



The Epidemic of Tommy John Surgery: The Role of the Orthopedic Surgeon

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Ulnar collateral ligament (UCL) reconstruction, commonly referred to as Tommy John surgery, is a well-described surgical treatment for elite athletes with a symptomatic, deficient UCL.^{1,2} The procedure was first performed by the late Dr. Frank Jobe in 1974, described in 1986, and has undergone several modifications over the past 30 years.³ Different graft choices, tunnel positions, graft configurations, and tunnel fixation methods are just some of the alterations that have been made to the original Jobe technique.⁴⁻⁶ With time, the index procedure has become more refined, with predictable outcomes in Major League Baseball (MLB) pitchers as well as other elite overhead throwing athletes.^{2,7,8} However, though this surgery was originally described for elite athletes suffering from UCL deficiency, recent times have seen an increase of over 50% in the number of UCL reconstructions performed on high school-aged and younger athletes.⁹ Furthermore, in 2000, a total of 13 MLB pitchers underwent UCL reconstruction, while in 2012 this number increased nearly threefold to 32.² This paradigm shift of performing UCL reconstructions more frequently and on younger athletes raises a very important question: what is the role of the orthopedic surgeon in this epidemic?

UCL reconstruction has become a reliable procedure for MLB pitchers and other overhead throwing athletes.^{7,10,11} Recent studies have reported that MLB pitchers who undergo UCL reconstruction return to pitch in the MLB 83% of the time, whereas only 3% fail to return to pitch in either MLB or the minor league.² Furthermore, pitchers who undergo UCL reconstruction perform similarly after surgery as prior to their UCL reconstruction, with fewer innings pitched after surgery, but, more importantly, a lower earned run average

(ERA) and walks plus hits per inning pitched (WHIP) after surgery. These last 2 statistics, known as sabermetrics, evaluate the pitcher's effectiveness; the fact that these are improved after surgery is reassuring for pitchers who undergo this procedure. However, it must be recognized that these pitchers pitched fewer innings after surgery.

There has been a sharp increase in the number of MLB pitchers who have undergone UCL reconstruction in recent years, especially the past 3 seasons, in which over 60 pitchers have had Tommy John surgery.² This increase, however, is not confined to MLB pitchers. High school-aged pitchers have also been part of this drastic rise in the number of UCL reconstructions performed throughout the country. Dr. James Andrews and colleagues noted a 50% increase from 1988-1994 to 1995-2003 in the proportion of high school-aged pitchers who underwent UCL reconstruction (while the absolute number increased from 7 to 77 in high school-aged players compared with 85 to 609 in adult athletes).⁹ Given the increase in MLB pitchers over the past few years, it is likely this number has also increased among adolescent pitchers.

This data again raises the question: what is the role of the orthopedic surgeon in this epidemic? There are many plausible responses, but in my opinion, there is one answer that surpasses the others. As a trained professional, surgeons are tasked with the responsibility of looking out for the best interest of their patients, even when this conflicts with the patient's, or the patient's parent's or coach's desires. This includes injury prevention, such as instituting pitch counts and developing products that allow coaches to determine when a pitcher may be at risk for injury from fatigue, as well as injury treatment.¹² It is difficult for a patient to understand the gravity of surgery and the rehabilitation process, specifically a procedure as involved as UCL reconstruction, and especially if the patient is an adolescent who has their outlook clouded by the fact that they believe they will be the next MLB star pitcher. The reality is that the National Collegiate Athletic Association (NCAA)¹³ has released data that has demonstrated that only 6.8% of high school baseball players will play baseball in college. Furthermore, only 9.4% of college baseball players will reach the professional level. That equates to 0.5%, or 1 in 200 high school players who will eventually play professional baseball.¹³ However, the reverse of this is also true, that out of every 200 players,

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I will make it to the major leagues, and that 1 player could be the patient in question. Hence, the purpose of this data is to show parents and athletes that, while they do have a chance of playing professional, and certainly collegiate, baseball, that percentage must be weighed against the risks of surgery.

MLB pitchers who have an endless supply of rehabilitation facilities, trainers, etc, do not return to pitching competitively and consistently in the majors for more than 15 months after UCL reconstruction.² The time commitment and rehabilitation required for these patients is staggering.^{14,15} Furthermore, parents of these children who are consenting for them also have a difficult time comprehending the workload they are signing their child up for. Some parents believe this surgery will help their child throw faster, longer, and more accurately—beliefs that numerous studies have shown to be flat-out inaccurate. In fact, pitchers tend to lose a slight amount of velocity and accuracy after UCL reconstruction.^{11,16} Ahmad and colleagues¹⁷ administered a questionnaire to 189 players, 15 coaches, and 31 parents about the indications, risks, benefits, etc, regarding UCL reconstruction to determine the public's perception regarding this surgery. The results demonstrated that the public, including coaches, have a significantly skewed perception of exactly how serious this surgery is. The study showed that 28% of players and 20% of coaches believed the pitcher's performance would be improved after surgery, and, more strikingly, 26% of collegiate athletes, 30% percent of coaches, 37% of parents, and 51% of high school athletes believed UCL reconstruction should be performed as a prophylactic procedure to enhance performance in an uninjured athlete.¹⁷

Henceforth, it becomes the surgeon's responsibility to ensure that both the patient and the parents understand what the surgery and rehabilitation process entails, to keep the expectations of the patient and his or her family realistic, and to counsel these patients on alternative options with lower risks. As Ahmad and colleagues¹⁷ demonstrated, this is not an easy task given the public's preconceived notions. Many patients, especially patients of the younger generation, seem to be willing to jump to surgery as the first option for treatment without having truly tried any nonoperative measures, because they believe surgery to be a quick, easy, and definitive answer. This is not always the case, and a trial of nonoperative treatment, including rest, ice, physical therapy, and possibly platelet-rich plasma (PRP), should be instituted for high school-aged players who present with UCL insufficiency prior to discussing surgery.^{18,19}

Medial UCL reconstruction is a successful procedure for elite MLB athletes. However, UCL reconstruction is becoming a victim of its own success as younger and younger athletes who will likely never play at the major league level are undergoing this procedure at an alarming rate. This is an epidemic which must be addressed by surgeons, coaches, and parents alike to curb the beliefs that UCL reconstruction will make high school-aged pitchers more successful. This procedure should not be performed prophylactically on an athlete of any age, especially those in high school. Further studies on

the effectiveness of both nonoperative rest and rehabilitation and of PRP on partial-thickness UCL tears are warranted. New technology in the form of a compression sleeve with imbedded sensors to track the biomechanics of a pitcher's elbow has been released and will hopefully provide information to coaches about when pitchers' elbows begin to fatigue based on several biomechanical parameters.¹² The future of UCL reconstruction is still fluid, and with proper prevention strategies, nonoperative treatment, indications, and preoperative discussions, the Tommy John epidemic can be cured. ■

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