

## NEWS

### The Science of Soccer

*by John Roth - Blue Devil Weekly posted 9/22/2005*

If second-ranked Duke returns to the College Cup and wins the national championship this fall, it probably won't be because the Blue Devils are in better shape than the competition.

Veteran Duke coach John Rennie doesn't see many soccer matches at the elite NCAA Division I level decided on physical fitness. Generally, all the good teams are in excellent shape, because soccer players typically are among the most fit athletes.

But there are many methods to maintain and enhance a team's fitness level, and Duke's program in recent years has turned to science as one element in the process.



The Blue Devils have developed a close working relationship with the [K Lab](#) -- formally the Coach Mike Krzyzewski Human Performance Laboratory -- and Rennie credits the association with helping his program avoid some of the injuries that can derail a soccer season.

"We just don't have a lot of the typical soccer injuries, which are the pulled hamstrings, pulled quads, sore backs," noted Rennie, now in his 27th year at Duke and one of just three active Division I coaches with over 400 career victories.

“Those injuries have been kept to an absolute minimum through our prevention program, which is part of the mission statement of the K Lab.”

The Blue Devils are involved with the K Lab on a year-round basis, beginning with preseason testing when the players report to campus each August and continuing through evaluations at the end of the spring season. The lab, which is located amid Duke Sports Medicine facilities in the Finch Yeager Building, measures the fitness level of the players through several field tests and analyzes flexibility through a series of lab tests.

Test results, when combined with the team’s soccer-specific warm-up routine and year-round conditioning program, have helped the Devils increase performance and prevent injuries according to Rennie.

[Mike Huff](#) of the K Lab oversees the field and lab tests for the soccer team. The flexibility tests are aimed specifically at identifying players who could reduce their risk of injury by improving their flexibility.

“We have a dynamic movement test that involves strength and balance, something that is unique that a lot of people don’t do,” Huff said. “For hamstrings we lay them on a table, put their leg up and measure them with a goniometer. We check external rotation of the hip, hip flexors, all of that.

“We continue to tweak what we do and look at what are the best tests and how are we going to use the information.”

Rennie said the flexibility tests last year indicated that one of his top freshmen, Zach Pope, was at risk for injury due to tight hamstrings and hip flexors. “Mike developed a program for him to work with on his own, and as a result he has not had injuries,” the coach said. “That’s a fairly typical example.”

“Developing a greater range of motion was only going to help Zach,” Huff said. “Help going after a ball, help with stride length, speed. It’s hard to quantify because some of the best athletes in the world have been tight, such as John McEnroe. But it gives him confidence psychologically knowing he worked on this, improved, and will have less chance of getting hurt.”

“I think it’s good,” said senior co-captain Danny Kramer, the leading scorer on last year’s team. “We do a lot of testing for range of motion with our legs, and it shows if you need some work. A lot of times when injuries occur, it goes back to the fact that your range of motion isn’t good. A guy who may be having problems with his legs, muscle soreness or whatever, probably lacks a little range of motion, so you can work on that and prevent injuries.”

Huff tests the players’ speed, agility, an aerobic endurance and aerobic endurance so they can evaluate where they are at various points during the year. He also uses an Omega Wave test to examine heart rate variability and energy. “We are the only people in the Southeast who have it,” he noted. “All they have to do is lay on a table. Unlike some of our tests where we run them to exhaustion, this is a very passive test. It’s very helpful for looking at their response to training to make sure they are not over-trained.”

The K Lab does not design the team’s overall conditioning plan, but provides information that assists Duke’s coaches and trainers. Huff has developed an athletic warm-up program aimed at injury prevention and worked with the team’s speed coach, Jeff Howser, to incorporate the main principles into the Blue Devils’ year-round conditioning warm-up.

The soccer team also has gotten more into heart rate monitor training and evaluation this year. Kramer was one of several players who wore a monitor during a recent exhibition game.

Afterward the information was downloaded into a computer so players could see how their heart rate changes during a game or intense practice. The K Lab and sports medicine staffs assisted the soccer coaches in providing the equipment and setting up the system and will consult when needed.

"You're hearing about this more and more in soccer now," Rennie said. "We tried it several years ago, then started again last spring. The ultimate goal is that a lot of kids who are serious will get the home version and monitor themselves when they are training off-season. The end result will be to adjust the players' fitness programs on an individual basis."

Rennie noted that while K Lab interaction provides much information that benefits the soccer program, he hopes the players realize its ramifications in the future.

"There is this whole educational aspect of learning how to stay fit, of learning how to warm-up properly, of learning how to stretch at the end of a workout vs. the beginning," he said. "The whole process of how the players have learned to take care of themselves is the real benefit to it. They know now what kind of workouts will get them fit depending on what time of year it is. It's an educational thing to help the serious athlete do better on his own and probably help them stay fit year round."

"For me it's been exciting to see their interest level," said Huff, who also works closely with basketball, women's lacrosse, volleyball, track and several other Duke teams.

"When I first got here we didn't have any contact with them at all and now in the off-season we're doing stuff monthly in the spring and during the season, and they ask me to come to practices. That's what we want to be. We want to be support for the teams and for the athletes and help them get better. That's our whole purpose."