

# Higher altitude not necessarily better for athlete training

January 5 2015, by Louisa Frew

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"A load cell [force transducer] attached to the treadmill was measuring the mean power output and peak power output they were able to produce while sprinting as fast as they possibly could," he says. Credit: MilitaryHealth

Sports scientists have demonstrated that sprint training at a simulated altitude of 4000m results in poorer training performance, suggesting that a moderate altitude may give the greatest benefit to team sport athletes.

In partnership with the West Coast Eagles Football Club and Australian

Sports Institute UWA School of Sports Science, Exercise and Health PhD candidate Paul Goods is investigating the effect of [high altitude](#), hypoxic (lower oxygen) environments on sprinting performance in football players.

"Living at altitude you expect haematological changes which increase the oxygen-carrying capacity of the blood, but there is conjecture as to what you would expect when merely [training](#) at a simulated altitude," he says

"Anecdotally, there are lots of team-sport clubs using [altitude training](#) in Australia and around the world but there's not a lot of published research—sport clubs are coy in releasing any data due to the competitive nature of it."

In the project's first experiment 10 WA Football League players completed a once-weekly sprint set training session at one of four different conditions each week (sea-level and simulated altitudes of 2000, 3000 and 4000m).

They achieved these conditions through an altitude chamber that uses increased nitrogen content in the air to reduce oxygen concentration and mimic the reduced oxygen uptake experienced at altitude.

## **Treadmill aids simulation**

"A load cell [force transducer] attached to the treadmill was measuring the mean power output and peak power output they were able to produce while sprinting as fast as they possibly could," he says.

"Intuitively we thought the higher you go, the harder it becomes to train."

The results showed that the athlete's, who didn't know the altitude

condition at each session, had significantly reduced mean power output after the first sprint set at all altitudes while maintaining peak [power output](#) in all sprint sets except the final sprint at 4000m, suggesting that training at 4000m may hinder absolute training quality.

"A modified altitude where you can still perform high intensity training whilst also achieving a greater hypoxic stress is the best combination and most likely to result in a positive adaptation," Mr Goods says.

"Our conclusion is that going higher is not necessarily better."

Mr Goods now hopes to conduct a longitudinal study of performance and physiological variables in footballers, seeking to substantiate proposed benefits of [altitude](#) training including the more effective handling of lactic acid and efficient repletion of phosphocreatine, a substance crucial for normal muscle function.

**More information:** "Effect of different simulated altitudes on repeat-sprint performance in team-sport athletes." *Int J Sports Physiol Perform.* 2014 Sep;9(5):857-62. [DOI: 10.1123/ijsp.2013-0423](https://doi.org/10.1123/ijsp.2013-0423) . Epub 2014 Feb 7.

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