SECOND WIND express

by PAVEL TSATSOULINE

Russian Breathing Techniques
for Superior Performance & Resilience

StrongFirst.

Practice notes for the online course

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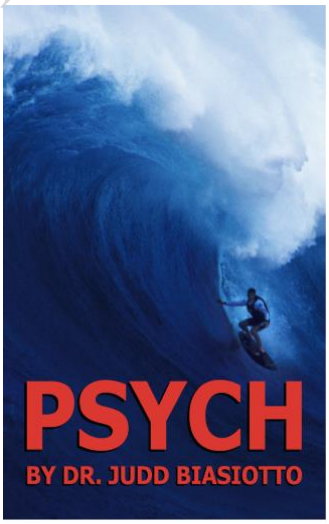
Russian Breathing Techniques for Superior Performance & Resilience

DISCLAIMER

The author and publisher of this course are not responsible in any manner whatsoever for any injury that may occur through following the instructions contained in this material. The activities—including breath holds and other breathing exercises—may be too strenuous or dangerous for some people. You should always consult a physician before engaging in them.

Autonomic effects of different breathing techniques

Sympathetic (MOBILIZE)	Parasympathetic (RELAX)
Hypocapnia	Hypercapnia
Forced exhalation	Passive exhalation
Prolonged inhalation	Prolonged exhalation
Breath holding following an inhalation	Breath holding following an exhalation
Breathing through the right nostril	Breathing through the left nostril
	Breathing ~6/min Synchronizing with Mayer waves (BP oscillation)—the rosary prayer



PSYCH
by Dr. Judd Biasiotto

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How to breathe when running

Learn how to breathe when running

"Before everything else a beginner athlete should be taught to breathe deeply and rhythmically during locomotion, engaging the so-called diaphragmatic breathing, making a complete and intense exhalation, consciously exaggerating it in the beginning. Later, in the course of repetition, an active exhalation will become an organic part of the movement skill and will not demand special attention from the athlete.

"Usually, the inhalation lasts somewhat longer than the exhalation. For instance, during prolonged running it makes sense for beginners to breathe to the rhythm of the steps: 3-4 steps—inhale, 2-3 steps—exhale. Early on it is difficult to breathe in this manner for several minutes: respiratory muscles fatigue rapidly. But with time the lung capacity increases, the respiratory muscles get stronger, the respiratory apparatus becomes more enduring." *

"Fractional breathing": run fast at a low biological cost

"Fractional breathing"—a single inhalation is divided into four equal parts coordinated with steps plus a forceful exhalation made over two steps.

This technique is modified and applied to kettlebell swings in *Kettlebell Simple & Sinister*.

"Breathing gears" in running

- At all speeds: Stretch the inhalation and the exhalation over multiple steps; exhale actively.
- Start with ~4+4 nasal breathing.
- As you speed up, switch to 4+2 fractional breathing with pressurized exhalations through closely held lips or teeth.
- As you speed up more, switch from a nasal to a mixed inhalation.
- In a race start breathing in a regime fitting the given distance from the very first step.

* Here and elsewhere, the quotations and the citations are found in the *Second Wind* seminar manual provided only to the students attending a live seminar.

How to breathe when recovering from intense exercise

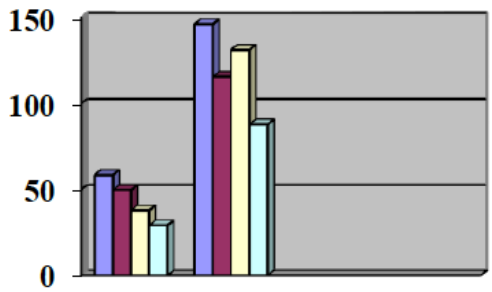
- **Emergency recovery**—a variation of fractional breathing: 4 short nasal inhalations followed by 1-2 sharp exhalation(s). Do as many cycles as needed until able to switch to standard recovery breathing.

  E.g., after a hard run or sparring session, between sets of kettlebell swings and get-ups during the timed training phase of Kettlebell Simple & Sinister*, after the kettlebell snatch event in the Tactical Strength Challenge, etc.*

- **Standard recovery**—"Darth Vader breathing." Extend an active exhalation for as long as you can without sucking wind.

  E.g., after sparring and heavy bag work, between "timeless" sets of Kettlebell Simple & Sinister *exercises, between sets in* The Quick & the Dead *regimen.*

Average time of oxygen saturation and HR recovery with different breathing patterns in grapplers after a 10min sparring



X-axis—left data set SaO_2; right HR. Y-axis—time, sec. Left to right: 1) breathing at will; 2) yoga "main breathing"; 3) Tai Chi breathing; 4) modified yoga *ujjayi* breathing (3sec—inhalation, 2sec—breath hold, 3sec—exhalation through a partially closed glottis)

"When in doubt, breathe out."

