

Editorial

"In My Experience...Tommy John Surgery- It's evolution, current status, and future"

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The author reviews his experience with Tommy John surgery.

I think this is a topic that's near and dear to my heart, obviously. I was a college baseball player and I've been around baseball my whole life. I just came back from my son's high school baseball game. So, baseball is something that's always been part of my personal life and certainly my professional life.

You've seen the evolution of the approach to the care of these athletes. I think this year in particular, it's important because this is the 50th anniversary of Tommy John surgery. September 2024 was the 50th anniversary of the actual Tommy John, done by Dr. Frank Jobe in Los Angeles. And so, 50 years, you see the evolution. Even Dr. Jobe, who did the original surgery, thought it was another failure initially. Tommy John had two other surgeries, I believe, afterward. He had dense ulnar nerve palsy, took him two years to come back. And it took Dr. Jobe, five years until he did another one of these operations because he thought it failed. But now we know, obviously, it's been very, very successful. The evolution of the approach to this operation, back in Dr. Jobe's day, with a maximally invasive approach with a flexor takedown and everyone getting an ulnar nerve transposition to now where most of us don't touch your ulnar nerve unless there's an issue with it and do a muscle-splitting approach, less invasive. Still, the return to play is still often the limiting factor in a lot of these athletes, over a year to sometimes two years. That's led to an evolution, approaching it differently and thanks to the work initially by Buddy Savoie and then more recently by Jeff Dugas looking at repairing the ulnar collateral ligament.

If you look at the old studies that maybe weren't as successful, I think the technology has changed, allowing us to do a better job of repairing these. I think MRIs have become better so now we can recognize certain tears that are more amenable to repairs. I think, without using proprietary names, we have technology that allows you to add a reinforcement or, a brace, people call it, to strengthen or to make it better. I think we're seeing outcomes that are at least the same as Tommy John reconstruction, but getting them back much quicker. In my experience - as the name of this topic - the UCL repair can now get them back in six to eight months as opposed to one to two years. I had probably three or four high school seniors this season that had issues at the end of last year that really wanted to be available for their senior season. And historically, we didn't have that opportunity or that option because either they had the surgery and they were out for a year and they missed their senior season and maybe they could be good enough to play afterward or they just didn't have the surgery and stopped playing. But now, I repair them and they get back in six months or eight months and make it back for the senior season. Now, maybe they don't have aspirations of playing after, but if you can get a kid back for the senior season of high school, I think that makes a difference. It makes a difference in their lives and their experience or memories, all those things that are very important. We all think fondly of our high school time and our experiences and being able to now have opportunities or options to get kids back for that, I think is important.

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That was the initial evolution, the advent of going from a maximally invasive, the original Tommy John, to a less invasive approach, the modified Tommy John, the muscle-splitting or docking approach that was popularized by Dave Altchek, showing that high rate of success. But again, taking one to two years to fully return versus now being able to repair it and add this reinforcement to get them back in six to eight months with fairly similar outcomes. I think that's been one of the big revolutions of my career and I'm probably now doing almost 50% repairs versus reconstruction.

The second thing that I've noticed from my experience is that the number of revisions is going up tremendously. A lot of that is multifactorial. If you look at Major League Baseball's own data, which they just published in December, the average fastball in the younger kids and Perfect Game, which is a big showcase organization, the number of players throwing fastballs greater than 95 miles an hour has been going up every year. If you look at the data from the Andrews Institute looking at the number of elbow surgeries, the number of kids that are having elbow surgeries that are high school age or younger is a larger percentage of their patient population. And the number of kids being drafted who already have had elbow surgery in the past has been going up exponentially.

Once they get to the major leagues, the data again shows that they throw harder. Fastball average velocities have gone up. The average velocity of the off-speed pitches has gone up. They're even throwing the off-speed pitches harder, so they're adding spin plus velocity. You take a cohort of kids who have already had elbow surgery, and you increase their velocity. That's why we're seeing more and more players having to have revisions done. Historically, revision Tommy John, has a return to sport of about 50%, so not great. But now we're starting to see maybe we can add something to this. Maybe you're hearing about the hybrid Tommy John Reconstruction, which is a reconstruction plus a repair plus this reinforcement or internal brace. Some people have called it the Triple Tommy John or the TJ3: repair plus internal brace plus a reconstruction. Now we're trying to do the best of both worlds, whereas historically, I think in these athletes, the engine was outstripping the chassis. The body was not able to keep up with what they're doing as far as velocity, spin rates, sweeper pitches, all these different things. Now we're trying to find ways to catch up. Maybe by taking care of everything, repairing what's there, add a graft to reinforce it, add an internal brace. Maybe now we've got something that lasts longer and has a lower chance of failure. This is the evolution that I've seen over the last 15 years.

