

عنوان مقاله:

Digital Radiography in Motion: A Review of Dynamic Imaging Techniques and Applications

محل انتشار:

سومین کنگره بین المللی انجمن علمی دانشجویان رادیولوژی کشور (سال: 1402)

تعداد صفحات اصل مقاله: 2

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خلاصه مقاله:

Digital radiography has undergone rapid technological advancement in recent years, evolving from static to dynamic imaging capabilities. While conventional radiography produces a single static projection image, dynamic digital radiography allows the continuous acquisition of multiple frames during a radiographic scan. This emerging technique shows great promise for expanding the clinical applications of digital radiography through functional and physiologic imaging. In this study, we investigated the Google Scholar and PubMed databases with the following search strategy: the exact phrase "Dynamic Digital Radiography" in the Title or abstract of the articles. Several studies have investigated the feasibility of using dynamic flat panel detectors to enable new time-resolved imaging techniques. Motion-compensated subtraction has been applied in the chest and abdomen to visualize vascular structures through enhancement of contrast. High-speed digital radiographic fluoroscopy of the musculoskeletal system has also been shown to assess joint kinematics and measure ligamentous laxity. More recently, dynamic perfusion imaging of the lungs using time-resolved digital chest radiography has been demonstrated. A case of pulmonary artery sarcoma imaged with multiphase chest radiography, revealed abnormal parenchymal enhancement caused by pulmonary blood flow obstruction. Quantitative assessment of lung perfusion using dynamic flat panel chest radiography has been shown capable of detecting regional lung dysfunction in a porcine model. The emergence of dynamic flat panel digital detectors has opened new possibilities for functional and physiologic imaging with radiography. Motion-compensated techniques and perfusion imaging are active areas of research that aim to expand the utility of dynamic digital radiography in clinical practice. Further technical refinement and clinical validation studies are needed to fully realize the potential of these novel dynamic imaging capabilities. In summary, the wide array of emerging clinical applications highlights the versatility of dynamic digital radiography for functional and physiological imaging. As outlined above, time-resolved radiographic techniques have shown promise for dynamic assessment of cardiac function, lung ventilation, swallowing, gastric motility, urinary obstruction, joint kinematics, and vascular flow across organ systems. With continued technological progress and clinical translation, dynamic digital radiography is poised to take on an increasingly vital role in modern medical imaging and intervention.

کلمات کلیدی:

"Dynamic Digital Radiography", "Medical Imaging", "Digital Radiography", and "Fluoroscopy"

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