

# Researchers link NBA playing style to knee injury

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Credit: Artem Podrez from Pexels

The more often a professional basketball player drives the ball toward the basket to score, the higher the risk of the dreaded knee injury known as an anterior cruciate ligament tear, according to a Stanford Medicine study.

While that may not be surprising to basketball fans whose favorite

players have suffered the injury—including the Golden State Warriors' Klay Thompson in the 2019 National Basketball Association finals—the study also found that those who return to play after ACL reconstruction come back just as strong as their healthy counterparts.

"Our study showed that not only do players perform just as well as uninjured players of equal caliber after ACL reconstruction, but they also do this without having to reduce their driving," said Blake Schultz, MD, an orthopedic trauma fellow at the University of Texas who was a Stanford surgical resident at the time of the study.

The research was published Nov. 5 in the *Orthopaedic Journal of Sports Medicine*. Kevin Thomas, an MD-Ph.D. biomedical informatics student at Stanford, shares lead authorship of the study with Schultz. Geoffrey Abrams, MD, associate professor of orthopedic surgery, is the senior author.

"Our study provides information to players, teams and medical staff that individuals who return to elite-level competition after undergoing ACL reconstruction surgery are likely able to make a full comeback," said Abrams, the medical director of the Lacob Family Sports Medicine Center, which cares for Stanford varsity athletes. Abrams is also an assistant team physician for the San Francisco 49ers.

Shultz developed the idea for the study—which analyzed player performance and injury data collected from 37 NBA seasons—three years ago when he was helping treat patients with ACL injuries as a resident at the Stanford Sports Medicine Clinic. He had patients asking him what they could expect upon their return to the basketball court.

"They wanted to know if they would be able to be as explosive and drive to the basket as well," he said. "I wasn't sure what to tell them. Now I can say, "You will be able to return to the same level of play and expect to be

as efficient at driving."

## Three dreaded letters

There's a collective shudder among the fans, teammates and coaches when an athlete goes down with a suspected ACL tear on the basketball court, whether at the high school, college or professional level. Usually, it means surgery and months of rehabilitation. The same is true for football and soccer, as well as other sports that can put a lot of strain on the knee, Abrams said.

"An ACL is always a big concern of athletes," said Jerod Haase, head basketball coach at Stanford who added that he always worries whenever he sees a buckling of a player's knee and a player collapses on the court. "You pretty much know if it is an ACL, it's going to be season ending."

The anterior cruciate ligament is a band of tissue that connects the thigh bone to the shin bone and is crucial for knee stability. Surgical reconstruction involves removing the damaged ligament and replacing it with a segment of tendon from another part of the knee or a deceased donor.

Driving to the basket involves quick pivots to maneuver through opposing players with sudden accelerations and decelerations, which puts a great deal of stress on the knee, Abrams said. Shooting a basket from a distance involves more up and down motion, biomechanics that put less stress on the ACL.

Still, [scientific research](#) has been mixed on whether there is a clear link between ACL tears and driving to the basket, the study said.

## A whole bunch of stats

Using publicly available data gathered primarily from online sources, including injury reports and news releases, researchers identified 97 NBA players who had ACL tears since 1980. They excluded athletes who played before 1980 because the 3-point shot was introduced that year, which significantly changed statistics, Thomas said.

From those 97 players they winnowed the number down to 50 for analysis: They excluded players for reasons including playing in another league after their injury or suffering a previous ACL tear.

Data on how frequently players drive to the basket has been kept by the NBA only since 2013, but the researchers needed this information for three prior decades of games. To overcome this challenge, they collected 49 more traditional statistics related to style of play, then developed an algorithm to estimate players' driving tendency from those traditional statistics.

The study results showed that players with high career driving tendencies experienced ACL tears at a rate of 5.2% compared with those with lower driving tendency, who experienced tears at rates of 3.8%.

## **Return to play**

The researchers developed another algorithm to match each ACL-injured player with two other NBA players of similar age and playing styles who had not torn their ACLs. The performance levels of the healthy controls were then compared with those of the injured players upon their return to the court.

"The healthy controls provided an estimate of what the injured player's career may have been like had they not been injured," Thomas said. "We found that when you use these control players, and account for the effects of aging, injured players didn't have any worse career outcomes.

They play as well as you'd expect if they didn't have an injury."

In addition, the injured athletes didn't significantly change their playing style. Those who drove a lot continued to drive frequently after ACL repairs. (All players, including the controls, slightly increased their long-range shooting as they grew older.)

As an example, the algorithm matched NBA player Ron Harper—the Los Angeles Clippers leading scorer before he tore his ACL in 1990—with NBA players Paul Pressey and Scottie Pippen, Thomas said.

"Our algorithm automatically found these case-control matches, but intuitively they make sense," Thomas said. "They were all very good players who played at the small forward position with strong defense. They also all played on teams with other good players, which likely affected their performance stats. This served as a nice validation that our matching algorithm was working as intended.

"Right before getting injured, Harper looked a lot like Pressey in 1985 and Pippen in 1991," Thomas said. Researchers then compared the remaining years in each of the three players' careers, adjusting for aging. When these comparisons were done for each injured player and their controls, no significant difference in performance levels or changes in style of play were seen between the two groups, the study said.

"Everyone assumes they are coming back worse than they were before," Thomas said. "We were really excited to find that wasn't the case."

Unfortunately, the researchers were not able to include Klay Thompson in their study because he suffered an Achilles tendon tear the year after the ACL tear, Shultz said. But the study is still good news for Warriors fans who hope to see him return this season.

"With regards to Klay Thompson, our study does not specifically look at coming back from multiple injuries," Schultz said. "But with regards to his ACL injury, if he is able to come back, we can expect a similar level of play and shooting despite the ACL tear."

**More information:** Blake J. Schultz et al, Tendency of Driving to the Basket Is Associated With Increased Risk of Anterior Cruciate Ligament Tears in National Basketball Association Players: A Cohort Study, *Orthopaedic Journal of Sports Medicine* (2021). [DOI: 10.1177/23259671211052953](https://doi.org/10.1177/23259671211052953)

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