

In pro baseball pitchers, weak core linked to more missed days

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A research participant demonstrates the motion used to assess lumbopelvic control during a stepping movement, in this case mimicking the start of a pitch.
Credit: Ohio State University

New research suggests that professional baseball pitchers with poor core stability are more likely to miss 30 or more days in a single season because of injury than are pitchers who have good control of muscles in their lower back and pelvis.

In the study, 347 pitchers were assessed for lumbopelvic control during spring training. Pitchers with more tilt in their pelvis as they raised a leg to step up were up to three times more likely to miss at least 30 days – cumulative, not consecutive – during the season than were pitchers who showed minimal tilt in their pelvis.

The study shows association, not causation, but does suggest that pitchers might benefit from training to improve their lumbopelvic control – essentially, a more stable core during movement.

Researchers say these findings and previous studies suggest that "task-specific training" mimicking real-world, quick-reaction activities – as opposed to such static moves as crunches and planks – could be an effective core-strengthening approach for pitchers and other active people.

"The nice thing about lumbopelvic control is that there's not any downside we can think of to trying to improve it," said Ajit Chaudhari, associate professor of health and rehabilitation sciences and of orthopaedics at The Ohio State University and lead author of the study.

The research, published in the *American Journal of Sports Medicine*, suggests that a well-controlled core can minimize interference of energy's movement through the body from the legs to the throwing arm.

"The core could help prevent injury by spreading out the energy load, allowing pitchers to use their legs more and their throwing arm less," Chaudhari said. "A stabilized core lets energy pass through it rather than

getting lost as the core moves around, leading to less torque on the shoulder and elbow and better efficiency that helps with performance."

Chaudhari noted that most participants were between the ages of 18 and 22, meaning the findings might be relevant to high-school pitchers. He is studying that age group now.

"We'll eventually explore whether improving lumbopelvic control makes a difference by reducing injury. That's what everybody would like to know," he said.

Participating pitchers played on teams at the developmental, minor league or major league level.

Researchers tested their lumbopelvic control by assessing how much the pelvis tilted forward or backward as each pitcher lifted a single foot about 10 centimeters in a movement similar to stepping up on a curb or beginning a pitching motion. The scientists placed an iPod-based tilt sensor on each participant's sacrum, where the spine and pelvis meet, to make the assessment. A score was assigned to each player based on the magnitude of the tilt.

The relatively minimal raise of the foot was intentional.

"If a pitcher raises his knee really high, the pelvis has to tip. We weren't interested in measuring that. We were interested in measuring how well they control the [pelvis](#) before it has to move," Chaudhari said. "We also wanted a test that is more broadly applicable."

Throughout the season that followed spring training, medical staff from each baseball organization recorded the days players missed. A missed day for the purposes of this research was defined as any day on which a study participant could not complete his scheduled work because of an

injury suffered during baseball-related activity.

The majority of injuries recorded were elbow and shoulder strains, tears and fractures. Fewer pitchers were sidelined by back problems and leg strains.

The participants were placed in one of three categories – those whose pelvises tilted less than 4 degrees, between 4 and 7.9 degrees and more than 8 degrees from the starting position. They also were categorized by the total numbers of days missed to injury during the season: fewer than 30 days or 30 or more days.

The analysis showed that the chances of missing 30 or more days in the season were three times higher for the high-tilt group than for [pitchers](#) in the lowest-tilt group, and 2.2 times higher than for players in the moderate-tilt group.

Additional analysis suggested that of the 108 (31.1 percent) participants who missed at least one day because of injury, the average number of days missed was significantly different among the three groups. On average, as a group, those with poor lumbopelvic control missed 99 days, while those with moderate control missed 46 days and the well-controlled group missed 44 days.

Researchers studying core stability hypothesize that better control of the lumbopelvic region creates a more stable base that athletes can push off of, said Chaudhari, adding: "I'd compare the stability difference to jumping from solid ground versus jumping out of a canoe."

The potential injury reduction and improved performance could apply to tennis players, football quarterbacks and even swimmers, he said.

Provided by The Ohio State University

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