

Short Commentary

Slow Breathing Activates the Lateral Abdominal Muscles and Improves Physical Performance

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Slow breathing activates the internal oblique muscle. Activated the internal oblique muscle improves physical performance. Slow breathing not only activates autonomic nervous activity, but also stimulates the abdominal internal oblique muscle and other lateral abdominal muscles, leading to improved physical performance.

Slow breathing affects autonomic nerve activity [1] and is often used in alternative medicine. The effects of slow breathing include suppression of increased sympathetic nerve activity [2], decreased heart rate and stimulation of the lateral abdominal muscles [3]. The lateral abdominal muscles are used as the expiratory muscles, but the main action muscles are the transverse abdominal muscle and the internal oblique muscle, and the rectus abdominis muscle is one of the accessory muscles [4]. In addition, there are differences depending on the body position, and the activity is higher in the standing position than in the supine position [5]. When slow breathing is performed, not only the agonist muscles but also the accessory muscles increase their muscle activity.

We are conducting research that contributes to improving physical performance. We will introduce two of them. The first is a study that clarified the start time of muscle activity of the trunk muscles and lower limb muscles in a quick vertical jump [6]. The subjects were 12 healthy men. When the red light up, perform the task of jumping as quickly as possible, and perform whole-body reaction time (time from light stimulation to getting out of floor on both feet) and muscle activity (internal oblique muscle, multifidus muscle, gastrocnemius muscle, biceps femoris muscle) was measured. As a result, a correlation between the speed of whole-body reaction time and the start time of muscle activity was observed in the internal oblique muscle. Those

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who started the muscle activity of the internal oblique muscle early had a short whole-body reaction time and enabled a quick vertical jumping motion. This study demonstrated that the muscle activity of the internal oblique muscle contributes to improved physical performance.

The second is a study that clarified the changes in the muscle activity of the internal oblique muscle and the whole-body reaction time before and after the slow breathing exercise [3]. The subjects were 10 healthy men. After turning on the red light 2 m ahead, the subject jump as soon as possible, and recorded the time from light stimulation to getting out of floor on both feet and the muscle activity of the right internal oblique muscle. Slow breathing exercise was performed and similar jumping task was measured. We compared the whole-body reaction time, the time when the internal oblique muscle contraction started, and the time when the internal oblique muscle activity was maximum before and after exercise. As a result, the whole-body reaction time was significantly faster after exercise. The maximum time of internal oblique muscle activity was significantly earlier after exercise. Slow breathing exercise improved the maximum timing of internal oblique muscle activity and enabled faster vertical jumping. This study demonstrated that slow breathing exercise activates the internal oblique muscle. Then, it was proved that by activating the internal oblique muscle, a faster vertical jumping motion can be performed.

It has been reported that slow breathing affects autonomic nervous activity. Depending on the body position, sympathetic nerve activity may become dominant or parasympathetic nerve (vagus nerve) activity may become dominant. Slow breathing not only activates autonomic nervous activity, but also stimulates the abdominal internal oblique muscle and other lateral abdominal muscles, leading to improved physical performance.

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