

Breathing is secret weapon in sports performance: study

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(PhysOrg.com) -- A 'secret weapon' used by a minority of sportsmen and women and which could make the difference between winning and losing at sport has been revealed by a scientist at the University of Portsmouth.

Training the muscles responsible for breathing in – inspiratory muscles – can improve performance by 15 per cent, meaning a runner can run for longer and a swimmer can swim faster, for example.

Dr. Mitch Lomax, of the university's Department of Sport and Exercise Science, has found that inspiratory muscle training and inspiratory warm-up exercises both boost performance, but when combined they can improve a sportsman or woman's performance even more. Her work is published in the *Journal of Sports Science*.

Dr. Lomax said: "People overlook that the muscles responsible for breathing are the same as other muscles and training or warming them up before playing sport means you will perform better. Doing both training and warming up is the best of all.

"Anecdotally I know some athletes use inspiratory muscle training devices but they don't acknowledge it – they know it gives them an edge over their competitors and they don't want to let on.

"Any little bit of advantage you can get legally as a sportsman or woman is worth doing and training and warming up the muscles responsible for

breathing in is incredibly easy to do.”

In the study, Dr. Lomax used an inspiratory muscle training device which works in a similar way to other resistance training devices to build muscle strength. An athlete doing training would use such a device to do one set of 30 breaths twice a day. For inspiratory muscle warm-up, because the power-boosting effect of warm-up exercises typically dissipates within half an hour, an athlete would use the device to do two sets of 30 breaths immediately before the sporting event for best results.

She said: “We know training and warm-ups work, but we don’t yet know the best way of incorporating such training into an athlete’s entire training schedule over a year.”

She also said it is important athletes and coaches use the device correctly because, as with any other sports equipment, if used incorrectly it could do more harm than good. “If it isn’t done right, there is the risk of hyperventilating and passing out. Technique with these devices really matters because they can also cause injury or strain if they aren’t used correctly.”

There are various devices available for inspiratory muscle training and warm-up, costing from £50-£300 but costs could be reduced if [sports](#) teams shared the device and each person bought just a mouthpiece for their own use. There could be other ways of training the muscles, without the use of a gadget or device, but because so many muscles are involved with breathing in, it would be extremely difficult to train them all to optimum level.

Dr. Lomax said: “The weakest muscle determines the point of exhaustion, so if you have trained some inspiratory muscles, the one you haven’t trained will be what limits this group of muscles from performing better or for longer and dictates the point at which your body

gives up.

“The body is designed so the muscles responsible for [breathing](#) and the heart will take priority for oxygenated blood over limb muscles, meaning the rest of the body – legs and arms – will be the first to “go” causing premature fatigue.”

Dr. Lomax tested 12 runners over six weeks and found that those who did inspiratory muscle warm-ups improved their times by 5-7 per cent; those who did inspiratory muscle training improved their times by 12 per cent; and those who did both improved by 15 per cent. Dr. Lomax said those were very conservative figures and did not rule out athletes making even greater gains. A sample size of 12 is a typical sample in sport and exercise physiological studies.

Provided by University of Portsmouth

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