Understanding Stress And The Scientific Osteopathic Approach To Stress

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3. Stress Mechanism

When a stressor arrives, the amygdala region perceives the threat and sends a distress signal to the hypothalamus.

The amygdala is an almond shape set of neurons located deep in the brain's medial temporal lobe and plays a key role in processing emotions, actions and cognition.

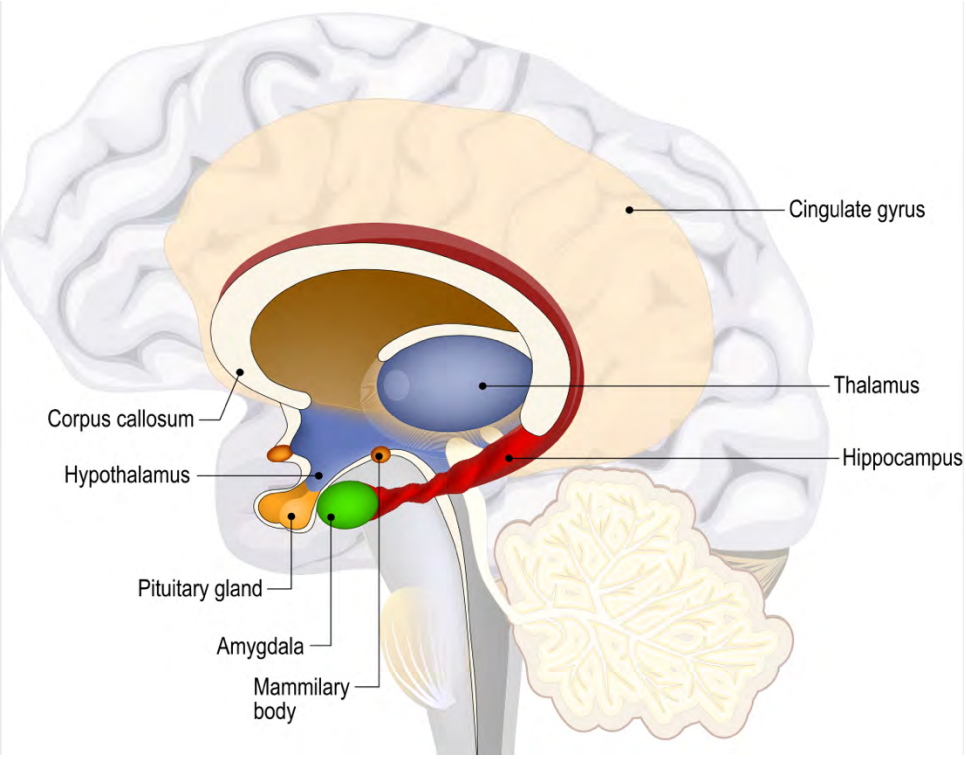

Figure 2 - Amygdala

In humans and other animals, this subcortical brain structure is linked to both fear responses and pleasure.

Its size is positively correlated with aggressive behavior across species.

In humans, it is the most sexually dimorphic brain structure, and shrinks by more than 30% in males upon castration.

Conditions such as anxiety, autism, depression, post-traumatic stress disorder, and phobias are suspected of being linked to abnormal functioning of the amygdala, owing to damage, developmental problems, or neurotransmitter imbalance.

Amygdala neurons increase dramatically as children become adults (more than other brain regions): except however in autism. Instead, children with autism spectrum disorders (ASD) have too many neurons early on and then appear to lose those neurons as they become adults.

Any deviation from this normal path of development can profoundly influence human behavior.

