

## Editorial

# "In My Experience...The SCOI Row: Superior Results That Have Stood the Test of Time"

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The author discusses his experience with the rotator cuff repair: The SCOI Row.

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For years there's been controversy regarding single-row versus double-row technique when you talk about rotator cuff repair, and there's a lot of pressure to go to double-row? You've got industry pressure, right because they want to sell anchors obviously, and they want to move forward with that technology. Then there is peer pressure, like, "What do you mean you're not doing a double-row for this rotator cuff repair?"

I trained at SCOI (Southern California Orthopaedic Institute) with Steve Snyder and after fellowship joined him as his partner. For years, we've been doing primarily single-row rotator cuff repair and our results have been fantastic. I think single-row got a bad rap early on, and it happened because there was no standardization as to what a single-row repair really was? Single-row repairs could theoretically be done with a single or even double-loaded suture anchor. But we use triple-loaded anchors and then its critical where

you put the anchor on the tuberosity, just off the articular cartilage, medially, versus far laterally on the tuberosity.

What happened years and years ago, is that single-row got trashed. Everybody said single rows don't work. If you go back to the original Yamaguchi paper with 94% failure rate on arthroscopic rotator cuff repair, there was a chance we were never really going to continue with arthroscopic rotator cuff repair. There was a chance that cuff repair was going to end up going back to being a mini-open operation, but then as we started working through the technology, our anchors and suture material got better. Braided sutures with different material and better strength characteristics were developed and all of a sudden our repairs got better. So now the failure point shifted away from the bone anchor attachment to the interface between the suture and the tendon, and we have changed the mode of failure. The strong suture started cheese wiring through the tendon. So where do we go and how do we look at this? What was hap-

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pening was people were putting their suture anchors on the lateral aspect of the tuberosity and tying it down, and you were putting too much tension on the repair. The sutures were ripping through the tendon under excessive tension and there were failures.

We started moving to a triple-loaded anchor and Alan Barber who has been the king of looking at biomechanics of suture anchors and sutures started studying this and found, if you triple-load a suture anchor as opposed to a double-loaded suture anchor, you're getting 100% better resistance to gap formation over a double-loaded anchor. We really learned a lot about this. Steve Burkhart was instrumental in creating this concept as well, going from single-loaded to double-loaded suture anchors back in the 1990s. Alan Barber took it to the next step and said triple-loaded is even better. We started exclusively using triple-loaded anchors and we made sure we weren't putting excessive tension on the repair. Steve Snyder was a true pioneer and he has been my mentor, my partner, and my friend, and together we learned that if you put the anchors just off the articular cartilage margin, you eliminate the tension on the repair. By doing that, you're basically laying the tendon onto the bone and creating a better environment for healing.

If you think about the rotator cuff, when it tears, there's degeneration. There's some poor-quality tissue that needs to be debrided before repair. Our concern was taking this shortened muscle tendon unit that, as Christian Gerber has taught us, has lost its normal angle and is shortened, then pulling the tissue all the way over the top of the tuberosity was putting too much tension on the repair, and, hence creating failure. What we said is let's just put the tendon where it rests more naturally, kind of an in-situ repair. We're not trying to reduce the tension, but we want to just get the tension as close to just right as we could. It's like Goldilocks? You know, this one's too tight. This one's too loose. We wanted it just right. And so, what we did, is we started putting the anchor just off the cartilage margin. Well, then you have this exposed tuberosity. Originally, we started abrading the bone and then we transitioned to micro-fracturing the tuberosity and it gained popularity. Papers came out, one out of Japan, which basically did this study where they took rats, and they used fluorescein and they basically irradiated the bone marrow of certain rats, put in this fluorescein in the new bone marrow, and all of a sudden you're seeing this fluorescein in the irradiated bone marrow coming through the tuberosity holes like, "Hey, there's something to this." This was certainly the precursor to PRP and BMAC and all these expensive things that people are talking about today.

