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Prospectus Q&A

Andy Andres

by David Laurila

Andy Andres teaches a class called "Sabermetrics: The Objective Analysis of Baseball" at Tufts University in Medford, Massachusetts. Andres is also an Assistant Professor of Natural Science at Boston University and has taught a seminar in Exercise Physiology and the Physiology of Human Athletic Performance at Harvard for over 15 years. A data analyst for Ron Shandler at BaseballHQ, Andres has a PhD in Nutritional Biochemistry and Physiology.

David Laurila sat down with Andres for Baseball Prospectus to talk about Sabermetrics 101 and the effect of steroids on baseball.

David Laurila: A common argument is that steroids don't help a hitter make solid contact with a 95 mph fastball, which is more important than any distance that might be gained from their use. Is that a valid point?

Andy Andres: In my opinion, it's not. Most people understand that you can increase the distance you hit a baseball with increased strength, but what isn't understood is that increases in skeletal muscle power increases the speed of muscular contraction. That improvement in quickness would increase bat speed. While he was on his run in 1998, Sammy Sosa was interviewed and said that he had learned to wait on pitches longer. Those words were really code for "I can swing the bat faster." The time involved is milliseconds, so the important difference was that his bat speed had improved. I think it's clear that better bat speed improves the amount of time for pitch recognition, and that is likely enough to make a difference for elite hitters.

DL: A hot topic is Human Growth Hormone (HGH), which is reportedly replacing anabolic steroids in a lot of locker rooms. How effective is HGH?

AA: Conventional wisdom says that everyone is on HGH now because there's no test to detect it, but what they don't realize is that there's a night and day difference between HGH and anabolic-androgenic steroids. Studies have shown that HGH supplementation will increase muscle mass; but there is little, if any, evidence of strength gains in these studies. In other words, when HGH supplementation has been studied in normal males, there are reports of small gains in muscle mass, but there seems to be no evidence from a randomized, double-blind study that you gain strength from HGH alone. If there is any effect of HGH, it is likely to be a small effect, especially compared to how anabolic steroids improve strength and baseball performance.

DL: Jose Canseco claimed that as many as 85 percent of major league players were using performance-enhancing steroids at one time, while others feel the number is 10 percent or lower. What would your estimate be?

AA: I definitely think the prevalence has changed because of testing and the attention being paid to the issue. I don't know that I would say Canseco was lying, but there's probably a perception or recollection problem there. I doubt that it was that high. The strength coach for the Rockies has estimated it to be about 30 percent, and that might be closer to the truth, especially before testing.

DL: How has steroid use in baseball evolved?

AA: The evolution of usage is not well known, for obvious reasons. Sandy Alderson's testimony before Congress in 2005 and Jose Canseco's book *Juiced* probably give the best evidence of the evolution of strength training and steroids in baseball. Essentially Alderson argues that in the early 1980s conventional wisdom in baseball was that improved strength would not improve baseball performance. This slowly changed during the 1980s and 1990s as strength training was incorporated into baseball training in MLB. The increasing prevalence of steroid usage in MLB probably lagged behind the increasing prevalence of strength training, most likely peaking before testing started in 2003. From there steroid usage has probably dropped off, especially when more stringent testing started in 2005. But there is no hard data to back this up. This is just a best guess on my part.

DL: How does a sabermetrician with a PhD in biochemistry and physiology compare the achievements of Barry Bonds and Babe Ruth?

AA: Sabermetrician? Thanks for the compliment, but I'm more of a biologist who tries to understand the game of baseball much better. My favorite analysis of Bonds v. Ruth was done by Nate Silver of BP in Baseball Between the Numbers. He uses a very cool method to understand how the skill level of players, and the difficulty of the game, has changed over the years. His conclusion, that Ruth was the greatest ever but that Bonds is catching up and real close now, seems spot on to me. This also jibes with Win Shares data the last time I looked at it.

DL: What if more than performance is taken into consideration? What impact do you feel steroids have had on Bonds' career numbers?

