



Two soccer players jump to head a ball, a move that can leave players with brain abnormalities and memory loss.

PHOTOGRAPH BY SCOTT WILSON, AP PHOTO

## When Head Meets Soccer Ball, How Does Your Brain Fare?

Brain abnormalities, memory loss found among frequent "head-butters."

BY ROFF SMITH, FOR NATIONAL GEOGRAPHIC



PUBLISHED JUNE 16, 2013 • 3 MIN READ

Soccer players who frequently head-butt the ball—a commonly used tactic for passing or scoring in a game—may be risking brain injury, memory loss, and impaired cognitive ability, according to [a study published in the journal Radiology](#).

Brain injury and the lasting effects of concussion in sport have become a major health issue in recent years, especially in such hard-hitting sports as American football. Although the thump of a soccer ball on a forehead seems fairly innocuous, compared with a crashing tackle on the three-yard line, a soccer player may "head" the ball hundreds or even thousands of times during the course of the season. The cumulative effect of many "sub-concussive" blows to the brain has been unknown and unstudied until now.


"We chose to study soccer because it is the world's most popular sport," says the report's lead author [Michael Lipton](#), associate director of the Gruss Magnetic Resonance Research Center at the Albert Einstein College

ADVERTISEMENT

Invest in a firm that invests in *you*.

DISCOVER WEAVER

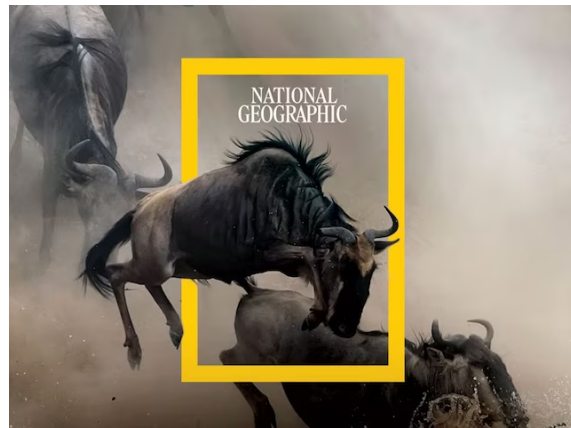


weaver 

of Medicine in New York. "It is widely played by millions of people of all ages, including children, and there is concern that heading the ball, an essential part of the game, might cause damage to the brain."

Lipton and his colleagues examined 37 amateur players, all adults, who had played soccer for an average of 22 years each and had played regularly over the previous year. They filled out questionnaires about their playing style and how frequently they headed the ball on the field and in training drills. Then they were given memory tests and highly sophisticated brain scans, using a type of MRI called diffusion-tensor imaging that looks at microscopic changes in the white matter in the brain. White matter is the tissue that conveys messages from one region of the brain to another.

The researchers found that players had to head the ball a certain number of times in a season before white matter abnormalities started to appear on imaging. The threshold varied from player to player but was generally in the range of 900 to 1,500 headers in a season. Beyond this threshold, the brain abnormalities quickly became more apparent. Those who headed the ball more than 1,800 times in a season scored measurably worse on memory tests than those who had headed the ball less frequently. The difference in scores was in the range of 10 to 20 percent.



### Explore further with a National Geographic subscription

World-renowned stories and exclusive content available in both print & digital access

**SUBSCRIBE NOW**

"To put this into perspective I should make it clear that all of these players' functions were still within norms," said Lipton. "These are all basically functional young professionals and students."

So, should soccer players—and parents of young soccer players—be worried?

"All we have at this point is some evidence that shows an association between heading and what looks like brain injury. However, we do not yet have the type of data that permits us to prove a causal role for heading or to generalize our findings to other specific individuals. In the meantime, controlling the amount of heading that people do may provide an approach for preventing brain injury as a consequence of heading."

"I should emphasize that we very much see soccer as an excellent source of beneficial physical activity. This should not be curtailed. Our message is to understand the role of heading in the game and look at how we can enhance the safety of soccer play and facilitate its expansion."

Read more from Roff Smith at <http://my-bicycle-and-i.co.uk>.

 SHARE

 TWEET

 EMAIL

## READ THIS NEXT



HISTORY & CULTURE

### How Barbie's signature pink took over the world

Pink—which may go back over a billion years—was once the color of fierce ancient hunters, powerful French women, and yes, boys.



SCIENCE

### Birth control pills: What you should and shouldn't worry about



SCIENCE

### Are your hormones unbalanced—and what does that even mean?