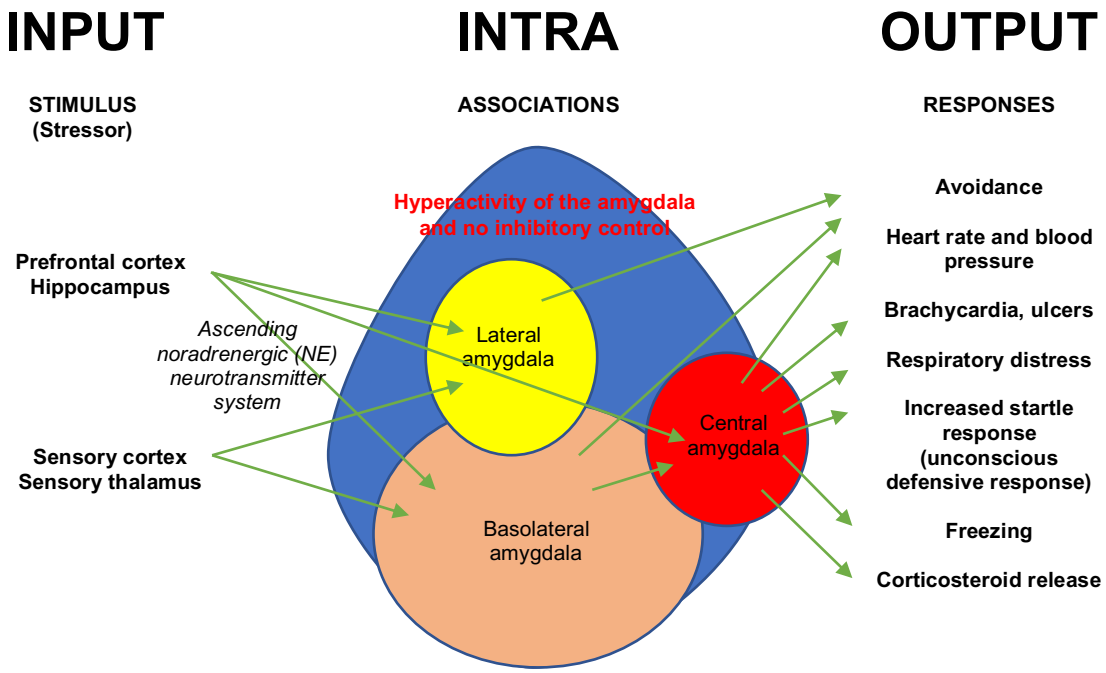

Figure 3 - Amygdala fear response

In the case of depression, the amygdala is often found to be enlarged from continual hyperactivation.

There is a positive correlation between the degree of amygdala activation and the severity of the depression.

In chronically stressed or anxious children, the amygdala sends signals to the decision-making parts of the brain that make it harder to regulate negative emotions,

Noradrenergic (NE) transmission is linked to the onset of negative emotions, such as anxiety and fear, in individuals who are exposed to stress.

Exposure to uncontrollable stressors often increases anxiety behavior, whereas controllable stress drastically reduces these effects.

Moreover, serotonergic neurotransmission in the amygdala undergoes sensitization *(a process in which there is progressive amplification of a response due to repeated administration of a stimulus)* in response to stressful stimuli following inescapable stress.

The hypothalamus then reacts like a command center.

Cortisol is important for health, but too much of it can wreak havoc on the body and cause a number of unwanted symptoms such as:

- Weight gain, mostly around the midsection and upper back.
- Also weight loss.
- Acne.
- Thinning skin.
- Easy bruising.
- Flushed face.
- Moon face.
- Slow healing.
- Muscle weakness.
- Fatigue.
- Irritability.
- Difficulty concentrating.
- High blood pressure.
- Headache.
- Cushing syndrome.

