

Understanding Rotator Cuff Disease

Athletes who injure their shoulders aren't the only ones to have rotator cuff tears (RCTs). Age-related degeneration is also a factor, especially for adults over age 60. Researchers are trying to understand the pathogenesis (process of disease) behind rotator cuff degeneration.

In this report, orthopedic surgeons from the Philadelphia Hand Center use the case of a 63-year-old man with shoulder pain as a result of an injury to examine the current scientific evidence explaining shoulder rotator cuff tears.

Magnetic resonance imaging (MRI) studies have helped surgeons look at rotator cuff tendons and see what's going on. MRIs taken over time show the degenerative process at the cellular level. MRIs of human tissue have been aided by cadaver studies (looking at tissues in humans after death) and by animal studies.

Taking a look at the tissues under a microscope has shown that the injured or degenerating rotator cuff tendon has disorganized tendon fibers, fewer normal cells, and quite a bit of fill-in by fat and scar tissue.

The cells that make up the collagen matrix (basic structure) of the rotator cuff are altered. As a result, the body's effort to repair and remodel degenerating or defective tissue is unbalanced. The natural break down of tissue occurs without an equal amount of repair and remodeling. The result is a tearing of the rotator cuff tendon in the older adult.

There isn't an inflammatory process like we would normally see with an acute injury. This ongoing process of unbalanced degeneration, repair, and remodeling results in a rotator cuff defect that is referred to as a tendinopathy. The literal translation of tendinopathy is "pathology (disease) of the tendon".

Studies show that defects in the rotator cuff occur more often than we thought. Up to half of all adults over the age of 70 may have unknown rotator cuff defects. Because many people are asymptomatic (no symptoms and especially no pain), the presence of rotator cuff disease goes unnoticed. Why some people have symptoms while others do not (with equal rotator cuff disease) remains a mystery.

Some experts question the possibility that the mechanism of tendon changes might explain symptoms. For example, direct injury may create an early acute inflammatory response with pain while mechanical compression or overuse of the rotator cuff doesn't generate an acute response so no pain or other immediate symptoms. When enough tissue breakdown occurs and the muscle can no longer contract fully, then loss of motion may be the first sign of a problem.

For some patients like the gentleman in this case example, the question becomes whether this new injury is really an acute rupture or merely the final result of an ongoing degenerative process. Under the stress of a load (e.g., trying to catch a suitcase falling out of an overhead bin on an airplane), the already degenerating tendon gives way. What was a chronic (but unknown) condition now becomes an acute (newly traumatic) problem.

Most of today's theories about rotator cuff tendon degeneration are still based on observations of patients who have symptoms, not those who have rotator cuff tendinopathy but remain asymptomatic.

The authors conclude that age-related tendinopathy of the rotator cuff may put older adults at risk for tendon rupture. But this is still a theory and not fully supported by evidence or explained by imaging studies. Newly symptomatic, chronic degenerative defects may be treated differently than acute traumatic injuries.

Long-term studies of adults and the natural history (what happens over time) of rotator cuff tendons is needed. The information gained may help direct treatment by identifying the true underlying problem.

Reference: Neal C. Chen, MD, Asheesh Bedi, MD. Rotator Cuff Defect: Acute or Chronic? In The Journal of Hand Surgery. March 2011. Vol. 36A. No. 3. Pp. 513-516.