

## **Biceps tendon rupture or Rupture Biceps Tendon (RBT)**

A tendon is the fibrous tissue that attaches muscle to bone in the human body. The forces applied to a tendon may be more than 5 times your body weight. In some rare instances, tendons can snap or rupture. Conditions that make a rupture more likely include the **injection of steroids** into a tendon, certain diseases such as **gout, hyperparathyroidism or senil cardiac amyloidosis (SCA), and having type O blood**. SCA is caused by deposition in the heart of protein derived from transthyretin (TTR), resulting in a restrictive cardiomyopathy, usually in elderly men. TTR deposition may also cause carpal tunnel syndrome which can precede the cardiomyopathy by 5-10 years. TTR deposits in other organs including tendons and ligaments has been described, but no clinical sequelae are recognized. Ruptured biceps tendon (RBT) has an annual incidence of  $< 2/100,000$  in the general population. After seeing this condition in several patients with SCA we sought to determine the prevalence of RBT in a series of patients with SCA. Ruptured biceps tendon, a rare disease in the general population is seen in  $1/5$  patients with SCA and, like carpal tunnel syndrome, precedes the cardiomyopathy by several years. The strong association with carpal tunnel syndrome in SCA suggests that the mechanism is due to TTR tendon deposition, and the rarity of ruptured biceps tendon in the general population indicates that its presence in an elderly male with heart failure should prompt consideration of a diagnosis of SCA.

Although fairly uncommon, a tendon rupture can be a serious problem and may result in excruciating pain and permanent disability if untreated. Each type of tendon rupture has its own signs and symptoms and can be treated either surgically or medically depending on the severity of the rupture and the confidence of the surgeon.

**Biceps tendon rupture:**The patient will have decreased strength of elbow flexion and decreased ability to raise the arm out to the side when the hand is turned palm up. Tendon rupture is usually diagnosed using a physical examination. Any imaging is done to confirm the diagnosis and decide the severity of the rupture.

X-rays may show that upper arm bone is out of place or that the place where the muscle attaches has changed.

If biceps tendon is completely ruptured, the biceps retracts toward the elbow causing a swelling just above the crease in arm. This is called the Popeye deformity.

The patient will experience decreased strength of elbow flexion and arm supination (moving the hand palm up) and will have decreased ability to raise the arm out to the side when the hand is turned palm up.

Most surgeons prefer not to operate on a ruptured biceps tendon because function is not severely impaired with its rupture.

Studies suggest that after biceps rupture, only a small fraction of elbow flexion is lost and approximately 10-20% strength reduction in supination (ability to turn the hand palm up). This is considered to be a moderate loss and not worth the risk of surgery in middle-aged and older people.



**Biceps tendon rupture in a patient with Cardiac amyloidosis diagnosis Ruptured Biceps Tendon is A Novel Non-Cardiac Clue to TTR Cardiac Amyloidosis**

**The Popeye deformity typical of Biceps tendon rupture**

Cardiac amyloidosis can be diagnosed noninvasively by echocardiography, cardiac MRI, or nuclear scintigraphy. Endomyocardial biopsy may be needed in the case of equivocal imaging findings or discordant data. Treatment is aimed at relieving congestive symptoms and targeting the underlying amyloidogenic process. This includes anti-plasma cell therapy in AL amyloidosis, and stabilization of the TTR tetramer or inhibition of TTR protein production in ATTR amyloidosis. Cardiac transplantation can be considered in highly selected patients in tandem with therapy aimed at suppressing the amyloidogenic process, and appears associated with durable long-term survival.(1;2)

### Frequency of Ruptured Distal Biceps Tendon Among Patients in the Biopsy-Proven ATTRwt vs Heart Failure (Control) Groups

Ruptured Distal Biceps Tendon Status	ATTRwt Group, No. of Events (n = 111)	Heart Failure Group, No. of Events (n = 40)
Present	37	1
Absent	74	38

Abbreviation: ATTRwt, wild-type transthyretin amyloidosis. Fisher exact test comparing ruptured biceps tendon prevalence in ATTRwt and heart failure group,  $P < .001$

1. Siddiqi OK1, Ruberg FL2. Cardiac amyloidosis: An update on pathophysiology, diagnosis, and treatment. *Trends Cardiovasc Med*. 2017 Jul 13. pii: S1050-1738(17)30108-1. doi: 10.1016/j.tcm.2017.07.004. [Epub ahead of print]
2. Geller HI1, Singh A1, Alexander KM1, Mirto TM1, Falk RH1. Association Between Ruptured Distal Biceps Tendon and Wild-Type Transthyretin Cardiac Amyloidosis. *JAMA*. 2017 Sep 12;318(10):962-963.