

# Understanding Rotator Cuff Tears and Repairs

by **Kevin Michael Kaplan, MD**  
*Sports Medicine, Joint Replacement*  
SAN MARCO



**Kevin Michael Kaplan, MD**

The shoulder is a ball (humeral head) and socket (glenoid) joint that allows a tremendous amount of mobility in the upper extremity. The rotator cuff is composed of four muscles and tendons (supraspinatus, infraspinatus, subscapularis, and teres minor) that cover and stabilize the ball and socket allowing normal shoulder motion.

Rotator cuff tears can be painful and disabling in adult patients. Causes of this injury range from a single traumatic episode to a chronic overuse injury over several months or years. Typically, patients engaging in repetitive overhead activities or motions are most at risk for rotator cuff tears.

Common symptoms include pain on the outer aspect of the shoulder, difficulty sleeping on that side, pain with attempted overhead motions and radiation down to the elbow. It is important to realize that pain radiating past the elbow does not typically originate in the shoulder and may be related to issues in the neck or peripheral nerves. With significantly larger tears, patients may have difficulty raising their arm over their head. In addition, many patients describe a crackling sensation when moving the shoulder in different positions.

Diagnosis of a rotator cuff tear can be made with a combination of history, physical exam, and radiographic studies. By thoroughly examining patients with shoulder pain and tests specific to this type of injury, patients may be sent for a confirmatory test such as a magnetic resonance imaging (MRI). This imaging modality is the test of choice to evaluate for a rotator cuff tear (Figure 1).

Treatment options for rotator cuff tears include conservative and operative management. Typically, tears occurring over time can be initially treated non-surgically. Rest, anti-inflammatory medications, steroid injections and physical therapy are common modalities utilized to alleviate the common symptoms of rotator cuff injuries. Physical therapy serves to strengthen the healthy rotator cuff muscles and tendons in an attempt to compensate for one that has torn.

Surgical treatment may be an option after a traumatic injury or after a trial of non-surgical management. In addition, it is important to realize that rotator cuff tears can progress over time and that symptoms can return or worsen.

Rotator cuff repairs have been performed for many years. However, advancements in surgical technique

and equipment are improving our ability to treat these injuries. Initially, the procedure was performed through an invasive approach with a large incision. Surgeons became more comfortable with the anatomy and began to make smaller incisions to decrease the pain and disability from surgery. With the advent of arthroscopy, repairs could be performed with minimally invasive techniques requiring only small incisions. In addition, the advances in arthroscopic equipment and materials have further enhanced our ability to achieve a strong, durable repair.

In a soon to be published article in the orthopaedic surgery literature, I describe a technique (The NET bridge designed by Dr. Neal ElAttrache) that I tested in a biomechanics laboratory and found it to be the strongest rotator cuff repair reported to date. The NET bridge utilizes a combination of high strength suture materials in a novel configuration to achieve the maximal strength of repair while also maximizing the contact between the torn tendon and bone of the humerus (Figure 2). One of the biggest pitfalls with rotator cuff surgery is avoiding a re-tear of the tendon. However, a common complication that can also be a considerable challenge is post-operative stiffness. By providing a stronger, more durable repair in utilizing the NET bridge, my patients can expect an early return to their daily activities through range of motion exercises and shorter time in a sling.

The rehabilitation process entails a period of passive motion, where a therapist mobilizes the shoulder. The next step requires regaining full active motion of the shoulder and the final stage allows the patient to strengthen the repaired rotator cuff muscle and tendon.

Rotator cuff tears can cause significant disability. However, through the use of the appropriate treatment protocol and when indicated, this innovative and highly effective technique, patients experiencing this injury can expect a quicker and successful return to their daily activities.



Figure 1: MRI demonstrating a rotator cuff tear. The arrow points to a gap in the tendon, indicative of a tear.

Figure 2: The NET Bridge utilizes several specially designed sutures including the above shown fibertape, in a novel configuration to achieve the strongest and most durable repair.

