

# Scientists assess effects of soccer player preparation and recovery on kicking performance

17 March 2021, by Luciana Constantino



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Brazilian researchers have published a systematic review of the scientific literature showing that some warm-up strategies such as dynamic stretching can effectively prepare soccer players to maintain kicking accuracy, whereas intense physical exercises have a negative effect on the velocity of the ball when kicked, and consumption of carbohydrate beverages during a match can enable players to maintain adequate kicking performance in the concluding moments of prolonged physical exercise such as a sudden-death playoff.

The [review](#), published in the journal *Sports Medicine* in December 2020, analyzed 52 studies, ten of which examined the acute effects of warm-up exercises while 34 verified the overall impact of physical training and 21 explored recovery-related strategies.

Proficient kicking is essential in soccer, especially to score goals. The top three clubs in round 30 of

the 2020 Brazilian Championship, for example, had taken 162, 132 and 169 shots at goal respectively in the matches played so far, scoring 50, 48 and 51 goals.

Individual player traits such as maturity, skill level and gender may influence performance, but training, and recovery interventions also help obtain better results.

The literature review was part of the doctoral research conducted by Luiz Henrique Palucci Vieira with support from FAPESP at the Human Movement Research Laboratory (MOVI-LAB) of São Paulo State University's School of Sciences (FC-UNESP) in Bauru.

Vieira's Ph.D. thesis advisors are Fabio Augusto Barbieri, who heads MOVI-LAB, and Paulo Santiago, who also took part in the review. Vieira is doing his research at the University of São Paulo's Ribeirão Preto School of Physical Education and Sports (EEFERP-USP) with support from FAPESP via projects 2019/22262-3 and 2019/17729-0.

According to Vieira and his co-authors in the review, kick velocity is negatively affected by intense [physical exercise](#) protocols, such as intermittent endurance sprinting or graded efforts to exhaustion, while passive resting in the half-time break does not affect kick velocity. Kicking accuracy and ball velocity can be enhanced by warm-up routines that include dynamic stretching, while consumption of carbohydrate beverages can help maintain ball velocity following prolonged exercise.

The authors conclude that the review can help inform future research and practical interventions in an attempt to measure and optimize soccer kicking performance, although more studies are needed,

especially involving young players.

The next steps in Vieira's project will include experiments designed to assess the effects of preparation and recovery techniques on players' kicking performance. Initially, the researchers are analyzing the impact of individual characteristics such as sleep quality and brain (especially cortical) activity during execution of mid-distance kicks.

"This is innovative research from the standpoint of applicability, aiming at different kinds of information, methods, and knowledge in neuromechanics to try to improve the performance of [soccer players](#)," Barbieri told Agência FAPESP. "An example is the monitoring of brain activity during kick preparation and execution. Few studies have done this anywhere in the world."

The second part of the project will include testing of post-activation potentiation (PAP) and cold water immersion, both widely used by soccer trainers, to find out how they affect movement mechanics and performance in young players.

Kicking by under-17s in a club in the interior of the state of São Paulo was filmed using slow-motion cameras in 2019 and 2020 to analyze leg movements, ball velocity, and kicking accuracy. "This year we'll continue the research to look for factors that influence kicking, complete our analysis of the data collected, and publish a paper," Vieira said.

Academics have little access to professional soccer clubs in Brazil for research and science partnerships, he noted. More openness and collaboration are needed if there are to be advances in science and in player performance since scientific journals in the field tend to publish only papers with practical applications.

## Methodology

To arrive at the study universe used in the review, the researchers conducted a systematic search for certain keywords and descriptors in papers indexed until July 2020 by PubMed, Web of Science, SPORTDiscus, Scopus, and ProQuest. The search resulted in 10,780 studies. After removing

duplicates and studies not directly relevant to sports performance, they were left with 52 studies considered suitable for systematic review. A total of 947 players were evaluated in these studies, all of them male. According to Vieira, very little scientific research is done on female athletes. "This is also one of the priorities we advocate," he said.

**More information:** Luiz H. Palucci Vieira et al, Acute Effects of Warm-Up, Exercise and Recovery-Related Strategies on Assessments of Soccer Kicking Performance: A Critical and Systematic Review, *Sports Medicine* (2020). [DOI: 10.1007/s40279-020-01391-9](https://doi.org/10.1007/s40279-020-01391-9)

Provided by FAPESP

APA citation: Scientists assess effects of soccer player preparation and recovery on kicking performance (2021, March 17) retrieved 29 July 2022 from <https://medicalxpress.com/news/2021-03-scientists-effects-soccer-player-recovery.html>

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