

Contraindications To Breath Hold Training

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Contraindications for Breath-Hold Training

Introduction

Breath-hold training, also known as apnea training, involves voluntarily holding one's breath for extended periods, often used in freediving, sports, and therapeutic practices to enhance oxygen efficiency, air hunger tolerance, and mental resilience. This practice induces significant physiological changes, including hypoxemia and hypercapnia, which can pose serious risks for certain individuals. This document aims to educate breath-hold training facilitators and coaches on potential contraindications and associated health risks. It is not intended as medical advice but provides the rationale for these contraindications to ensure safe practice.

Individuals interested in breath-hold training should undergo a thorough health screening addressing the contraindications outlined below. Those with absolute contraindications should refrain from participating unless they obtain written consent from a physician and a medical waiver, which does not absolve facilitators of their responsibility to ensure safety and provide due diligence. Relative contraindications indicate conditions where caution is warranted, and specific protocols should be implemented to enhance safety, such as increased observation or modified training guidelines.

Absolute Contraindications

- 1. Cardiovascular Disease Including Recent Heart Attack or Stroke**
 - **Reason:** Breath-hold training induces parasympathetically-mediated bradycardia and peripheral vasoconstriction, increasing cardiovascular strain (Elia & Lemaître, 2025). In individuals with a history of heart attack or stroke, these changes can compromise oxygen delivery to the heart and brain, increasing the risk of adverse events such as myocardial infarction or cerebral ischemia. The elevated intrathoracic pressure during breath-holding can further stress an already compromised cardiovascular system.
- 2. Uncontrolled High Blood Pressure**

- **Reason:** Breath-holding significantly increases blood pressure due to sympathetic activation and intrathoracic pressure changes (Lemaitre et al., 2015). For individuals with uncontrolled hypertension, this can lead to hypertensive crises, vascular rupture, or other cardiovascular complications. The risk is heightened during prolonged or repeated breath-holds, which amplify cardiovascular stress.

3. Severe Arrhythmias

- **Reason:** The bradycardic response and potential hypoxemia during breath-holding can disrupt cardiac rhythm, particularly in individuals with pre-existing severe arrhythmias (Elia & Lemaître, 2025). This may trigger life-threatening arrhythmic episodes, as the heart's electrical stability is compromised by altered oxygen and carbon dioxide levels.

4. Diagnosis of Aneurysm in the Brain or Abdomen

- **Reason:** Breath-holding increases intrathoracic and intracranial pressure, which can alter blood flow dynamics and stress weakened vessel walls in aneurysms (Elia et al., 2021c). This heightened pressure may increase the risk of aneurysm rupture or dissection, posing a life-threatening risk, particularly for cerebral or abdominal aneurysms.

5. Pregnancy

- **Reason:** Breath-holding reduces oxygen availability, potentially compromising fetal oxygen supply and leading to hypoxemia (Elia & Lemaître, 2025). The associated hypercapnia and cardiovascular stress can further impact maternal and fetal health, particularly in high-risk pregnancies, increasing the risk of adverse outcomes such as fetal distress or preterm labor.

6. Recent Panic or Anxiety Attack Episode

- **Reason:** Breath-holding can induce intense physiological and psychological stress, potentially triggering panic or anxiety attacks in individuals with a recent history of such episodes (Bouten et al., 2020). The sensation of air hunger and hypoxemia may exacerbate anxiety, leading to emotional

distress or loss of control during training.

7. **Epilepsy and/or Seizures**

- **Reason:** Hypoxemia from breath-holding lowers the seizure threshold, increasing the risk of seizures in individuals with epilepsy (Elia & Lemaître, 2025). Changes in cerebral blood flow and electrolyte imbalances due to hypercapnia further heighten this risk, making breath-hold training unsafe for those with seizure disorders.

8. **Prior Diagnosis of Bipolar Disorder, Schizophrenia, or History of Psychosis**

- **Reason:** The intense physiological changes and altered states of consciousness induced by breath-holding can destabilize mental health in individuals with bipolar disorder, schizophrenia, or a history of psychosis (Elia et al., 2021c). These conditions may be exacerbated by hypoxemia-induced perceptual changes, potentially triggering mood swings, psychotic episodes, or emotional distress.

9. **Being in or Near Water Without a Partner**

- **Reason:** Breath-holding in or near water without a trained partner significantly increases the risk of hypoxic blackout, which can lead to drowning (Lindholm, 2007). The absence of immediate supervision prevents timely intervention, making this practice extremely dangerous and potentially fatal.

