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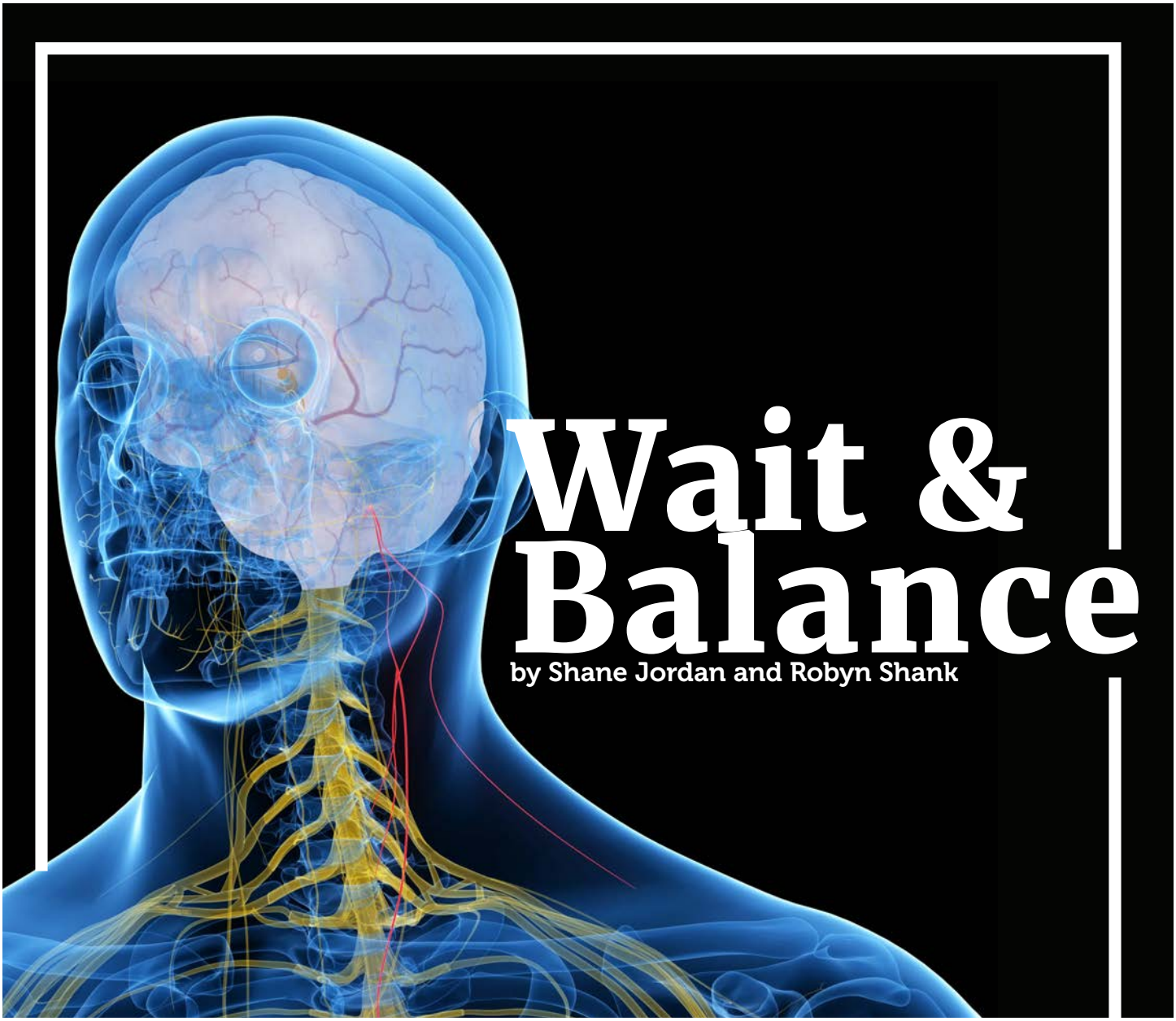
# POPA

***wait & balance***
HRV AND THE IMPACT ON OUR BODIES

TRUST BUT VERIFY
**WHAT IS YOUR PT6 UP TO?**

SPRING FLYING
TAKING CONTROL OF THE WEATHER



# Wait & Balance

by Shane Jordan and Robyn Shank


In the Winter 2021 issue of POPA Magazine, Robyn and Shane co-authored "We Might NOT Make It." The article featured a true flight story involving unexpected weather conditions that produced acute stress for the pilots. This article continues to explore vagal tone through daily measurements taken by wearable devices. Wearers use the data for goal setting and improvement.

