

## Outrunning the Fear

---

Milton Teske, MD

Anxiety is a natural response to a threatening situation. The sympathetic nervous system becomes quite active. This is a network of nerves that can speed up the heart, raise the blood pressure, the brain becomes more alert, active and focused, and muscle fibers become tenser ready to fire into action. It stimulates the adrenal gland that releases not only adrenalin but also dozens of other messenger molecules into the blood. As they circulate through your body they further extend and prolong your response to the threat. Your glucose and triglyceride levels shoot up providing fuel for whatever action you might need to take. Blood capillaries in the skin shut down to prevent bleeding from any lacerations or abrasions you might sustain. Blood to the stomach and other digestive organs is shut off and sent instead to your major muscle groups – you can digest your meal later – now is the time for action.

But all of this nervous activity can accelerate into a full-blown panic attack as well. Profuse sweating, severe chest pains, or the brain circuits can become overloaded and paralyzed with fear. The beneficial responses have morphed into a painful and dysfunctional mess. Every shift I work in the ER will present me with at least a couple of patients who are there because of symptoms of a panic attack of some kind.

But if you are anxious and worried when there is no real threat or if you regularly are responding disproportionately to minimal or imaginary threats – especially to the point where you can't function normally then you have a clinical anxiety disorder. About 40 million Americans (about 18% of the population) suffer from some degree of an anxiety disorder. And

almost all of us have some varying degree of anxiety that affects us in a negative way from time to time.

When a patient shows up in the ER with a panic attack the frontline pharmacologic treatment is the benzodiazepines (Valium, Ativan, Xanax), powerful drugs that are very effective in shutting down the neural networks of anxiety and fear. But if used on a regular basis these drugs are very addicting with a withdrawal syndrome that is much worse than for opiates like morphine or heroin.

Another medication we sometimes use is called a beta-blocker. This class of medications blocks the receptors for adrenalin (epinephrine and norepinephrine) thus blocking the sympathetic nervous system which is what has become over activated in anxiety attacks and disorders.

The psychiatrist's medications of choice for treating the various anxiety disorders are the SSRIs (Prozac, Zoloft, Paxil, etc.) these drugs strengthen the neural circuits of calmness, peacefulness and that everything is OK feeling. They are also used extensively as antidepressants. But, as any of you who are on these medications know – they also affect many other neural circuits in the brain as well producing many side effects. Discontinuing these medications once your body has become accustomed to them can also be quite difficult.

But medical scientists are now confirming with multiple studies that there is another powerful agent available for treating anxiety, panic and anxiety disorders. This agent is ***Physical Exercise***. In comparison studies it has been shown to be as powerful and effective as any of the pharmacological agents we are currently using without any of the negative side effects.

Most of us intuitively know that if we are stressed out or upset we can go for a walk or go running or workout at the gym and afterwards the anxiety symptoms seem to just melt away. But now therapists are starting to learn that they can use exercise either alone or in combination with medications and or cognitive behavioral therapy and it will reliably produce excellent results. One woman who's life was completely paralyzed by her anxiety attacks started jumping rope every time she felt one coming on and it not only relieved it as

effectively as if she had taken an Ativan but over several years time it significantly decreased the attacks to the point where she could lead a fairly normal life.

We now understand some of the mechanisms whereby exercise exerts such a powerful effect upon the brain:

One of the mechanisms has to do with a substance called GABA (*gammaamniobutyric acid*). This is a neurotransmitter produced in the brain that causes a relaxing calming effect the opposite of anxiety. Our powerful benzodiazepines like Ativan work by binding to the GABA receptors in the brain. But with exercise there is a natural surge of GABA producing the same powerful calming effect with out any of the side effects. So next time instead of an Ativan go for a run or swim a few laps.

With aerobic exercise another factor comes into play. When the heart is beating hard its cells make and release a molecule called ANP (*atrial natriuretic peptide*). This ANP molecule from the heart passes though the blood stream to the brain and crosses the blood brain barrier and goes directly to special receptors in the hypothalamus. There it slows down the release of CRF, which has the job of accelerating the release of stress hormones from the adrenal glands that are responsible for producing many of the symptoms of anxiety – thus it has the effect of putting the brakes on the whole anxiety response system. In studies, giving an injection of ANP to people having a panic attack produced a powerful calming effect. We also know that ANP slows down the sympathetic nervous system significantly reducing the flow of epinephrine in the body and reducing the heart rate.

ANP also reduces cortisol (a major stress hormone) in the blood. Did you know that pregnant women naturally triple their levels of ANP during pregnancy? Apparently God designed this to protect the sensitive developing brain of the baby from the damaging effects of too much cortisol. People with a damaged heart in congestive heart failure produce very high levels of ANP, which can reduce the stress of epinephrine and cortisol on the already weakened heart – God knew that a damaged heart needed as much rest as possible.

Exercise increases Serotonin levels in the brain. Serotonin works at many synapses in the anxiety circuits of the brain by producing calming, peaceful, relaxing feelings instead of the fearful anxiety moods. The SSRI drugs we talked about work by increasing serotonin in the brain – but they do it all over producing many side effects while exercise produces it only where it is needed for the calming antianxiety effects.

Exercise also decreases muscle tone – thus relaxing the muscles. People with anxiety have overactive electrical activity in their muscle fibers – muscle tension. This tension can produce further feelings of anxiety as well as tension headaches. But like the beta-blocker drugs, exercise can have a tranquilizing effect on muscle tension.

Exercise stimulates the sympathetic nervous system in a good way allowing the brain to learn an alternative pathway response so that it does not have to associate increased heart rate etc. with fear. Thus we can learn new positive responses to replace the old panic associations. And remember BDNF (Miracle-grow for the brain) we wrote about in a previous article? Well the increase of BDNF with exercise makes it much easier to grow new synapses so we can learn the new healthy responses to replace the old anxiety responses.

So if you suffer from a little anxiety at times or have a serious and debilitating anxiety disorder remember that exercise is one of the most powerful drugs you can take for this. It produces real biochemical effects in the brain as effective as any pharmaceutical agents that could be prescribed for you – and without the side effects. If you are weakened or paralyzed by fear or anxiety – know that with God’s help you can literally outrun the fear.

“They that wait upon the LORD shall renew their strength.... they shall run.... and they shall walk.”