

The Effects of Stress on the Human Body

By Dr. Gideon Orbach, DC

The human body is a dynamic entity. We are undergoing constant changes, motions, and processes at the smallest cellular level at all times. These events may be wide ranging, yet they are dependant on our body's systems to be able to work together.

For example, the ability think through a logical problem is a neurological event, a brain based exercise. However, it isn't that simple. Our neurotransmitters, chemicals which deliver a message from one nerve to the next throughout our bodies and into our brain, and back to our bodies are actually synthesized, or developed, in our gastro-intestinal tract (Kandel, Schwartz, and Jessell page 933).

In order for these chemical substances, neurotransmitters, to be developed, several conditions have to be met. First of all, the intestines have to function and be free of a disease that could potentially inhibit this event. This means, at the very least, that blood has to be flowing, and that blood has to be relatively free of toxins. It also means that our internal body temperature has to be appropriate for this to occur. Furthermore, we have to consume the kind of food(s) and nutritional support necessary to provide our intestines with the raw materials to create neurotransmitters, and we have to use different nutrients plus oxygen to make the energy to achieve this task. Finally, there has to be communication between the brain and the intestines (through pre-existing neurotransmitters) to say, "Build us the following list of specific neurotransmitters, we are running low and we have a logical problem to solve."

In summary, there has to be a communicated need, raw material from both food and oxygen, a transportation system (blood), and a healthy environment in order to initiate activation.

All of the bodies systems work in this same way: they are reliant on one another. If we were not talking about constructing neurotransmitters to achieve logical thought, we could put the same information in the context of sending a message to the bone marrow in order to produce new white blood cells in order to drive the immune system of fight off an impending infection (Campbell page 832). Maybe we can substitute one bodily system for another, depending on the immediate need of which biochemical reaction will occur, because they don't all occur in the same places, but we can't substitute the principle that we are a whole that is dependant on many parts working together.

Once again, the essential ingredients are:

- (1) The ability to communicate need, a message from the brain to the body using neurotransmitters.
- (2) Raw materials: nutritional substances to combine in order to form what we need and oxygen. Oxygen is absolutely vital for the creation of energy to initiate all of these processes
- (3) A healthy environment for these processes to occur in; disease will alter our ability to achieve what we want.
- (4) A transportation system. For our purposes that is circulation; our blood carries substance from one body part to the next.

What happens if we have a breakdown of one or more of our four criteria? If we are compromised to the point that we are not able to function effectively on our four criteria, then we simply won't be healthy.

Let us consider stress and the ramifications stress may have on our bodies and the interdependent systemic parts. (1) Stress is an applied force or system of forces that tend strain or deform a body. (2) The resisting force set up in a body as a result of an externally applied force. (3) A physical or psychological stimulus that can produce mental tension or physiological reactions that may lead to illness.

From this definition, we can see that the body doesn't recognize the difference between physical stress or emotional/ psychological stressors. This is true by definition, and by practical application.

When the body is subjected to stress, be it psychological/emotional or if it is physical, the body will have the same reaction. Chiefly, cortisol levels are raised. Cortisol activates the sympathetic nervous system, which is our "flight or fight" response (Desposoulos and Silbernagl, pages 50-54).

When the sympathetic nervous system is activated, it takes the following action on certain organs and body systems:

The eyes will dilate and it will be harder to accommodate for gauging distance. The heart will beat at an accelerated rate with greater force, and blood vessels will constrict, raising blood pressure and making it more difficult to supply end organs with the necessary nutrients to transport throughout the body via the circulatory system. Furthermore, motility in the digestive tract is inhibited which means that digestion is slowed down (Desposoulos and Silbernagl pages 53-54).

Activation of the sympathetic nervous system by mechanisms brought out by stress can also lead to physical pain. This is because of a phenomenon called ephaptic transmission (Hooshmand page 17). An ephaptic connection is a spontaneous connection occurring between the activated sympathetic nervous system and pain sensors in the nervous system. This phenomenon is able to occur because pain nerve endings are free in the sense that they have no covering and the sympathetic nervous fibers are able to bind to the free nerve endings because they are so close in size and diameter.

From this, we can see a clear mechanism why both physical and psychological/emotional stress can cause pain in the body. The important thing to realize here, is that the previously discussed ephaptic connection occurs within a nerve and not within a specific body part. This means that many people will experience pain that they can't account for. As a direct result of stress, one may experience lower back pain for example. The patient will then visit a doctor with this complaint and be unable to document an injury. The doctor will make a series of unsuccessful suggestions because this is not a case of mechanical lower back pain; this is a case of stress induced neurological pain manifesting in the lower back, and it requires a non-conventional treatment.

Furthermore, as cortisol builds up, it has a negative effect on the regulation of insulin release. This means that a stressed patient is more likely to experience cravings for sweetness or sugar, and this will be stored as body fat because it won't be digested or metabolized at the appropriate rate due to the inhibited digestive motility, as previously mentioned.

Finally, cortisol build up will decrease immune function. This occurs because the immune system reacts to or is turned on by a specific set of hormones that are turned off by cortisol.

As we have seen, illustrated in detail, the body is dependant on all systems working together to achieve a comfortable but dynamic equilibrium. When one system is not pulling its weight or doing it's part, the whole body will lose the ability to find dynamic equilibrium. When we are under stress, the nervous system is wound up and activated in a way that makes this equilibrium almost impossible to achieve and allows for dysfunction of vital systems. Furthermore, because of the hormone released via stress, they body is further compromised.

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About Dr. Gideon Orbach, DC

Dr. Orbach takes great pride in creating functional treatment plans tailored to each individual patient's specific needs based upon innovative practices and conventional theories of chiropractic and neurology. Dr. Orbach has over a thousand hours of post graduate education and training in neurology, nutrition, bio-mechanics, and rehabilitation. He has been published in text books and professional journals, taught both clinical technique and neurology to colleagues for re-licensure, as well as won awards for both clinical scholarship and community service. Dr. Orbach has practiced in New York City; Jamaica, West Indies; Pittsburgh, PA; and Kansas City, MO.