for the review.

DISCUSSION

The synthesis of available literature suggests that dental assistants have a multifaceted and highly relevant role in paediatric dental radiology. Several key themes emerge:

Patient preparation and child-specific considerations

Children are more likely to move, be anxious, have difficulty understanding procedures, and require adaptation of equipment (smaller film/sensor, shorter exposure settings, proper immobilisation/distraction). The dental assistant can make a significant difference by preparing the child (explaining in child-friendly terms), engaging the parent, applying behaviour-management techniques, securing appropriate positioning aids, and coordinating with the dentist and radiographer. The paediatric radiography literature emphasises these points (4).Thus, in paediatric settings, dental assistants must have skills in child psychology, behaviour management, communication, as well as technical radiography tasks.

Image acquisition, technique and quality assurance

The quality of radiographic images is crucial for accurate diagnosis and avoiding repeat exposures (especially important in children). The study of IOPA radiographs by assistants found about 34% unacceptable, often due to contrast or positioning errors (5).

Dental assistants who are competent in positioning, sensor/film handling, equipment operation, and recognising when images are flawed (and thus need retake) contribute directly to better diagnostic outcomes and safety. The "Importance of Educating Dental Assistants in Radiology" emphasises training in positioning, exposure settings, and minimising radiation.

In paediatric settings, where motion, cooperation and anatomy differ, targeted training is imperative. Dental assistants working in paediatric radiology may need additional continuing education on protocols for children (alternatives when children cannot bite film, use of extra-oral imaging, completing imaging with minimal retakes).

Radiation protection and safety

Children are more radiosensitive and have more remaining lifespan, so justification, dose optimisation and protection are paramount (6).

Dental assistants support radiation safety by ensuring use of lead aprons/thyroid collars, correct collimation and shielding, verifying exposure settings, adhering to ALARA principle, and sanitising equipment. In the broader assistant literature, radiation protection is highlighted as a core responsibility (7).

In paediatric dental radiology, assistants may also act as a liaison to explain radiation safety to parents, screen for contraindications or special conditions (e.g., pregnancy, prior exposure), and ensure parental/guardian cooperation (8).

Workflow efficiency and team communication

Dental assistants improve practice efficiency by preparing equipment, organising trays, arranging sensors/film, cleaning between patients, and thus facilitating smooth chair-side and imaging workflow. This allows the dentist and radiographer to focus on imaging and diagnosis rather than logistics. The broader assistant role literature emphasises improved workflow and patient satisfaction when assistants are involved effectively (9).

In paediatric radiology where kids may require more set-up time, distractions, positioning aids and behavioural management, the dental assistant's role in efficient workflow becomes more critical: minimising time in the imaging chair, avoiding retakes, coordinating with other team members (dentist, hygienist, parent) and ensuring that imaging rooms are child-friendly (10).

Education/training and role clarity

A recurring gap in the literature is the relative paucity of paediatric-specific training for dental assistants in radiography (11). The broader assistant literature emphasises the need for continual education in radiography, digital imaging, and updated protocols.

The paediatric radiology literature indicates that imaging for children requires protocols and training that differ from adults (12). Thus, dental assistants should receive targeted modules (child anatomy, behaviour management, paediatric imaging protocols, extraoral vs intraoral considerations, CBCT in children, etc). Practice policies should define the dental assistant's radiography role (which tasks they may perform, under what supervision, what quality assurance is in place).

Gaps and future directions

- There is a lack of empirical studies specifically investigating the impact of dental assistants in paediatric dental radiology: e.g., comparing image quality, radiation dose, retake rates, patient/patient-parent satisfaction when dental assistants are involved vs not (13).
- Standardised paediatric radiography assistants' competency frameworks are missing in many jurisdictions.
- More research needed on behavioural management protocols in imaging of children and the assistant's role therein.
- Integration of new technologies (digital sensors, CBCT, AI assistance) will alter the assistant role; dental assistants must adapt to evolving imaging tools. For example, studies of AI in dental radiology (though not specific to paediatric or assistants) are emerging.
- Quality assurance systems need to include dental assistants, with audits of radiograph acceptability, repeat rates, radiation doses, patient cooperation and workflow metrics.

Summary of key findings

- Dental assistants are integral to dental radiography workflows and their tasks include equipment prep, patient positioning, sensor/film handling, radiation protection measures, image acquisition, and sometimes processing and record management.
- In paediatric dental radiology, additional demands (child cooperation, small anatomy, higher need for quality imaging to avoid repeat exposures) mean the dental assistant's role is even more critical.
- The literature signals a gap in formalised role definition, paediatric-specific training of dental assistants, and research on outcomes (image quality, radiation dose reduction, child experience) associated with assistant involvement in paediatric radiology.

CONCLUSION

The dental assistant occupies a pivotal role in paediatric dental radiology: assisting with patient preparation and child cooperation, executing technical imaging tasks, ensuring radiation safety, optimising workflow and contributing to diagnostic image quality. Given the heightened demands of imaging children (anatomy, behaviour, radiosensitivity) the importance of a well-trained dental assistant is even greater. The available literature underscores these responsibilities but also highlights significant gaps in paediatric-specific training, empirical evaluation of assistant roles, and integration into quality-assurance frameworks. To optimise paediatric dental radiography outcomes, dental practices and educational programmes should clearly define the assistant's role in paediatric imaging, provide targeted training, implement audit and quality-improvement protocols, and foster team communication. Future research should empirically evaluate the assistant's impact on image quality, retake rates, radiation dose and child/parent experience in paediatric radiology settings.

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