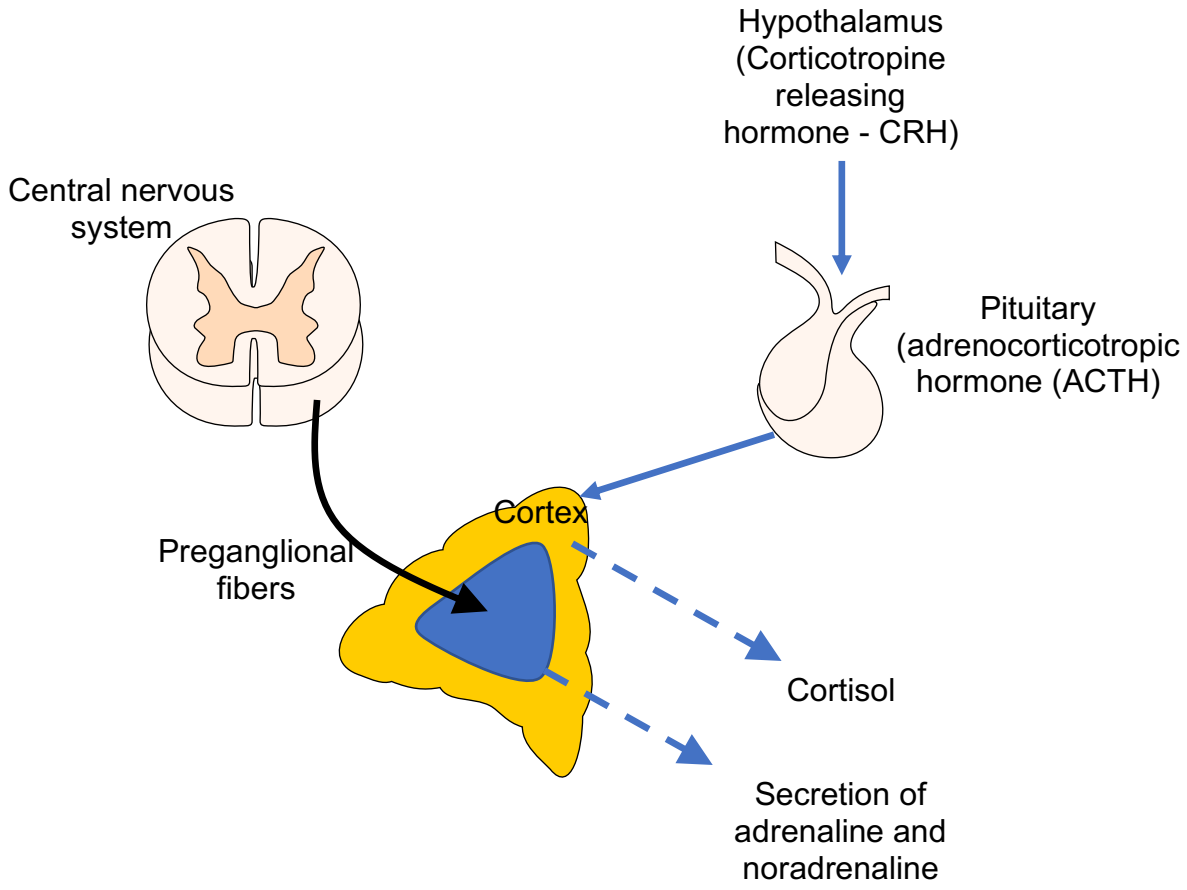

Figure 6 - Function of the adrenal gland

STRESS ⇒ ↑ CORTISOL ⇒ Fatty acids become mobilized from the fat reserves to be used as a source of energy. In this way glucose is reserved for nervous system function.

Cortisol intensifies vasoconstriction by increasing adrenaline levels. This increases the efficiency of the blood supply system: more rapid distribution of nutrients and oxygen.

A normal level of cortisol aids in the function of the organism, is significantly anti-inflammatory but also immunosuppressive.

A continued elevation of cortisol levels will lead to a decrease in the anti-inflammatory system and even a decrease in bone and cartilage formation as well as paralyse the immune system. This is often seen in the form of polyarthritis and allergies. In this way therapy aimed at stress reduction can be important.