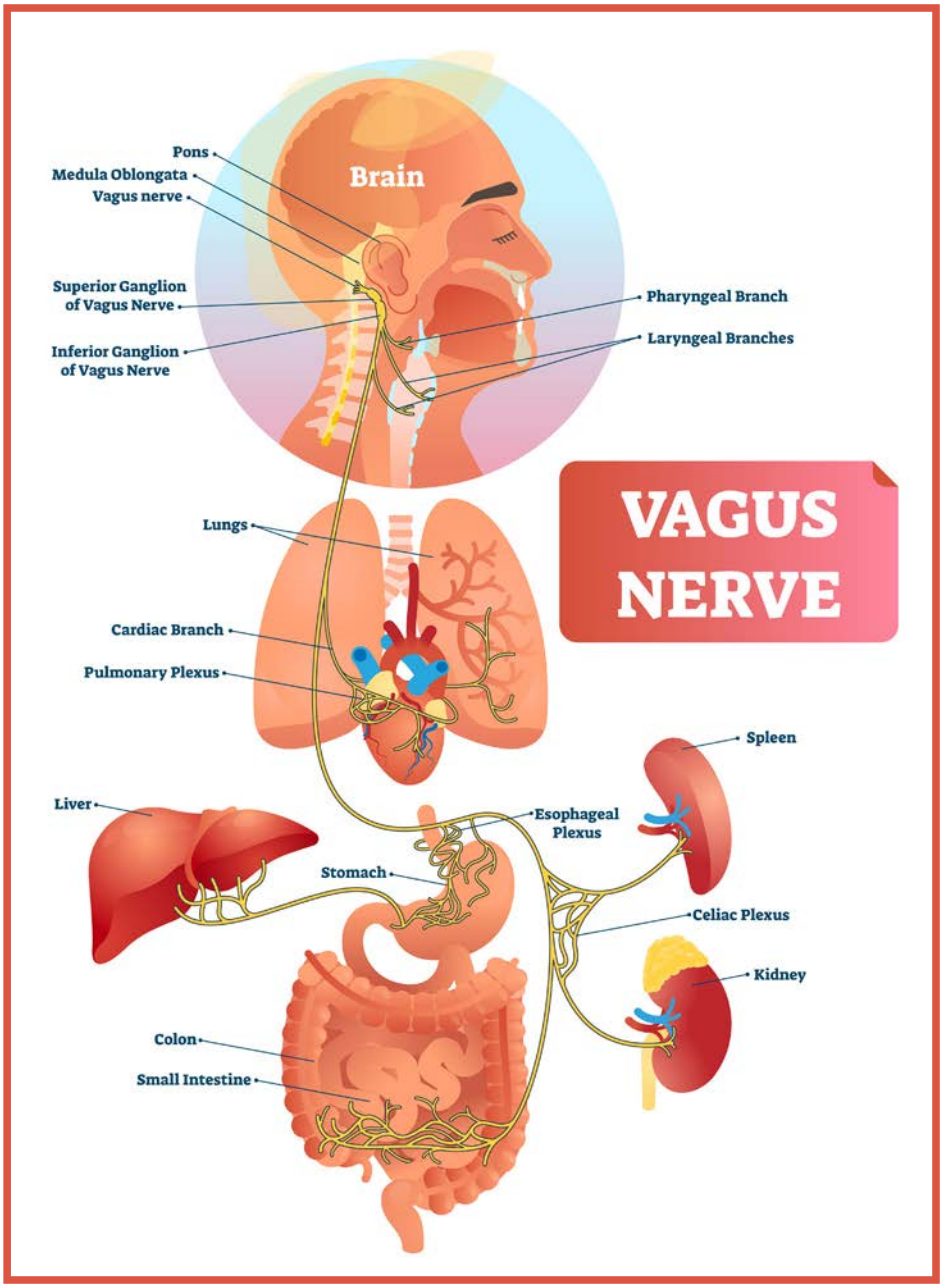
Remember, we have two branches within our autonomic nervous system: the sympathetic (fight or flight) and the parasympathetic (rest and digest). Think of these two systems as needed to balance each other on a teeter-totter: the parasympathetic nervous system signals counter to the sympathetic nervous system and vice-versa. The counter-play between the two is our heart rate variability. When one nervous system has a stronger signal than the other, like when threatened, we find ourselves in a heightened state of fight or flight. The parasympathetic nervous system resets our fight or flight response once the threat is gone. If we have a poor vagal tone, our parasympathetic nervous system cannot reset these efforts easily, and chronic stress develops, which ultimately leads to chronic diseases.

