

Scapholunate Ligament Injury Diagnosis Using Dynamic Digital Radiography (DDR) Technology



Sarah Koles, MD, MSc, FRCPC is a Clinical Assistant Professor, Department of Radiology at the University of Calgary and a Musculoskeletal Radiologist at Beam Radiology in Calgary. She began using DDR in her clinic in 2022, incorporating it in her diagnostic imaging studies when clinically relevant. Driven by her commitment to refine DDR's clinical utility, she is using dynamic X-rays in musculoskeletal scenarios to detect subtle joint instability and malalignment across diverse joints.

Summary/Overview

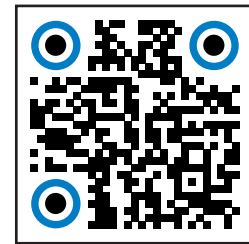
A 60-year-old right-hand dominant woman sustained an injury to her wrist a year ago and experienced persistent pain despite conservative measures. Initial static X-rays were normal. DDR, a recent advancement in X-ray technology that rapidly acquires sequential images to depict anatomic structures in motion, offered clear visualization of the wrist, confirming the severity of the tear and indicating the potential for successful surgical repair. DDR technology provided insights into range-of-motion analysis, increasing diagnostic accuracy, expediting the appropriate treatment, and optimizing the patient care pathway.

Approach and Use Case

The patient presented with persistent wrist pain after falling on her outstretched hand a year ago. She was initially assessed at the emergency room, and static X-rays were normal without fracture and the carpal bones were in anatomic alignment. Despite physiotherapy, her pain persisted at her wrist's dorsal aspect and worsened on dorsiflexion. Subsequent static X-rays demonstrated widening between the scaphoid and lunate, suggesting a high-grade scapholunate ligament tear. This prompted the utilization of DDR for its ability to evaluate the carpal bones alignment during dynamic imaging. DDR imaging was performed using an anterior-to-posterior approach, with the patient moving her clenched fist through radial and ulnar deviation. During ulnar deviation, the gap between the scaphoid and lunate space returned to normal but then demonstrated widening during radial deviation, confirming re-apposition of the bones not visualized on static imaging. This dynamic observation suggests that the patient may respond favorably to surgical repair and improved joint stability. Consequently, the patient was referred to a hand surgeon to address the significant wrist ligament injury. DDR technology enabled a unique visualization of the carpal bones in motion, which led to a clear treatment plan and prevented further unnecessary imaging.

Discussion: Clinical and Patient Value

The ability of DDR to visualize anatomy in motion allowed this patient to benefit from earlier surgical intervention for her wrist ligament injury. The Musculoskeletal Radiologist, Dr. Sarah Koles, could clearly assess the dynamic repositioning of bones during radial or ulnar deviation. DDR aids in triaging patients likely to have a good outcome from surgical repair. In addition, the patient could better appreciate the gap in the bones and the need for intervention due to the clarity of the DDR video.



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Figure 1. DDR image showcasing the widened scapholunate ligament interval, indicating ligament tear

