

# Clinical Sheet

## APPLICATION OF A NATURAL RESORBABLE MEMBRANE IN TENDON RECONSTRUCTION

Use of an equine pericardium membrane in the treatment of a chronic complete rupture of the distal triceps tendon.



Case report of Dr. Andrea Atzei  
Treviso, Italy  
E-mail: andreatzei@gmail.com

Distal triceps tendon rupture is a rare event that can cause long-term disability; it is markedly prevalent in the male gender (3:1). Often, it originates as a result of single traumatic events: typically falls on the palm of the hand or direct trauma to the posterior region of the elbow. Tendon disruption most frequently occurs at the olecranon insertion, with possible avulsion fracture. Other possible causes include intramuscular or localized injuries near the myotendinous junction. Clinical diagnosis is based on evaluation of pain on palpation, presence of ecchymosis, and pain during extension against resistance. A preliminary assessment of tendon integrity can be made by the modified Thompson test, with elbow at 90°. Instrumental imaging diagnosis by radiography and MRI is helpful in specifying the type and extent of damage. Early surgical intervention is the appropriate treatment for complete or otherwise greater than 50% rupture of the triceps tendon. Treatment of rupture at the distal insertion or avulsion is by re-insertion of the tendon at the olecranon using transosseous sutures, while intra-parenchymal rupture is accomplished by direct suturing. In cases of late diagnosis or post-surgical ruptures, treatment of the tendon injury involves reconstruction or reinforcement by application of tendon allograft. In the present case, the author chose an equine pericardium membrane, which is already known for its use in other medical fields.

## Materials

The equine pericardium membrane (HEART, Bioteck Spa) used in the surgery was obtained through the patented Zymo-Teck process, which allows the elimination of potentially immunogenic elements and the preservation of collagen fibers in their native conformation.

Its low thickness (0.2-0.4 mm) and tensile strength make the membrane well adaptable to anatomical contours and facilitate its adhesion or suturing. It also acts as a scaffold for

fibroblast proliferation.

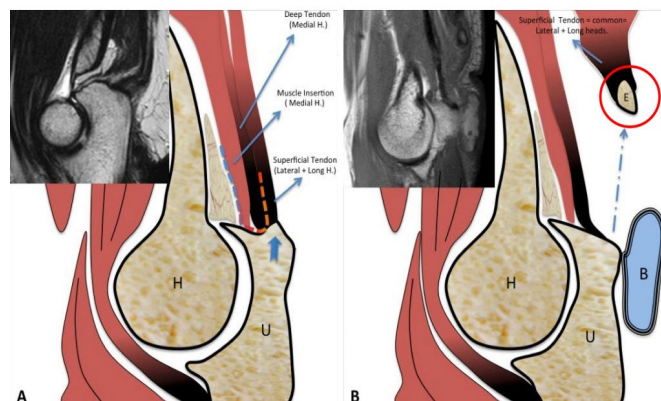
HEART equine pericardium membrane is available in a variety of formats and sizes and, once applied, provides significantly longer-lasting isolation and protection of the site of interest than do other membranes of animal origin, including those made from collagen extracted from tendon or other tissues. Since it is a resorbable material, it is gradually degraded and replaced by new, viable tissue from the patient.



**Fig. 1** – Clinical diagnosis: the patient is unable to fully extend and flex the arm.



**Fig. 2** – Instrumental imaging diagnosis: MRI showed the presence of a gap of about 2 cm.



**Fig. 3** – Illustrative diagram of the elbow joint in a healthy individual (A) and one with detachment of the tendon from the olecranon, red circle (B) (from Augusto, N., et al. (2014). doi:10.1594/EURORAD/CASE.11480).

# APPLICATION OF A NATURAL RESORBABLE MEMBRANE IN TENDON RECONSTRUCTION

Use of an equine pericardium membrane in the treatment of a chronic complete rupture of the distal triceps tendon.



## Results

The patient of this clinical case is a male adult who had sustained a violent sports injury about 3 months earlier and presented for observation with marked impairment of elbow flexion-extension and total deficit of active extension against gravity. Clinical evaluations deposed complete rupture of the triceps tendon, and were later confirmed by MRI. Indeed, the images obtained revealed complete avulsion with a gap of about 2 cm between the tendon stump and its olecranon insertion. It was therefore proposed that the patient proceed with an operation to reinsert the triceps tendon into its olecranon insertion by bridging bone sutures and reinforcement by means of an equine pericardium membrane. After making a cutaneous incision posterior to the elbow in a 90° flexed position, the proximal stump of the triceps tendon, which was retracted within the muscle belly, was isolated, preserving the continuity of the surrounding newly formed scar tissue.

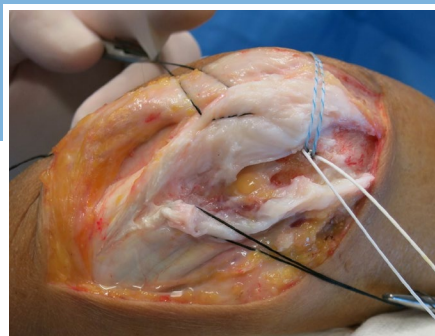
After cruentation of the tendon stump and appropriate tensioning, a gap of about 3 cm was observed to persist.

A bony anchor with a double high-strength suture was applied at the level of the apex of the olecranon. With a view to bridging the remaining gap and promoting the healing process of the tendon, equine pericardium membrane was attached to the olecranon, shaped and wrapped around the tendon as a protective and reinforcing covering, using the first pair of sutures. The second pair of sutures was sutured directly to the tendon stump by-passing the interposed gap. The sheath obtained from wrapping the membrane around the tendon stump was covered by the soft tissues. The subcutaneous and cutaneous tissues were finally closed. The patient was immobilized for 2 weeks in a cast appliance and then began passive mobilization of the elbow according to gravity, recovering full flexion at 6 weeks after surgery. Active triceps loading was granted at the end of 8 weeks. Return to active sports was granted after the sixth month.

Eighteen months after surgery, clinical evaluation showed that the patient had fully recovered Range Of Motion (ROM) and 90% muscle strength.



**Fig. 4** – Surgery: repositioning of tendon stumps.



**Fig. 5** – Surgery: restoration of tendon fixation to the olecranon.



**Fig. 6** – Surgery: pericardium membrane is fixed to the bone and properly shaped.



**Fig. 7** – Surgery: wrapping of the pericardium membrane around the tendon to strengthen it; suturing of the tendon follows.



**Fig. 8** – Healing at 18 months after surgery: the patient fully recovered elbow ROM in extension.



**Fig. 9** – Healing at 18 months after surgery: the patient fully recovered elbow ROM in flexion.



Visit [www.bioteckacademy.com](http://www.bioteckacademy.com) for other clinical sheets and to access the ever up-to-date scientific literature.