Historically, everyone got Tommy John if they needed it. Now we're seeing a more nuanced approach based on the tear patterns, based on the athletes' time in their season, when they need to get back, all these different things. We can approach surgery in an individualized way. In the past, it was very much a cookie cutter response that, you hurt your elbow, you got Tommy John, you're back in one to two years, sorry, no other options. We're seeing an evolution of options now to approach this in a much more individual-

ized manner, which I think is very beneficial to these athletes.

When I first got to UF, we had an athlete, one of our pitchers, who had bilateral hip cam impingement. He had cam surgery, hip scopes, and he made it back from both hip scopes after a year or so. And then with a few months, he tore his UCL. That brought to my attention, or made me start thinking, is there more to this than just the arm? We knew that the shoulder was a risk factor for elbow problems. If he lacked some shoulder range of motion, he had a higher risk of elbow problems. We started looking at the hip range of motion and 10 years ago we published data showing in our UF pitchers that if a pitcher had decreased hip range of motion, these biomechanical risk factors in your mechanics puts you at risk for increased elbow torque. That's led to a lot more people looking at pelvic, lumbopelvic control, showing that if their ability to control their pelvis and one-legged stance is not as good, that puts you at risk for other issues. People have looked at low back, all different things within the entire kinetic chain that seem to be related.

We're now looking at these athletes holistically and not just doing arm care arm rehab. They need to get range of motion on their hips, their low back, working on their core muscles, the pelvis, all these things now that may hopefully be protective and may try to stem some of this tide that we're seeing with his increasing elbow injury. So we're trying to educate coaches and parents on the importance of the kinetic chain.

We did a study, about eight years ago now, where we looked at the caregivers of the athletes those who brought them into the office, or even to the travel ball teams, and we found out who actually kept track of their kids pitching pitch counts and who knew the recommendations. The numbers were pretty abysmal, I think about 25% of parents actually knew the recommendations for pitch counts. These are kids who are playing on multiple different teams and it's really up to the parents to help keep track of this. I think we've learned that over time that increased risk is related to pitch volume. We actually published some data looking at risk of Tommy John injury based on where you grew up and where you played college baseball. If you grew up in the South and you played in the SEC, you have a higher risk of having elbow issues. Now, we'd like to argue because we throw harder and all that. But the actuality is that we play year-round down here, whereas if you're from Chicago or New York or those places, you don't really have that opportunity like you have here. Year-round play has been shown to be a detriment and a risk. I think we're seeing all these things that are all tied together and trying to find ways to improve them and address them. I think that over time, hopefully, we'll make a difference. But right now, the wave is so strong in one direction that it's hard to slow things down.

The internal brace, trademarked by Arthrex, they're the company that pushes several different applications like ACLs and in ankle surgery. They tend to be the company that has the most involvement. But I like a strong suture tape, and I like one that's collagen coated. We're incorpo-

rating that with either the reconstructed ligament or the native ligament so that we can try to incorporate them all together. It's like a load-sharing device and I think there's some value to having this collagen-coated layer sewn to the repaired native UCL. They've shown in dog models that you get ingrowth of tenocytes into the tape. That's what I like to use, a collagen-coated suture tape as the reinforcement in this setting.

It'd be nice to have some sort of biologic avenue. Podesta published a study that showed PRP may be a viable option in partial UCL tears. Other studies have not really supported this, so it's fallen out of favor. But it'd be nice to have some other option besides surgery in these partial thickness injuries that you try to rehab, spending several months until you realize this approach isn't successful.

That's why in most cases, certainly at the professional level, they just jump right to surgery because they can't afford to put three months or six months into it and realize it wasn't working. It would be nice to have some other options like injectables, modalities that can be beneficial, whether it's, ultrasound, pulse therapy, something with potential to show some non-surgical improvement. I've got two or three guys right now in the middle of the season that I'm dealing with, trying to see if we can get things heading in the right direction. It'd be nice to have some other options as opposed to just jumping into surgery and taking them out for the season.

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