

## Surf Syncope

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Your chances of losing consciousness during a surf hold down can be reduced by maintaining good physical fitness and cardiovascular endurance. The moments leading up to a hold down rarely offer sufficient time to gather your thoughts. Quite the opposite, just before you get pounded (hopefully not against your board or fins) you were thinking about surfing.

Wipeouts happen all the time and usually the wave just brings you back up to the surface and you are able to swim out of the impact zone. A couple things you can do when before going under are: take a deep breath and protect your head. The ocean floor, rocks, and reef will always be the most common surfing threat as they can cause serious head and neck injuries.

Relax, conserve your energy, and don't panic. For longer hold downs trying to limit oxygen consumption is about all you can do. Training and exercising to improve your cardiovascular fitness will provide the greatest overall benefit as you prepare for bigger waves.

### Causes of Loss of Consciousness / Syncope:

-Hypoxia (decrease oxygenation to the brain). There is a wide range in the amount of time that a healthy individual can hold their breath (30 seconds on the lower end up to over 6 minutes for highly trained divers). The length of time is also dependent on your level of activity – higher metabolic rate equals more rapid oxygen consumption. Nutritional status can also play a part, a study from the European Journal of Sports Science found that fasting (not eating) overnight can improve an elite diver's breath holding performance<sup>1</sup>.

-Head injuries are probably the easiest to conceptualize, you hit your head, maybe see a big flash of light, and then pass out / lose consciousness.

-Vasovagal syncope – exposure to a stimulus like extreme pain, prolonged standing when it's hot out, or seeing blood can trigger a reflex controlled by the brain stem which causes loss of consciousness<sup>2</sup>. In the vasovagal reflex a

decreased heart rate and dilation of blood vessels causes a rapid drop in blood pressure and decreased blood flow to the brain<sup>3</sup>. The decrease blood flow to the brain leads to a temporary shutdown of the reticular activating system<sup>4</sup> (part of the brain that keeps you awake).

-Vasomotor (blood vessel dilation) - a sudden drop in blood pressure can occur after standing up from seated or laying position (also known as orthostatic hypotension). In orthostatic hypotension the body fails to constrict the blood vessels enough to maintain a normal blood pressure and blood flow to the brain. Contributing factors can be: dehydration, medications that causes the blood vessels to dilate, and neurologic complications of diabetes<sup>2</sup>.

-Excessively slow heart rate (brady-arrhythmia - less than 40 beats/min). The heart rate is too slow to keep enough blood flowing to the brain. This is usually caused by a cardiac (heart related) medical condition – or possibly a medication side effect.

-Excessively high heart rate (tachy-arrhythmia – great than 100 beats/min resting heartrate). The heart is beating too fast to efficiently pump and maintain adequate blood flow to the brain. Also usually caused by a cardiac condition – or medication side effect.

All of the causes of syncope listed above can contribute to passing out during a hold down. Our best advice is to exercise every day to maintain strong cardiovascular fitness.

**References:** 1. Schagatay E and Lodin-Sundstrom A. Fasting improves static apnea performance in elite divers without enhanced risk of syncope. *Eur J Sport Sci.* 2014; 14 Suppl 1:S157-64.

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3. Alboni P. The different clinical presentations of vasovagal syncope. *Heart.* 2015; May 101 (9):

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