Rotator Cuff Tear Diagnosis Using Dynamic Digital Radiography (DDR) Technology

Eric R. Wagner , MD, MSc is an Associate Professor of Orthopedics, specializing in upper extremities at Emory Healthcare in Atlanta, Georgia. He has a passion for innovative approaches to patient care and is considered a trailblazer in his field. Dr. Wagner utilizes DDR for every patient he sees, providing an evidence-based practice for diagnosis and treatment.

Summary/Overview

A 60-year-old woman complained of severe shoulder pain and limited function without recent evident injury. The patient's weakened external rotation, abduction, and forward flexion raised concerns. Static X-ray images did not show conclusive evidence to make a diagnosis. DDR is a recent advancement in X-ray technology that rapidly acquires sequential images to depict anatomic structures in motion. DDR images of the shoulder in motion offered clear visualization of a massive, retracted rotator cuff tear that was quickly diagnosed. DDR's ability to provide visualization of the joint motion enables providers to increase the efficiency and specificity of diagnosis beyond external observation and static X-rays. DDR is a technology at the forefront of advancing Orthopedic care.

Approach and Use Case

The patient had significant shoulder pain and function loss, worsening function limitation, and pain-associated movement. She is a former CrossFit athlete and pickleball player, which caused repeated stress on the rotator cuff muscles and tendons. Despite no recent obvious injury, her orthopedic physician, Dr. Eric Wagner, noticed signs of significant weakness, particularly in external rotation, abduction, and forward flexion. Palpation at the bicep tendon elicited pain, and static X-rays did not provide enough information to diagnose the cause of pain. Imaging with DDR revealed a massive, retracted rotator cuff tear.

With DDR's clear visualization of the interaction between the humeral head and the scapula, he could diagnose the condition quickly. The standard protocol calls for confirmation via MRI, but having the ability to dynamically scan with DDR increased his confidence that the MRI would confirm his findings. An accurate diagnosis allowed him to recommend the appropriate treatment—tendon transfer to replace the damaged rotator cuff—maximizing the patient's chances for a successful recovery.

Discussion: Clinical and Patient Value

DDR technology has revolutionized the way Dr. Wagner approaches musculoskeletal diagnosis and treatment. The ability to visualize internal structures in motion and identify injuries has significantly enhanced the diagnostic process.

DDR's capability of showing the joint in motion allows patients to actively participate in their treatment journey. This patient could see the abnormal motion between the humerus and scapula in the pre-operative images resulting in a better understanding of her condition. It also enhanced her ability to focus on rehabilitation and better communicate with her physician and support systems.

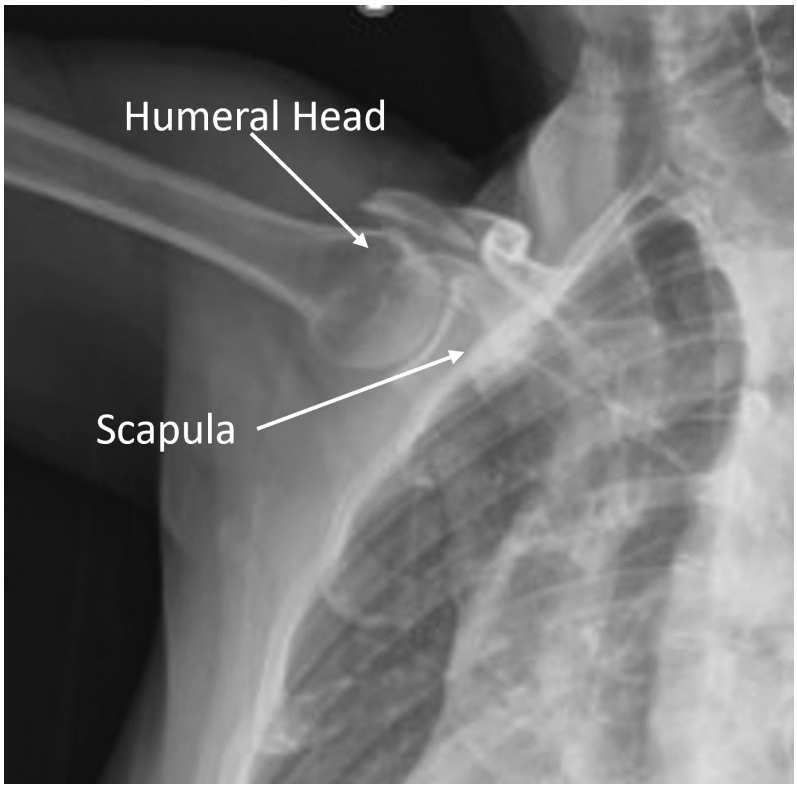

Figure 1. DDR images showcasing scapular involvement, an indicator of massive rotator cuff tearing.

Scan or click to view

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