

Editorial Commentary: Rotator Cuff Repair: How Much Tension Can a Tendon Stand? If It Hurts My Finger, It's Probably Hurting the Tendon



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Abstract: Rotator cuff repairs may fail anatomically because of greater-than-needed tension to approximate the tendon to the greater tuberosity during repair. Surgeons should make every effort to minimize the tension when reapproximating a torn rotator cuff.

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In their article “How Much of a High Tension Will Adversely Affect the Rotator Cuff Repair Integrity?”¹ Park, Shim, and Seok, from the Republic of Korea, have provided a quantitative perspective to the case for making every effort to minimize the tension required to approximate our rotator cuff repairs. In a single-surgeon series of 50 repairs of >3 cm tears that needed extensive soft-tissue releases to approximate the rotator cuff to the greater tuberosity, they found that when they applied the receiver operating curve method of statistical analysis to tendons that were healed versus those that re-tore (based on magnetic resonance imaging at more than 1 year postoperatively), the repairs that had greater tension (measured at the time of repair) were more often re-torn, with 35 N being the number bracketed by statistics as the bar to try to get below.

It certainly seems obvious that greater tension at the time of surgery equals greater chance of re-tearing. However, the confidence intervals in their findings are pretty wide (around 5 N at the low end and close to 60 N at the high end), so the threshold of 35 N may be inexact. And what's a Newton in real life, anyway? For those using English units, 35 N is about the amount of force you'd feel if you looped a polyblend suture around an 8-lb weight and hung it from your index finger. Ouch! No surprise that the cuff doesn't like that, and I certainly

wouldn't want to do that to my finger for any significant time with the high end of their confidence interval, which would be around 14 lbs. It's surprising that any rotator cuffs heal at those tensions, and the values suggest that there is probably progressive creep that occurs, and that their method of measuring tension represents a worse-case scenario that's less once the repair is completed due to multiple sutures spreading that tension among multiple suture-tendon interfaces. They also used an intraoperative trick that most of us employ, which is to medialize the repair a few millimeters when things are tight. The low end of their confidence interval is where I'm happiest with repair tension (5 N is a little over a pound) and is a number that those who measure tension intraoperatively should shoot for. Park et al.¹ should be congratulated for beginning the process of nailing down the threshold tension, and I hope others measure and publish their results so that we can narrow the confidence intervals and increase our intraoperative confidence that we're doing everything possible to promote healing. Like other authors, Park et al.¹ also found that even the patients who re-tore their cuffs did well according to patient-reported outcome measures, so we shouldn't abandon a repair attempt if things get tense. I'm hoping my colleagues in Korea and throughout the world can next come up with novel ways to decrease the tension on our rotator cuff repairs at time zero so I and my patients can both feel more relaxed.

Reference

1. Park S, Shim B, Seok H. How much of a high tension will adversely affect the rotator cuff repair integrity? *Arthroscopy* 2019;35:2992-3000.

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The author reports no conflicts of interest in the authorship and publication of this article. Full ICMJE author disclosure forms are available for this article online, as [supplementary material](#).

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0749-8063/19915/\$36.00
<https://doi.org/10.1016/j.arthro.2019.07.028>