AA: Again, this enters into the murky arena of speculation as we don't know for certain when and if Bonds started using anabolic steroids. If we assume that Game of Shadows is correct, and that Bonds started using before the start of the 1999 season, we can speculate about his career trajectory. Patrick Hruby in May 2006 did a nice analysis for ESPN.com looking at what Bonds' career may have looked like without his recent power boost. Hruby says his "boost" led to an increase of about 100 home runs -- again, all speculation, but fun to consider nonetheless.

DL: You teach a class called Sabermetrics 101. What makes the class unique?

AA: Our goal isn't to teach statistics using baseball as a vehicle; this has been done before by other universities. There is even a textbook for this kind of course, *Teaching Statistics Using Baseball* by Jim Albert. Our goal is to teach baseball analysis. The students may need to use tools like regression to perform their analyses, but we don't emphasize this. Our focus is on the sabermetric research studies themselves. It's a subtle distinction from similar courses, but it's a real distinction.

DL: What types of projects do your students do?

AA: Two students did a project called "The Leo Mazzone Effect," measuring the impact he has on pitcher's performances. They controlled for league and park effects, and they found a reduced ERA for pitchers while under Mazzone compared to when they pitched for other teams. Interestingly, just as they finished their project for the course, JC Bradbury of Sabernomics.com published his most excellent study of the same thing. These

students did get to present their work at SABR 35 in Toronto, and they made quite a splash there.

DL: Can you give us a few other examples?

AA: One student did a project that tried to measure "bullpen guile." He studied the intangibles of closers, targeting guys who pitched better than their skill-set would have predicted. It was sort of a "Is there such a thing as a clutch pitcher?" study. It's something I'd like to see expanded upon at some point, actually. Students have also looked at performance improvement following Tommy John surgery, how the Green Monster in Fenway changes baserunning, and of the effect of Moneyball on free agent signings. In other words, have salaries risen for batters with higher OPS recently? There have been many good projects in the three semesters we have taught the course.

DL: Have you had any guest lecturers?

AA: We have. Bill James did a round table with us. Alan Schwarz has come to Tufts to talk about his work. Brian O'Halloran and Zach Scott, both in baseball ops for the Red Sox, have visited. Jay Jaffe of BP has also addressed the class.

DL: Have any of your students gone on to work in baseball?

AA: There have been a few. One had an internship at the Hall of Fame for two years. Two others have worked for the Red Sox, but not in baseball operations. Another, Peter Bendix, who worked on the Leo Mazzone project, took a part-time job with the Indians in customer service and then moved into a business internship with the Devil Rays. His ultimate goal is to work for the Indians. The most significant so far has been Helen Zelman, who had been a QuesTec operator at Fenway before she took the class. She did some work for MLB on arbitration while she was at MIT, and after graduating went to work as an intern for Josh Byrnes in Arizona. She's a baseball ops assistant now.

DL: Give us a little background on Sabermetrics 101, including how the syllabus was put together.

AA: Sabermetrics 101 at Tufts started with my buddies Morgan Melchiorre and David Tybor. We play on a Tufts employee softball team, the "Jumbo's Peanut Surprise," and we all have a huge passion for baseball. Tybor is a huge White Sox fan and is finishing his PhD in biostatistics at Tufts, while Morgan roots for the Mets, is a computer expert, and most importantly, is a stud who hits bombs. We constantly argued about baseball, and being science geeks we pushed each other to learn sabermetrics well. We read Bill James' work, Total Baseball, Ron Shandler's work, and sites like BP and BaseballHQ.com. The Experimental College at Tufts is expressly for non-traditional courses; we pitched them the idea for this course, and the rest is history. The syllabus we hammered out after a softball game over beers, just brainstorming all the different areas of research within sabermetrics and baseball. Good times.

David Laurila grew up in Michigan's Upper Peninsula and now writes about baseball from his home in Cambridge, Massachusetts. He is the author of "Interviews from Red Sox Nation" which was published in 2006 by Maple Street Press. He can be reached here.