New study analyzes link between digit ratio and oxygen consumption in soccer players

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The efficiency of oxygen supply to tissues is a factor in the severity of important diseases such as COVID-19 and heart conditions.

Scientists already know that the relationship between the length of a person's index and ring fingers, known as the 2D:4D ratio, is correlated with performance in distance running, age at heart attack, and severity of COVID-19.

Now, Swansea University digit ratio expert Professor John Manning has been working with colleagues to look more closely at the subject.

Their findings have just been published in the *American Journal of Human Biology*.

The research analyzed 133 professional soccer players as they underwent a series of body measurements, which included measuring digit lengths from hand scans. They also completed an incremental cardiopulmonary test to exhaustion on a treadmill.

Professor Manning of the Applied Sports, Technology, Exercise, and Medicine (A-STEM) research team said, "With our partners from the Cyprus campus of the University of Central Lancashire, we have clarified the relationship between 2D:4D and oxygen metabolism in a sample of well-trained athletes.

"The players with long ring digits (4D) relative to their index digits (2D) have efficient oxygen metabolism such that they reach very high maximal oxygen consumption in an incremental cardiopulmonary test to exhaustion on a treadmill."

Long ring digits relative to index digits are thought to be a marker of high testosterone levels in the womb. Testosterone has effects on oxygen metabolism through its influence on the energy producers (mitochondria) within cells.

He added, "Our findings are consistent with those from distance running,

where long 4D is related to high performance, and heart disease and COVID-19, where long 4D is linked to low severity of disease."

"Overall, our study illustrates the value of using healthy, well-trained athletes to clarify metabolic processes that are important in disease outcomes."

The team says further work is now necessary to quantify these associations in women.

Professor Manning's previous research has examined how the difference in finger length between a person's left and right hand may provide vital information concerning outcomes from contracting COVID-19.

More information: Koulla Parpa et al, The associations between digit ratio (2D:4D and right—left 2D:4D), maximal oxygen consumption and ventilatory thresholds in professional male football players, *American Journal of Human Biology* (2024). DOI: 10.1002/ajhb.24047

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