

# Frozen Shoulder Precision 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 50-year-old woman presented with adhesive capsulitis, often called frozen shoulder, a condition that is challenging to diagnose using conventional imaging methods. DDR, a recent advancement in X-ray technology that rapidly acquires sequential images to depict anatomic structures in motion, enabled a diagnosis that provided the a non-invasive treatment option.

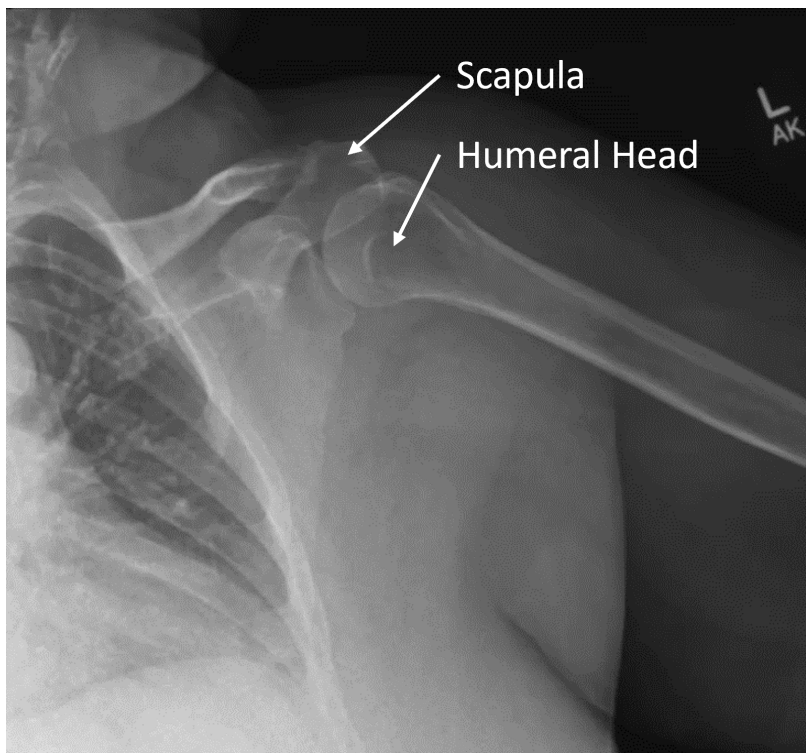
## Approach and Use Case

The healthy female patient presented to Dr. Eric Wagner with increasing shoulder pain, stiffness, limited motion, and loss of function. The pain intensified with active motion, and she experienced discomfort with restriction even with passive motion. The patient had previously attempted physical therapy with limited success. Conventional imaging methods, such as static X-rays and MRI, failed to provide a definitive diagnosis, leaving the condition unresolved for numerous months.

The physical exam verified the patient's report of pain with various shoulder movements, including elevation, abduction and flexion, all common symptoms associated with multiple etiologies. DDR imaging revealed restricted motion with increased compensation by the scapula for inadequate humeral contribution to the shoulder movement, leading to a diagnosis of adhesive capsulitis. Scapulohumeral rhythm is a metric of shoulder motion demonstrating the contributions from the glenohumeral and scapulothoracic joints. Patients with frozen shoulders typically have significantly lower scapulohumeral rhythm values than normal shoulders.

## 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. In this case, DDR was crucial in distinguishing between conditions which have similar symptoms, such as small rotator cuff tears and early arthritis. These can be challenging to differentiate using traditional imaging methods. In adhesive capsulitis, static X-rays and MRIs are often non-diagnostic, especially earlier in the disease process, before significant morphological changes occur. DDR made a significant contribution to this diagnosis and allowed the patient to avoid surgical intervention and pursue conservative treatment options, such as steroid injections, leading to increased patient satisfaction.



**Figure 1.** DDR image of the scapulothoracic rhythm, indicating adhesive capsulitis



Scan or click to view