10. **Engaging in Breath-Holding Without Education and Understanding**

- **Reason:** Lack of proper education on breath-hold techniques, physiological responses, and safety protocols increases the risk of adverse events, including hypoxic blackout and injury (Sperlich et al., 2015). Uninformed practitioners may fail to recognize warning signs or implement necessary precautions, compromising safety.

11. **Prior Hyperventilation Before Breath-Holding Near Water**

- **Reason:** Hyperventilation before breath-holding reduces carbon dioxide levels, delaying the urge to breathe and

increasing the risk of hypoxic blackout without warning (Elia et al., 2024b). This is particularly dangerous near water, as it heightens the likelihood of unconsciousness and drowning.

12. **Chronic Obstructive Pulmonary Disease (COPD)**

- **Reason:** Breath-holding exacerbates respiratory distress in individuals with COPD due to compromised lung function, leading to severe hypoxemia or hypercapnia (Elia & Lemaître, 2025). The increased intrathoracic pressure and oxygen desaturation can precipitate respiratory failure or acute exacerbations.

Relative Contraindications

1. **Mild to Moderate Cardiovascular Issues**

- **Reason:** Individuals with controlled hypertension or stable heart conditions may still experience cardiovascular strain during breath-holding, requiring medical clearance and supervision to ensure safety (Elia & Lemaître, 2025). Modified protocols, such as shorter breath-holds, may be necessary.

2. **Recent Surgeries (Within 3–6 Months)**

- **Reason:** Recent surgeries may impair healing or involve cardiovascular stress, and breath-holding can strain surgical sites or increase intrathoracic pressure, risking complications (Elia et al., 2021b). Consultation with a physician is required before participation.

3. **Presence of Acute Illness or Symptoms**

- **Reason:** Acute illnesses increase physiological stress, and breath-holding may exacerbate symptoms such as shortness of breath or fatigue, delaying recovery (Elia & Lemaître, 2025). Training should be postponed until full recovery.

4. **Fatigue or Dehydration**

- **Reason:** Fatigue or dehydration reduces physiological reserves, increasing the risk of dizziness, fainting, or hypoxic blackout during breath-holding (Elia et al., 2022a). Participants should

be well-rested and hydrated before training.

5. Fasting

- **Reason:** Fasting can reduce energy reserves and increase the risk of hypoxic blackout, particularly in untrained individuals (Elia et al., 2022a). However, trained and expert breath-hold trainers may safely incorporate fasting under controlled conditions with proper supervision, as they are accustomed to managing physiological stress. Untrained individuals should avoid fasting before breath-holding to minimize risks.

Special Consideration: Mild Asthma

- **Note:** Mild asthma is not considered a relative contraindication for breath-hold training, as some individuals may tolerate it without adverse effects. However, caution is advised due to potential respiratory stress from hypoxemia or hypercapnia (Elia et al., 2021c). Participants with mild asthma should proceed under supervision, bring an inhaler, and be monitored for symptoms such as wheezing or shortness of breath. A tailored approach with shorter breath-holds may be necessary to ensure safety.

Precautions and Recommendations

- **Medical Clearance:** Individuals with absolute or relative contraindications must consult a healthcare provider before engaging in breath-hold training.
- **Supervised Practice:** All sessions, particularly in water, should be supervised by a trained professional to monitor for signs of distress or blackout (Elia & Lemaître, 2025).
- **Pulse Oximetry:** Use validated pulse oximeters to monitor oxygen saturation, with a safety threshold to abort breath-holds if levels drop critically (Shi et al., 2022).
- **Avoid Risk Factors:** Refrain from hyperventilation, intense exercise, or fasting (except for trained experts under supervision) before breath-holding to minimize blackout risk (Elia et al., 2024b; Lindholm & Gennser, 2005).

- **Gradual Progression:** Start with short, submaximal breath-holds and progressively increase duration under supervision to build tolerance safely.
- **Safe Environment:** Conduct training in controlled settings, avoiding solo practice, especially in water, to prevent drowning or injury.
- **Education:** Participants must be educated on breath-hold physiology, risks, and safety protocols to ensure informed and safe practice.

Breath-hold training offers potential benefits but carries significant risks for individuals with certain medical or psychological conditions. Rigorous screening, professional supervision, and adherence to safety guidelines are essential to mitigate risks and ensure a safe training experience.

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