

## **Lung muscle exercises boost divers' endurance**

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NEW YORK (Reuters Health) - Breathing exercises can significantly increase the respiratory endurance of divers, a new study shows.

Men who completed a half-hour session of respiratory muscle training five days a week for four weeks could swim longer until exhaustion and also required fewer breaths for underwater swims with scuba gear, Dr. Claes E. G. Lundgren of the State University of Buffalo in New York and colleagues found.

Lundgren noted in a university statement that when respiratory muscles tire, they "steal" blood flow and oxygen from the muscles moving the body, causing them to become fatigued. Training can help respiratory muscles work longer without becoming fatigued, increasing diving or swimming endurance.

Studies in cyclists, rowers and runners have shown that respiratory training improves endurance. To investigate whether these exercises also help divers, Lundgren and his team assigned 30 healthy young men to a placebo group that did a series of breath-holding exercises; a resistance respiratory muscle training group that performed exercises in which they breathed in and out against pressure; or an endurance respiratory muscle training group that performed exercises in which they progressively increased breathing frequency.

After training, the men in the resistance training group were able to swim 66 percent longer underwater with scuba gear and 33 percent longer on the surface using a snorkel, while the endurance respiratory muscle training group showed a 26-percent increase in underwater endurance and a 38-percent increase in surface endurance.

Underwater breathing frequency fell 23 percent in the resistance training group, while both groups showed increases in tidal volume, which is the amount of air they were able to breathe in and breathe out.

No significant improvements were seen in the placebo group.

"Specific respiratory muscle training could allow divers in the military, civilian rescue services, commercial enterprises and sport to perform better underwater," Lundgren concluded. He added that the exercises could also be helpful for patients with respiratory problems.

**SOURCE:** European Journal of Applied Physiology, January 2007.

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