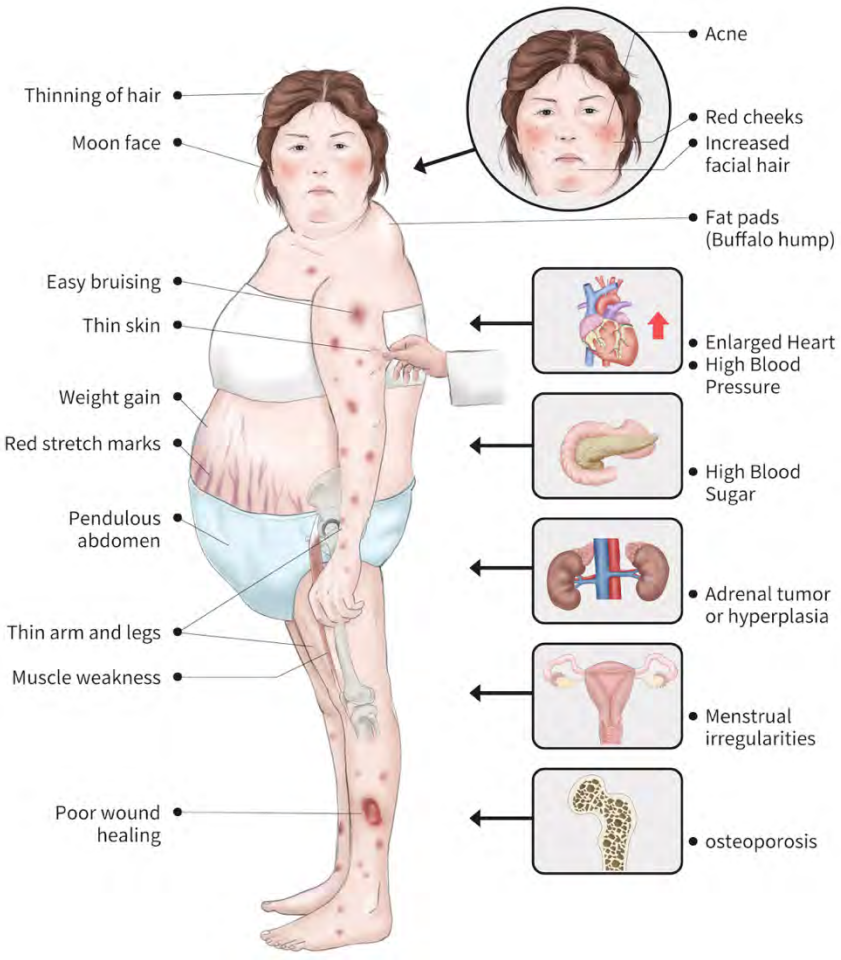

Figure 7 - Cushing syndrome

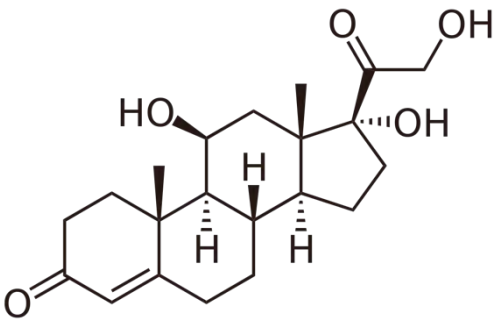

Figure 8 - Cortisol

Cortisone is medically used as:

- Against inflammation.
- Against swelling.

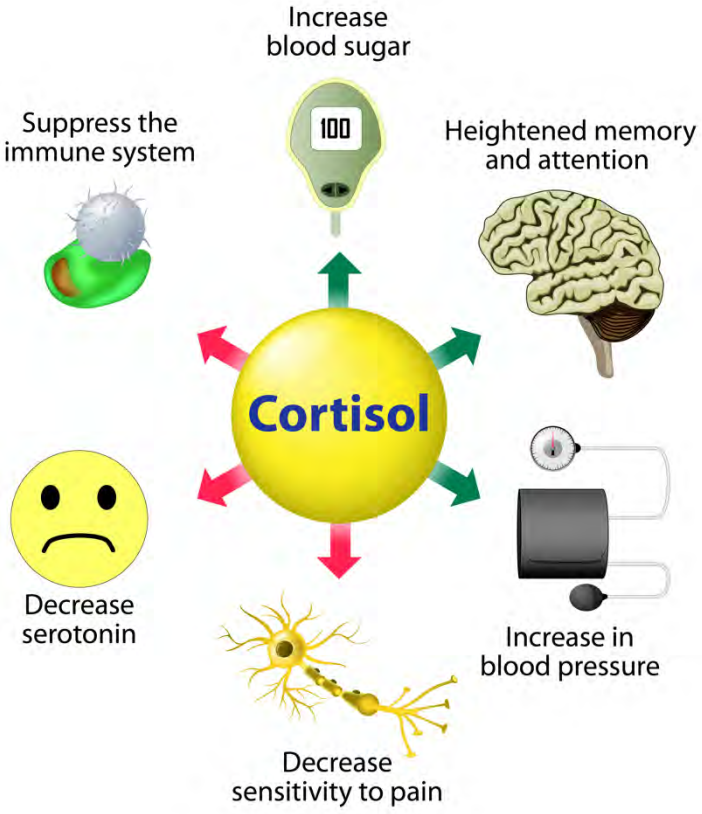

Figure 9 - Effects of cortisol

4. Different Forms of Stress

Stress can be divided in:

