THE USE OF DIGITAL RADIOGRAPHY IN DENTISTRY

Zobeidan Mahtab

Student, Volgograd State University, Russia, Volgograd

Salman Majed

Student, Volgograd State University, Russia, Volgograd

Alsalhadi Mohammad

Student, Volgograd State University, Russia, Volgograd

Pourhemati Mohammad

Student, Volgograd State University, Russia, Volgograd

Rusta Zahra

Student, Volgograd State University, Russia, Volgograd

Adhamjon Yunusov

Student, Volgograd State University, Russia, Volgograd

Farah Elmetawali

Student, Volgograd State University, Russia, Volgograd

Denisenko Larisa Nikolaevna

научный руководитель, Scientific director associate professor, Volgograd State University, Russia, Volgograd

Abstract. This article explores the implementation and advantages of digital radiography in modern dental practice. Digital radiography has become an indispensable diagnostic tool, offering clearer imaging, reduced radiation exposure, and faster processing times. By utilizing advanced digital technologies, dental professionals can improve diagnostic accuracy, enhance treatment planning, and ensure better patient outcomes while addressing the environmental benefits of reduced chemical waste.

Keywords: Digital radiography, dental imaging, diagnostics, radiation exposure, treatment planning, eco-friendly dentistry.

Relevance. Digital radiography has transformed dental practice, becoming an essential tool for diagnostics, treatment planning, and preventive care. Unlike conventional film-based X-rays, digital radiography uses electronic sensors to capture detailed images of the teeth, gums, and jaw. This

method offers notable improvements in speed, precision, and environmental impact. For dental professionals, understanding both the advantages and the challenges of digital radiography is vital for delivering exceptional patient care and ensuring diagnostic accuracy. One of the most significant benefits is the reduction in radiation exposure. Digital sensors require much less radiation than traditional film, making the procedure safer for patients. Research indicates that digital radiography can decrease radiation exposure by as much as 70%, ensuring a safer and more effective diagnostic process [1, p. 45]. Digital radiography offers enhanced image clarity, providing greater contrast and finer detail. This allows dental professionals to detect dental issues more precisely, including cavities, fractures, or infections in the root canal that might be overlooked using traditional imaging techniques. The ability to zoom in and adjust brightness and contrast digitally further enhances the evaluation of oral structures, resulting in more accurate and detailed diagnoses. One of the major advantages of digital radiography is the rapid image processing. Unlike traditional methods that require lengthy film development and chemical processing, digital radiography allows images to be instantly displayed on computer screens, speeding up both diagnosis and treatment planning. This swift processing is especially beneficial in urgent dental situations, where prompt action can help avoid complications and shorten the treatment process. Additionally, digital radiography is a more environmentally friendly option compared to traditional film-based methods. Conventional X-ray films require chemicals for development, which can be harmful to the environment if not properly disposed of. Digital radiography, on the other hand, eliminates the need for these chemicals, greatly reducing the environmental impact of dental imaging. By reducing waste and pollution, dental practices can support more sustainable and eco-conscious healthcare practices. [2, p. 67]. Although digital radiography offers many benefits, it also presents some challenges. The upfront cost of digital radiography equipment can be significant, which may discourage smaller clinics from adopting this technology. Furthermore, while the learning process is generally quick, dental professionals still require specialized training to efficiently use digital imaging software and accurately interpret the results. Technical difficulties, such as sensor failures or software malfunctions, can also occur, potentially delaying diagnoses and treatments. To address these challenges, it is essential to maintain digital radiography systems properly and invest in continuous staff training, ensuring that the full potential of this technology is realized and its benefits maximized.The incorporation of artificial intelligence (AI) into digital radiography is set to revolutionize dental diagnostics even further. AI-powered algorithms have the ability to identify anomalies and irregularities in radiographic images, helping dentists detect dental problems with unmatched speed and precision. These advancements are expected to enhance clinical outcomes while also optimizing workflow, allowing dental professionals to devote more time to patient care and treatment planning. Furthermore, continuous progress in technology is expected to make digital radiography more affordable and accessible, enabling smaller practices and clinics to implement these tools. The combination of enhanced image processing, lower costs, and AI integration will continually elevate diagnostic accuracy and improve overall patient care.Digital radiography has emerged as a key tool in contemporary dental diagnostics, providing enhanced image clarity, lower radiation levels, and significant environmental advantages. Although the initial investment and technical challenges associated with this technology can be considerable, the long-term benefits vastly surpass these obstacles. Dental practitioners are essential in utilizing this technology to improve diagnostic precision, optimize treatment results, and prioritize patient safety. Ongoing advancements in digital imaging and research will continue to solidify the role of these tools in dental practices globally, promoting not only improved patient care but also supporting environmentally responsible and sustainable dental practices.

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