We refer to the vagus nerve's ability to reset the nervous system's fight or flight response as its vagal tone. A strong vagal tone performs the reset task much more efficiently and effortlessly than a weaker one. One way to measure your vagal tone and set improvement goals is through our heart rate variability (HRV). The higher HRV score, the better.

So, what is HRV, and isn't it only necessary for elite athletes? Your HRV score is the variance in time between the beats of your heart. If your heart rate is 60 beats per minute, that doesn't mean it is beating exactly once every second. Instead, the heart beats with a unique variance to you. Factors that influence this score are your current vagal tone, gender, age, genetics, sleep quality, sleep consistency, sleep quantity, food quality, hydration levels, and the amount of stimulants and alcohol you consume per day. Yes, that extra cup of coffee or glass of wine can wreak havoc on your HRV score. And no, it is no longer a metric reserved for elite athletes. It is a marker of good health and wellbeing for all of us.

Think of your vagus nerve as the wire between the landing gear proximity sensors and the computer, such as the MAU in the PC-12 NG. Suppose the wires have excessive resistance. In that case, the computer doesn't know when to stop activating the hydraulic pump or individual electric gear actuators once the gear is in the proper position. It would fail to get the "stop" signal on time. Similarly, when the vagus nerve has a lot of "resistance," the parasympathetic nervous system's message to calm down or rest is delayed or diminished.

The greater your HRV score (variance between heartbeats), the more prepared your body is to execute at a higher level when called upon by circumstances, in reference to its ability to respond on-demand to its environment.



Ultimately, this means that your autonomic nervous system is balanced and that your body can adapt to its environment as needed with either fight-or-flight or rest and digest response. Going back to past aerodynamics studies, we want an aircraft with positive static and dynamic stability, meaning it will try to go back to its original position when disrupted. Similarly, we want this balance physiologically as it provides resiliency and adaptability. Without it, decisions can be reactive and not well thought out. This is why there is a good saying: "In an emergency, the first thing to do is count to ten." Counting to ten gives the parasympathetic nervous system a chance to reset the alarm and allow clearer thinking. Your vagal tone's strength is essential here since it represents the transmission line through which these reset signals travel.

Tracking our HRV score is a new way of measuring wellbeing. Today, many wearable devices such as watches, straps, and rings make this very simple. Armed with these innovative health devices and metrics, we can begin to understand our bodies better on a day-to-day basis and plan for better readiness and recovery. Using the data over time, individuals can understand what helps or hinders readiness and make informed decisions on changing our daily routines for maximum health, wellness, and safety. Some wearable devices that track HRV scores are the Apple and Garmin watches, Oura Ring, and Whoop strap. As pilots, our HRV gets measured during our flight physicals using an electrocardiogram test, but that is required only of pilots age 40 and older. Since the FAA values this measurement, it would be nice to confidently go into our medical exams knowing that we have a higher HRV score (more significant variability between our heartbeats) to recover more efficiently from prior accumulated stress. Possibly one day, pilots will incorporate their stress recovery scores and sleep quality measurements into Flight Risk Assessment Tools (FRATs).

Besides tracking our HRV score, we want to strengthen our vagal tone. Fortunately today, we know a lot more about doing that and why it is essential (ability to reset the fight or flight response). Some improvement methods are cold exposure — such as a cold plunge or finishing your shower with cold water — deep belly breathing, chanting, singing, humming, meditation, massage, acupuncture, hydration, quality sleep, omega-3 supplementation, or decreasing caffeine and alcohol. You can also improve your vagal tone by stimulating it through calming vibrations produced by a passive, wearable device such as Apollo, Healey, and My String.

Robyn and I have been wearing the Oura Ring for a couple of months. With targeted improvement efforts, we have seen our HRV score increase from their baselines. We often compare our improvements for some competitive fun. Robyn always has a higher HRV score, but who is keeping track? This most likely relates to better REM and deep sleep numbers. She doesn't experience the sleep pattern disturbances that I do, given my intensive travel schedule.

What was surprisingly insightful was to see our HRV scores decrease (not desirable) after an evening of consuming wine. Interestingly, Robyn's readiness/recovery score (determined by resting heart rate, HRV balance, sleep balance, and others) was lowered for seven days following her recent COVID vaccine because her body temperature remained elevated throughout the night. Her Oura ring app advised to take it easy rather than take on the world.

As health science and technology innovations continue to develop, we will gain a deeper understanding of our bodies' needs and choose the behaviors that best support these needs in the moment. This could ultimately impact our mental health as well. We've known for some time that how we treat and reset our bodies, from exercise to sleep to what we consume, directly affects our short-term and long-term health; now we have the evidence on our fingers or wrists.

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