Biomechanics of patellar tendon repair using a high resistance flexible suture frame: a cadaveric study

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Disclosure Statement

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No financial conflicts to disclose

Mario Orrego, MD

Arthrex® consultant
Cadavers donated by Promedon®
Acute patellar tendon ruptures

No consensus on best repair technique

Most used is trans osseous Krakow suture

Can we avoid biological disruption of sutures near tear?
Objective

Compare the biomechanical performance of two repair techniques

Standard Krakow Repair (FiberWire®) v/s Trans osseous Suture Frame (FiberTape®)
Methods: setup

12 fresh frozen adult cadaveric samples

LDVT sensor tracks linear displacement

2.2 kilograms 33cms distal of medial epicondyle simulates foot weight

Hydraulic pump: 240N traction forces knee extension
Method

Base displacement measured previous to tendon rupture

10 full range cycles
Method

Tenotomy, retinaculotomy and computer randomization

Repair displacement measured after 50 full range cycles
Method

Force to failure measured with knee fixed at 45° of flexion\(^4\)
Results

Less real displacement (base displacement – repair displacement) with suture frame

1.67mm vs 3.38mm (p 0.010)
Results

No difference in Force to Failure

774N vs 572N
(p 0.109)
Discussion

Both techniques - classic Krakow suture and the high resistance flexible suture frame- surpassed the mechanical requirements.

The suture frame had less real displacement, but the difference (1.71mm) is below the 5mm minimal clinically important difference we propose.

Main limitations are ruptures generated in previously healthy tendon, indirect measurement of displacement and no healing process assessment.
The high resistance flexible suture frame with FiberTape® had an acceptable biomechanical performance in patellar tendon rupture repairs.

