

Unusual Biceps Tendon Injury

Physical Therapy in Fremont, Carbon, and Sweetwater Counties for Elbow Conditions

Review and Update on Unusual Biceps Tendon Injury

From anatomy to the post-operative rehab process, the authors of this article provide us with a complete review of injuries to the biceps tendon. The specific focus is on the distal insertion of the tendon. That's where it attaches to the radius (bone in the forearm).

The reason this topic is of interest to orthopedic surgeons is because rupture of the distal biceps tendon doesn't happen very often. With injuries that are rare or infrequent, it's difficult to know what's the best treatment available. Having a topic like this reviewed from all angles based on current research evidence is helpful.

Let's start with a quick review of the anatomy. The biceps muscle is the one most visible in the upper arm when you hold your arm up and make a fist. For those of you who remember the cartoon character Popeye, the biceps muscle is the one he always showed drooping down without his spinach and strong and large with his spinach. Much of the strength of elbow flexion (bending the elbow) comes from the biceps muscle.

The biceps muscle goes from the shoulder to the elbow on the front of the upper arm. It is attached to the bone by tendons at the top and bottom. Two separate tendons connect the upper part of the biceps muscle to the shoulder. One tendon connects the lower (distal) end of the biceps to the elbow.

A distal biceps rupture occurs when the tendon attaching the biceps muscle to the elbow is torn from the bone. A distal biceps rupture is rare compared to ruptures where the top of the biceps connects at the shoulder. This injury occurs mainly in middle-aged men during heavy work or lifting. Similar injuries in women are extremely rare. Smokers are more 7.5 times more likely to rupture the distal biceps tendon than nonsmokers.

If this is such a strong muscle, why does the distal biceps tear at all? The answer to that question is still a bit of a mystery. Studies of cadavers (bodies preserved for study after death) and X-rays of live humans point to two possible causes. One idea is that there is a decreased blood supply to the area. Degeneration of the tissue occurs when there isn't enough blood delivered to the area to keep it healthy.

The other is more of a mechanical problem: the tendon gets pinched or impinged with certain movements. Over time, impingement leads to damage to the tendon and wearing through the tendon and then over time, rupture. With color drawings, CT scans, and photos taken of the tissues during open surgery, the authors are able to illustrate how both causes might explain this type of injury.

The diagnosis is made using a combination of patient history, visual inspection, palpation, clinical tests, and imaging studies. The history is often an important clue because patients usually describe a sudden force applied to the arm followed by a tearing sensation on the inside of the elbow. There is immediate pain and then weakness when trying to bend the elbow.

Two clinical tests that are very useful are the squeeze test and the hook test. You can actually do these tests

on yourself to try them out. The squeeze test is done by using one hand to squeeze the upper portion of the biceps muscle of the other arm. You'll see and feel the hand of the arm being squeezed turn slightly toward a palms up position. This happens automatically when the muscle is squeezed.

The hook test is done with the elbow slightly bent. Use your fingers of the opposite hand and feel the tendon as it attaches to the front of the elbow. You can actually use your index finger to grab or "hook" that tendon and pull it up. If the tendon is ruptured, you won't be able to see the hand turn when you squeeze the biceps muscle and you won't be able to find the tendon to hook a finger under it.

To confirm the diagnosis, the surgeon can order MRIs, which will show exactly what's happening in the soft tissues around the elbow. Of course, the diagnosis is confirmed if/when surgery is done. But sometimes, operative repair isn't needed.

Older adults or people who are fairly inactive may regain enough strength and motion to remain functional without surgery. The arm is placed in a sling for a few days up to a few weeks. Medications may be used to control pain and make the patient comfortable.

Physical Therapy is a key part of conservative (nonoperative) care. The therapist helps the patient learn how to regain motion, strength, and proper motor control. The therapist will also use manual (hands on) techniques to help the healing tissue fibers line up correctly during the healing process.

Surgical repair is really the most common treatment approach and recommended for those who want to regain full strength, motion, and return to work at their preinjury level. The method of operative care isn't as straight forward as nonoperative care. Surgeons have a wide range of methods they can use to complete this repair.

The first decision is whether to try and reattach the tendon to its proper (native) location or stitch it to a muscle nearby (the brachioradialis muscle). Reattaching it where it belongs is called an anatomic repair. Suturing the tendon to the brachioradialis muscle instead is referred to as a nonanatomic repair.

The surgeon can choose between using one versus two incisions to make the repair. There are advantage and disadvantages with each one. With one incision, there is less scar tissue formation and fewer cosmetic changes. But access to the area is limited and nerve injury is a greater risk factor. Two-incisions opens up the area more completely but puts the patient at increased risk of pain, heterotopic ossification, wound infection, and loss of motion.

No matter what type of technique the surgeon uses, the right amount of tension must be applied to get the correct muscle pull and direction. Different type of sutures (stitches, buttons, anchors, screws) apply varying amounts of tension and can hold up under different levels of load. The goal is to restore the natural alignment, tension, pull, and function.

Once the operation has been completed, the work of rehab and recovery begins. Studies have shown that it is acceptable to follow a more aggressive postoperative plan than was used in previous years.

Immobilizing the arm is still done in the early days but motion is started much earlier than before. Different surgeons use different approaches. Some put the patient in a splint right after surgery (limiting all motion), while others use a hinged elbow brace (set to allow certain movements).

When to start motion and how much to allow also varies from surgeon to surgeon. Some of this is determined by the type of surgery that was done. Some decisions are made based on reports from other

studies. And, of course, surgeon training, experience, and preferences play a part in the plan of care.

The authors conclude there isn't one method of operative repair for distal biceps tendon ruptures that works best for everyone. The operative technique used over the years has certainly improved with a more aggressive rehab protocol. Treatment will continue to evolve over time as more and more studies are able to offer helpful information about best practice for best results.

For the most part, patients can expect to get back to normal daily activity four to six weeks after surgery. Full strength and return-to-work (especially manual labor or activities requiring lifting) may take longer.

Reference: Ryan G. Miyamoto, MD, et al. Distal Biceps Tendon Injuries. In *The Journal of Bone and Joint Surgery*. September 1, 2010. Vol. 92-A. No. 11. Pp. 2128-2138.