- **Positive stress:** a positive stress response is a normal and essential part of healthy development. Positive stress is characterized by brief increases in heart rate and hormone levels. Examples of positive stress include the first day of school or the first violin recital, particularly if that stress motivates you to prepare more or try harder.
- **Tolerable stress:** the body's alert system is activated to a greater extend. Examples are a car accident of being taken to the hospital. f the activation is short in time and buffered by relationships with adults who help the child adapt, the brain and other organs recover from what might otherwise be damaging effects.
- **Toxic stress:** this stress response can occur when a child experiences strong, frequent and/or prolonged adversity which results in changes to their baseline state. Examples of toxic stress include physical or emotional abuse, chronic neglect, caregiver substance abuse or mental illness, exposure to violence or the accumulated burdens of family economic hardship.

5. Resilience

Quote from The American Psychological Association: ‘Resilience is the process of adapting well to adversity, trauma, tragedy, threats or significant sources of stress – such as family and relationship problems, serious health problems or workplace and financial stressor’.

Physical resilience refers to the ability to recover or optimize function in the face of a disease or an acquired disability.

Biopsychosocial studies on the individual qualities that promote resilience show that these factors help protect against the deleterious influences of stressors on physiology in general and immunity in particular.

Resilient individuals have a different immunophenotype from that of stress susceptible individuals. This means again that stress influences immunity.

The adaptive immune phenotype also influences the ability to recover from inflammation-induced symptoms. The modulation of these bidirectional relationships between resilience and immunity by the gut microbiota opens the possibility to influence them by probiotics and prebiotics.

The relation between stress and health is not uniform across individuals.

Some people succumb to stress-related disorders while others are resilient.

Specific genetic polymorphisms affect how an individual appraises and responds to stress, potentially mediating the impact of stress on health.

These genetic vulnerabilities can influence responses to the external environment, shape motivated behavior, and have an impact on health throughout life.

The relation between genes and stress is also the inverse: stress can alter our genes.

Osteopathy

Advices given by osteopaths:

Building resilience has different aspects:

- **Awareness of the objective situation** is important to strengthen resilience.
- **Embrace relationships:** connecting with empathetic and understanding people can remind you that you're not alone in the midst of difficulties. Isolation is a bad idea. Accepting help strengthens resilience.
- **Help others:** this gives you a purpose and can make your own resilience to grow.
- **Take care of your own body:** stress is as well physical as emotional. Proper nutrition, healthy lifestyle, good sleep, good hydration and regular exercise strengthen resilience.
- **Avoid negativity and negative outlets:** avoid alcohol, smoking and other substances. Focus instead on giving your body resources to manage stress, rather than seeking to eliminate the feeling of stress altogether.
- **Think positive.**
- **Be proactive.** If the problems seem too big to tackle, break them down into manageable pieces.
- **Set goals** and move towards them in smaller steps. Develop problem solving skills.
- **Discover yourself and be aware of your own strength.** Believe in your own abilities.
- **Accept changes:** many people want to stay in stereotype patterns. Life however is full of changes: embrace them.
- **Be optimistic.**
- **Don't be a victim but a survivor.**
- **Embrace your sense of humor.**
- **See yourself as a friend that you want to help.**
- **No procrastination.**

Figure 10 - Strengthen resilience

Figure 11 - Mental resilience

6.3. Dry Skin

Stress impairs the barrier function of the skin (stratum corneum) and influences the skin water retention negatively.

When your body starts producing excess cortisol, it loses its ability to retain water. This is what leads to dehydrated skin.

Dry skin often accelerates the appearance of dark spots and wrinkles.

Figure 14 - Dry skin

6.4. Rashes and Hives (Urticaria)

Stress has the potential to weaken the immune system.

A weakened immune system can lead to an imbalance of bacteria in your gut and skin known as dysbiosis.

When this imbalance occurs on your skin, it can lead to redness or a rash.