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Vital lung capacity +

Vital capacity (VC) is the total amount of air exhaled after maximal inhalation (tidal volume + inspiratory reserve volume + expiratory reserve volume). **"[VC] was a very strong predictor of cardiovascular-related death and disease**. This relationship was robust, even when factors such as initial age, smoking status, and prior pulmonary and heart disease were taken into account."

How to increase the VLC+

Traditional strength training decreases VLC. There is a direct correlation between respiratory muscles' strength and elasticity and VLC.

To develop respiratory muscles and improving rib cage mobility, during easy locomotion breathe deeply while changing rhythm: gradually increase the duration of the inhalation and the exhalation from 15sec to 45sec each. May also do different exercises while breathing deeply. Avoid hypocapnia.

"1+3" exercise ("superdeep breathing")

Advanced female cross-country skiers increased their VLC by 20% after practicing the following "1+3" exercise for 3 months.

- A slow deep inhalation while standing
- A relaxed 3sec pause without exhaling
- 3 more consecutive inhalations, maximally tensing rib cage muscles, with a 3sec relaxed pause after each
- A slow deep exhalation
- A 3sec pause while maximally relaxing the muscles of the rib cage (do not inhale)
- A full exhalation with a maximal contraction of the abdominal muscles
- 3 more consecutive forceful abdominal exhalations with a 3sec relaxed pause after each (let the cough reflex manifest)
- 3-5 breaths per set, start with 3-4 sets and build up to 10
- Recommended between sets of A+A kettlebell swings and snatches

Forced expiratory volume (FEV1)—how much air a person can exhale during a forced breath in 1sec. "**FEV (1)** adjusted by age, body mass index, systolic BP, education, and smoking status was **inversely related to all-cause mortality in both men and women**."

The quick lifts in StrongFirst style kettlebell training are very effective at increasing one's FEV. See the **StrongFirst Kettlebell Fundamentals Online Course**.

Breathe less

Beware: hyperventilation

Hyperventilation (hypocapnia)…

- Suppresses the Verigo-Bohr effect and hampers oxygen release in tissues.
- Reduces blood circulation by ~1/3.
- Decreases the erythrocyte volume.
- Increases the tonus of the coronary arteries.
- Causes muscle convulsions and spasms; in some subjects after just 1-2min of hyperventilation.
- Increases the concentration of adrenaline and noradrenaline in the blood plasma.
- Leads to arrhythmia, cardiovascular insufficiency.
- As a component of the stress reaction, potentiates ischemic damage of organs.
- Increases the breath hold time by ~1.5 times—but may be lethal to free divers.
- If done before a hard breath hold, leads to pathological levels of hypoxia.
- Activates glycolysis to compensate for the effects of respiratory alkalosis.

Breathe more—occasionally

Since the 1920s Soviet scientists have recommended to do all exercises that intensify breathing on a background of a metabolic load. When the respiration is intensified in response to increased metabolic demands and there is no alkalosis, you are performing *hyperpnea*, as opposed to *hyperventilation*.

A technique for intensifying hyperpnea during exercise to train the respiratory muscles and to develop better breathing skills:

Introduce multiple bouts of hyperpnea into steady state exercise at 80-85% MHR. Start with 5-10sec bouts and build up to 30sec and more. Before each hyperpnea bout perform a breath hold.

Focus on increasing the respiration rate without switching to shallower breathing. The increased respiration rate should lead to an involuntary increase in the movement frequency and thus an increase in the speed of locomotion.

StrongFirst Hypoventilation Training

A clearance from a physician before undertaking any type of breathing exercises, including breath holding, is mandatory!

Never do breath holding exercises in the water without a coach or a dive buddy!

Hypoxic loads

To refresh your memory about the benefits of hypoxic training, click here and scroll down

I. Relax before a breath hold, physically and mentally. During a BH, maintain this relaxation, no matter how difficult it is. Treat the BH as a practice of calm under pressure.

II. Keep an impassive face—always.

III. Do you BH seated (in a chair, in a lotus, half lotus, or *seiza*). Maintain a perfect upright posture. Pinch off your nose with your fingers or use a swimmer's nose clip.

IV. Do your BH after a normal passive exhalation and without hyperventilation.

V. Empty your mind. Start by "forgetting to breathe." When your diaphragm starts contracting, ignore it. When the difficulty increases, swallow. Towards the end of the BH, imitate inhalation by elevating your rib cage.

VI. Always use a timer but do not look at it continuously.

VII. Do not perform the Valsalva maneuver or tense your muscles to extend the BH.

VIII. After a BH actively exhale the little air you have held (to assert self-control and untrain the gasp reflex), then enjoy one pleasant large yawn like inhalation followed by a sign of relief (to condition a reflex associating a BH with something pleasant).