So for years now, my whole career, Snyder and I were basically doing these style rotator cuff repairs. Joe Burns was another one of our partners at the time who really took a big part in this and the three of us were really looking at outcomes, realizing that this works and we're putting the tendon just off the cartilage on the tuberosity.

Then this whole explosion of double row came in. I tried a few double-rows and I didn't know that it was any better and had some failures. We worried that when you pull that tendon out over the top of the tuberosity and you put the

tensioned spider web over the top, it felt like we may have been strangling the tendon a little bit and maybe impacting the blood supply. Even though you're getting good footprint coverage, you may be limiting that rotator cuff's ability to heal? Then the Cho paper comes out describing medial type two failures, where you're putting too much tension on the repaired cuff and it's failing medially. When it fails medially at the musculotendon junction, then you've got nothing to repair. That's the higher risk of failure with a double row. When it fails medially, you've got nothing left to fix.

When we started looking at it, and went back to the data, all these cuff repair systematic reviews came out stating double-row was better than single-row. All that early single vs double row data was pretty much before 2016. It was 10 years ago in 2014, when the first systematic reviews came out, Verma published one, Peter Millett published one, basically saying double-row was better than single-row. I think there were some flawed assumptions and limited data of what we do today at the time. It wasn't until 2016 that the first repair using triple-loaded suture anchor placed medial on the tuberosity with microfracture vents lateral to it were compared against double-row. And at that point, the pendulum started to swing back a little bit, but that was after all these systematic reviews were written, and so there wasn't a lot of data on this single row technique. Then people from the podium pooled what we were doing at SCOI into your standard single-row technique and criticized it. And so, what we wanted to say is, our style repair is a very specific type of single row. It's all triple-loaded anchors, medial on the tuberosity with micro fracture to the tuberosity behind it, and so we coined it the SCOI Row.

Yes, before it was single-row versus double-row, but now it's the SCOI Row and it has helped and makes sense because people will say, Oh, that's not just a single-row. It's this very specific type of repair-single-row triple-loaded anchors, medial on the tuberosity with a micro fracture behind it. Steve Snyder has been the master of an acronym, for example, the SLAP lesion. He coined many terms. And so with Steve, it was one of those things that had to be named and so it became the SCOI Row and it stuck, Joe Burns, myself, and Snyder, believe SCOI Row shows excellent healing and improved outcome and changed the landscape that not all single rows are the same.

We have hundreds, if not thousands, of post-operative MRIs that showed the cuffs were healed. At the same time, we started seeing many authors report 30% failure rate, 40% failure rate, 50% failure rate of their double-rows to the point where people started saying, now you need BMAC, now you need PRP, now you need an augment. We said, let's go back and look at our data. What does our data tell us? We went and looked at two different cohorts. Snyder liked to use titanium suture anchors. I used PEEK or bioresorbable anchors. We took both groups and we looked at essentially 200 patients followed prospectively for a year with MRIs at one year on every single one of them. I'm happy to share those MRIs. Somebody else can look at them independently. We published a 92% healing rate on rotator cuff repair, which today represents the best results in the world's literature, It's published in the European and US

literature, most recently in the green journal, Arthroscopy 2021 and it's the best results that are out there.

Every time I'm on a panel, I say I feel like the sacrificial lamb of single-row when I have five guys and girls around me who are all doing double-row. I remain a huge supporter-the SCOI row works- it's a very specific type of repair. So now the name SCOI Row has hit. It is interesting, we published an infographic in another journal, and I get a letter from the editor saying we can't use SCOI Row because it's not recognized. I said it's an accepted acronym. I sent him a publication that came out of China, which basically said patients under the age of 55 received the SCOI

Row. We should have trademarked it back then. Now it's become known as the SCOI Row, and I'm asked to speak about the SCOI Row often. I'm passionate about it. I love it. I like being on an island of sorts trying to support this technique, which we have shown to be very successful. We have 5 fellows a year who believe in it and come spend a year with us to learn this technique and so many others. It's been a wonderful journey.

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