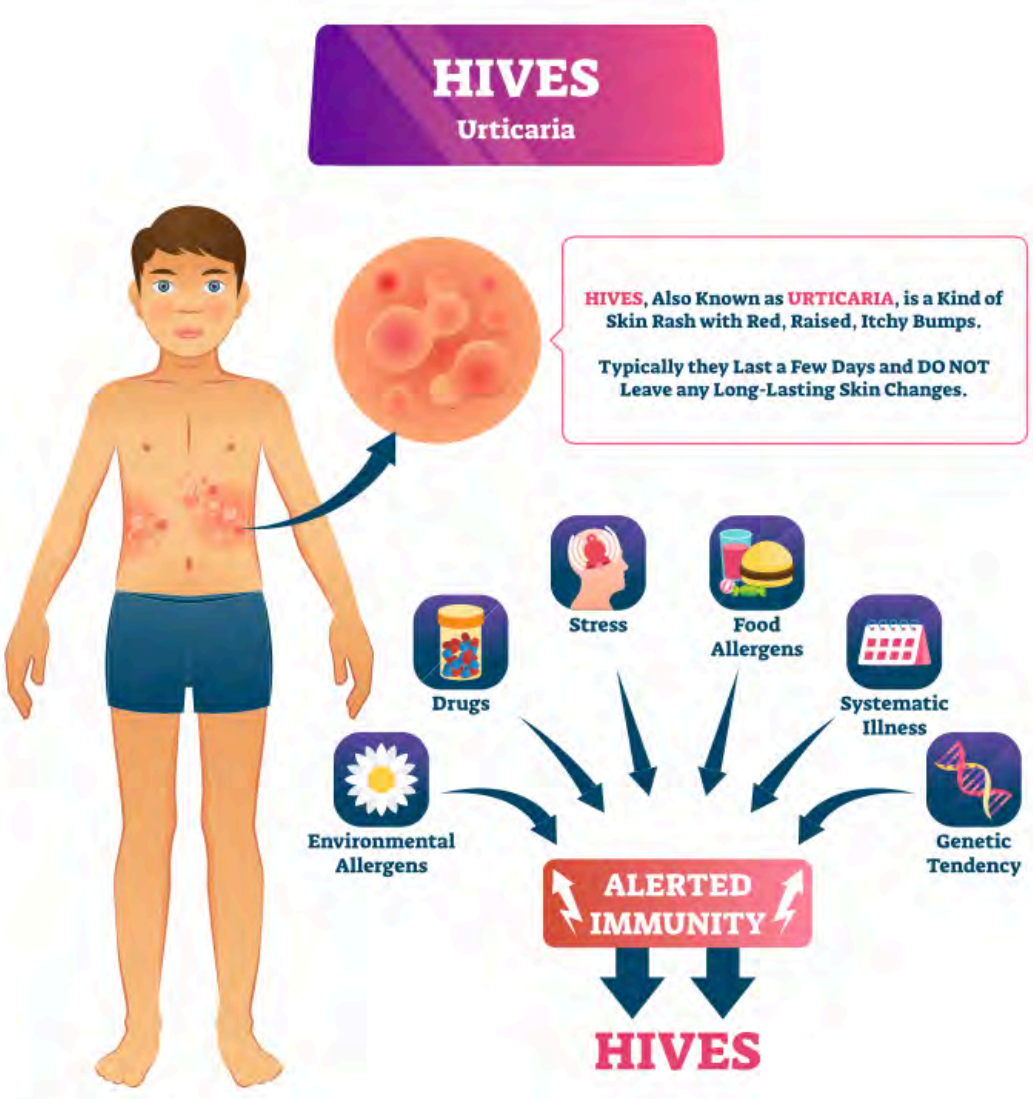

Figure 15 - Hives

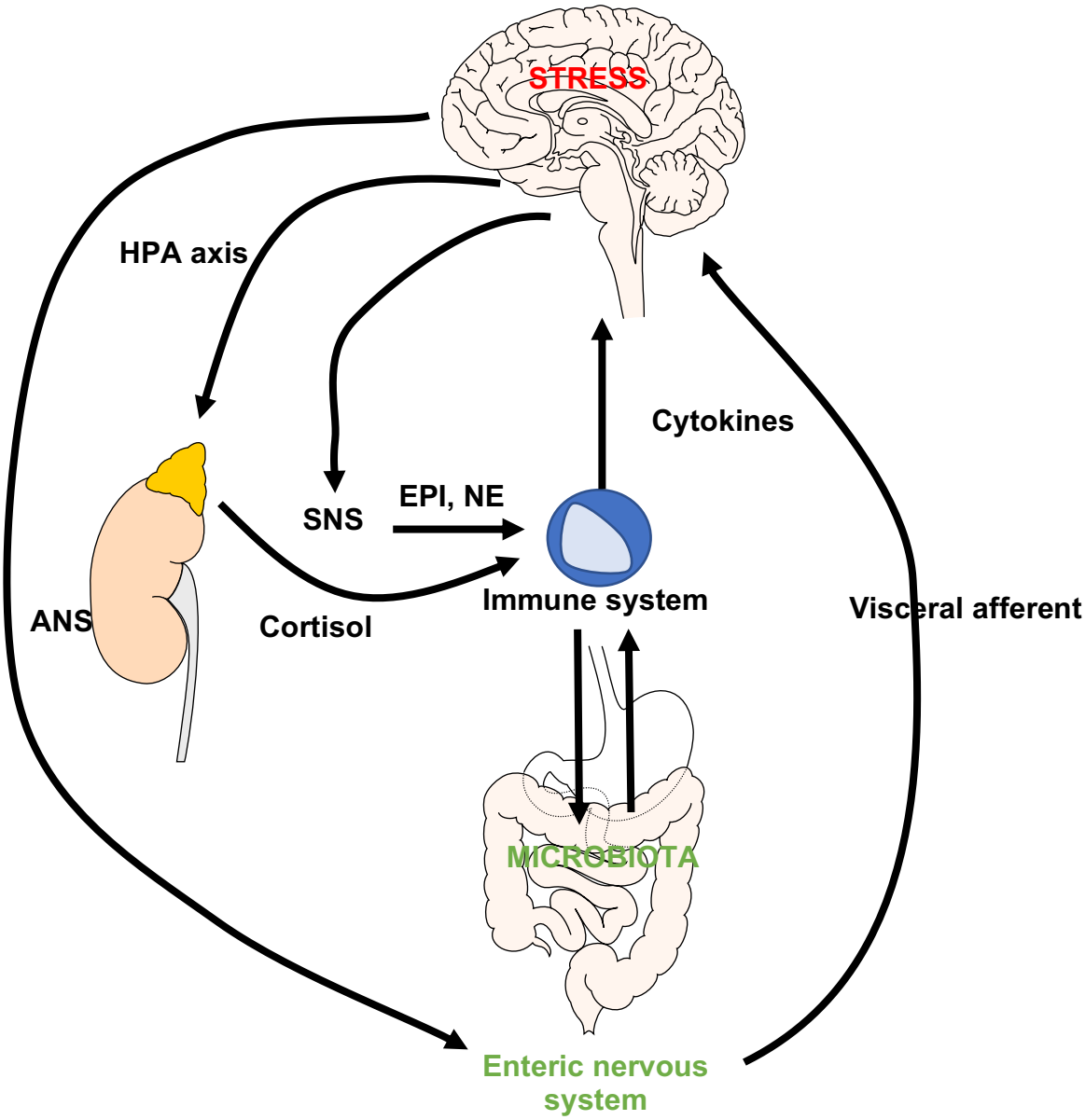

Figure 18 - Pathway brain/gut - gut/brain

ANS = autonomic nervous system.

SNS = sympathetic nervous system.

HPA = hypothalamic-pituitary-adrenal axis.

EPI = epinephrine.

NE = norepinephrine.

7.5. Techniques to Stimulate the Parasympathetic Nervous System

The techniques that I describe here must be seen in a complete plan to manage stress. Every individual technique will not cure chronic stress but can contribute to the managing process of chronic stress.

7.5.1. Decoaptation of the Upper Cervical Region

The patient is supine, and the osteopath brings the upper cervical region in rotation and sidebending.

From this position, the osteopath decoapts the upper cervicals in a superior direction.

The technique is done without force and without pain.

Video 1 - High cervical manipulation in decoaptation

Note concerning manipulations: manipulations can but don't have to be used to reach these different goals. In respect of the safety of the patient, osteopaths try to avoid manipulations, especially in the cervical area.