IX. Do hypoxic BH 3-6 days a week.

X. Do not practice BH after eating, drinking caffeinated drinks, or a demanding athletic training session.

XI. Do not practice BH before a high intensity power or strength training session.

XII. Keep in mind that BHs are a training load placing demands on your body and mind. Use your judgment and plan your other training accordingly.

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XIII. Daily volume is 3-15 BH (including the "breathe-up" reps).

XIV. Vary the volume according to the Δ 20 principle (a 20% minimal change from day to day).

XV. Rest between BH is 3-5min (e.g., once a BH every 5min).

XVI. You may perform all daily volume at once, separate it into several series throughout the day.

XVII. Start each series with a "breathe-up" of 2-3 easier holds.

XVIII. Program your "breathe-up" sets based on a percentage of your maximal pause. The way a lifter keeps adding a pair of standard size barbell plates when ramping up for the day's heavy sets, use standard jumps in your "breathe-ups." ~1/3, 1/2, and 2/3 of your maximal pause are recommended.

XIX. Include the "breathe-ups" into the daily volume total.

XX. Generally, it takes RPE~9 on a 1-10 scale to reach the target level of oxygen desaturation (SpO_2 77-89%); aim for this effort level in most work sets.

XXI. You may use a pulse oximeter to calibrate the desired effort level to reach SpO_2 77-89%. (Note that a finger pulse oximeter's SpO_2 reading may be delayed by up to 30sec, which makes it useless for monitoring the hypoxic load in real time.)

XXII. For a number of reasons, your BH ability will vary from day to day. Do not be concerned; even if your times are lower, you have likely reached a sufficiently low oxygen saturation, as long as you have kept the RPE~9 for the work sets.

XXIII. The general trend is for the BH times to increase and then stabilize at a given RPE as the session progresses. If the apnea duration drops at a given RPE or it takes a greater effort to maintain the same duration, the load is excessive. Stop for the day and in the future do your best to stop before reaching this drop off point.

XXIV. Test your maximal pause on a day when you are on a roll and are certain of making a 5sec PR. Experiment with a longer rest period before the PR attempt—but keep it <10min.

XXV. Test your Hench test once a month under standard conditions.

XXVI. Hypercapnic training is recommended as a complimentary modality to hypoxic training: improved CO_2 tolerance enables a longer BH and thus a deeper hypoxia. Think of hypercapnic training supporting hypoxic training as muscle hypertrophy serves neural strength training.

StrongFirst Hypoventilation Training

Hypercapnic loads

- Hypercapnia is appropriate in many circumstances:

  - As a part of a warm-up for endurance exercise (not power or strength)
  - During acute recovery from exercise that has elevated the heart rate
  - Within a cool-down from any type of exercise
    (mix with static stretching, "breathe through" tight or tired muscles)
  - During locomotion endurance exercise (walking, running, bicycling, swimming)

    Again, ***never hold your breath in the water without a coach or a dive buddy!***

  - During rest periods between A+A sets (not between Q&D sets)
  - Before sleep
  - When you want to relax
  - When you want to get warm

  Do not do hypercapnic exercises before a high intensity power or strength training session.

- There are innumerable ways to reach hypercapnia. E.g., slow breathing techniques practiced during meditation, added dead space training such as straw breathing,"RPM breathing," breath holds according to free divers' hypercapnic apnea tables, etc.

  Do not induce hypercapnia by limiting the respiration volume, as this may lower your VLC.

- When inducing hypercapnia through breath holds, do it only following a normal exhalation. There is no need to pinch your nose.

- Hypercapnic exercises are generally pushed only to the "edge of pleasure"—as opposed to the hard efforts in hypoxic holds.

- Adjust the load by experimenting with the duration (or sensation) of "no breath holds" and the number of normal breaths between them to comfortably carry on for several minutes until you feel warm and relaxed.

- We are not familiar with any data suggesting restricting the volume of hypercapnic loads, provided one does not experience unpleasant symptoms associated with CO_2 toxicity such as headaches and alcohol like symptoms.

Please send your *SECOND WIND express* success stories to
success@strongfirst.com

About StrongFirst

StrongFirst is a global school of strength.

We are experts at making the weak strong and the strong stronger.

On top of strength, we coach "strong endurance" and resilience for most demanding applications.

Distilled from the best of the Russian and Western sport science, our methods have a proven record with professional athletes, tier one special operators, as well as regular folks who have decided to be weak no more.

Our instructor team includes national team coaches, national champions, former military special operators, first responders, law enforcement officers, elite martial artists, national team doctors, and other high-end professionals.

Our school is elite but not elitist. The price of admission is a strong spirit and obsessive attention to detail.

Join our FORUM, a classy online joint where we help each other get stronger, today.

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