7.5.5. Harmonizing the Cranial Membranes

7.5.5.1. Stretching the Dura Mater

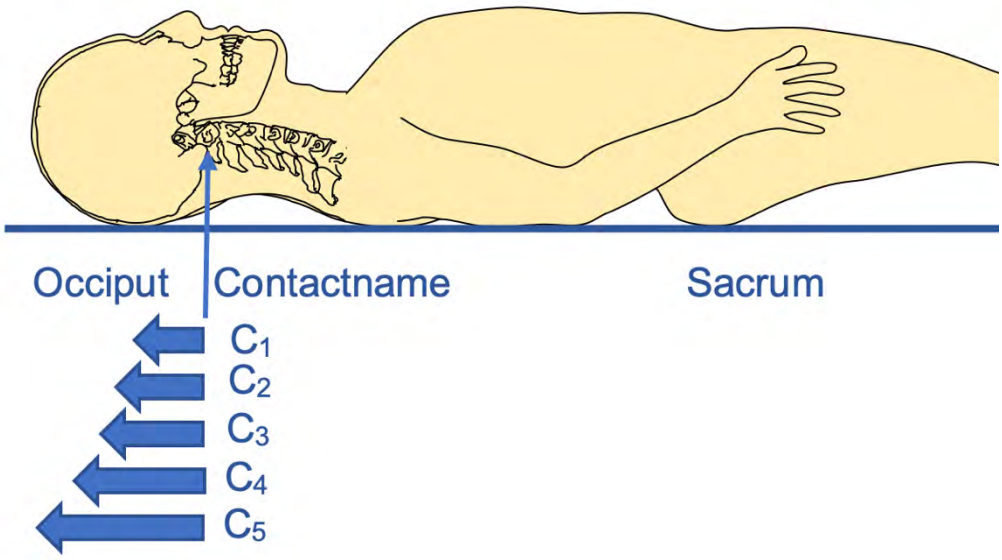

Figure 19 - Stretching dura mater

Video 5 - Stretching dura mater

Do the Valsalva maneuvers

This maneuver, which attempts to force air through the blocked passage and re-establish air flow, should always be performed gently.

When you try to blow out through blocked passageways, the air pressure in your body is affected.

The sudden rush of air when you release your breath can cause a rapid change in blood pressure and heart rate.

Procedure:

- Take a deep breath and hold it, closing your mouth and pinching your nostrils shut.
- Try to blow air out through your closed nostrils.
- If the maneuver is successful, you will hear a popping sound in your ears.

Video 9 - Valsalva maneuver

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ANNEX: The Perceived Stress Questionnaire (PSQ)

Date……

Name……..

Gender…M…….F……..Other…….

Age……..

Instructions

For each sentence, circle the number that describes how often it applies to you in the last month.

Work quickly without bothering to check your answers.

	Almost never	Sometimes	Often	Usually
1. You feel rested	4	3	2	1
2. You feel that too many demands are being made on you	1	2	3	4
3. You are irritable or grouchy	1	2	3	4
4. You have too many things to do	1	2	3	4
5. You feel lonely or isolated	1	2	3	4
6. You find yourself in situations of conflict1.	1	2	3	4
7. You feel you're doing things you really like	4	3	2	1
8. You feel tired	1	2	3	4
9. You fear you may not manage to attain your goals	1	2	3	4
10. You feel calm	4	3	2	1
11. You have too many decisions to make	1	2	3	4
12. You feel frustrated	1	2	3	4
13. You are full of energy	4	3	2	1
14. You feel tense	1	2	3	4
15. Your problems seem to be piling up	1	2	3	4
16. You feel you're in a hurry	1	2	3	4
17. You feel safe and protected	4	3	2	1
18. You have many worries	1	2	3	4
19. You are under pressure from other people	1	2	3	4
20. You feel discouraged	1	2	3	4
21. You enjoy yourself	4	3	2	1

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Luc Peeters is an osteopath since 1985. He was the Joint-Principal of the largest Academy of Osteopathy in Europe from 1987 till 2020. He provided curricula, syllabuses and academic recognition from several universities.

This book gives a practical overview on how stress can influence patients and the scientific osteopathic approach to stress.

The theory and procedures in this book are checked on their scientific background and esotericism is avoided.

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