

ACCESSING the HEALING POWER of the VAGUS NERVE

**SELF-HELP EXERCISES
FOR ANXIETY,
DEPRESSION,
TRAUMA,
AND AUTISM**

A stylized illustration of a human head in profile, facing right. The head is white with a thin black outline. Inside the head, the brain is depicted with various colored regions: the frontal lobe is yellow, the parietal lobe is green, the temporal lobe is red, and the occipital lobe is pink. The brain is connected to the spinal cord by a thick red line, which then branches out into a network of red lines representing the vagus nerve, extending down the neck and into the chest area.

Stanley Rosenberg

Forewords by Stephen Porges, PhD
and Benjamin Shield, PhD

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Accessing the Healing Power of the Vagus Nerve

***Self-Help Exercises for Anxiety, Depression,
Trauma, and Autism***

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North Atlantic Books
Berkeley, California

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Acknowledgments

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Introduction: The Autonomic Nervous System

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RESTORING SOCIAL ENGAGEMENT

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PART ONE

ANATOMICAL FACTS OLD AND NEW: THE POLYVAGAL THEORY

***Overcoming Health Challenges: Are You
Fighting the Heads of the Hydra?***

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The Heads of the Hydra: Common Problems Related to Cranial-Nerve Dysfunction

CHRONIC PHYSICAL TENSIONS

- Tense/hard muscles
- Sore neck and shoulder muscles
- Migraines
- Back pain
- Tightly clenched teeth
- Grinding teeth at night
- Eye or facial tensions
- Cold hands and feet
- Unwarranted sweating
- Tenseness after exertion
- Arthritis
- Nervousness
- Dizziness
- Lump in the throat

EMOTIONAL ISSUES

- Irritability, anger
- Feeling “down”

- Feeling of hopelessness
- Lack of energy
- Tendency to cry easily
- General anxiety
- Feeling of heaviness
- Extended periods of depression
- Fearfulness
- Nightmares
- Restlessness
- Difficulty sleeping
- Excessive worries
- Difficulty concentrating
- Forgetfulness
- Frustration
- Excessive daydreaming and fantasizing

HEART AND LUNG PROBLEMS

- Chest pains
- Asthma
- Hyperventilation
- Shortness of breath
- Irregular heartbeat
- High blood pressure

VISCERAL-ORGAN DYSFUNCTIONS

- Poor digestion
- Constipation

- Irritation of the large intestine
- Diarrhea
- Stomach problems
- Hyperacidity, ulcer, heartburn
- Loss of appetite
- Excessive eating

IMMUNE-SYSTEM PROBLEMS

- Frequent influenza
- Minor infections
- Allergies

BEHAVIORAL PROBLEMS

- Frequent accidents or injuries
- Increase in drinking or smoking
- Excessive use of medicine with or without prescription
- Autism, ADHD, Asperger's syndrome

INTERPERSONAL RELATIONSHIPS

- Excessive or unreasonable distrust
- Difficulty in reaching agreements
- Loss of interest in sex

MENTAL ISSUES

- Excessive worrying
- Difficulty concentrating
- Difficulty remembering
- Difficulty making decisions

OTHER PROBLEMS

- Excessive menstrual pains
- Skin problems

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Chapter 1

Get to Know Your Autonomic Nervous System

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The Twelve Cranial Nerves

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Cranial Nerve Dysfunction and Social Engagement

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Treating the Cranial Nerves

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The Enteric Nervous System

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Chapter 2

The Polyvagal Theory

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The Three Circuits of the Autonomic Nervous System

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Goldilocks and the Three ANS States

A good metaphor for the three states of the autonomic nervous system can be found in the fairy tale “Goldilocks and the Three Bears.”

Goldilocks was wandering alone in the woods when she came to the cabin belonging to the three bears. She knocked on the door, but no one answered. Being tired and hungry, she decided to go inside and wait until someone returned.

Goldilocks noticed three bowls of porridge on the table. When she tasted them, she found that the first was too hot, the next was too cool, and the third was just right.

After she ate that third bowl of porridge, she saw three beds and decided to take a nap. The first bed was too hard, and the second too soft—but the third one was just right, so she lay down on that one and fell asleep, contented.

The quality of the tone of the musculature in the three autonomic states can be described as one of the following: too hard or hot (in the fight or flight state of spinal sympathetic activity), too soft or cold (in the shutdown state of dorsal vagal activity), and just right

(in the state of social engagement, based on the activity of the ventral branch of the vagus and the other four cranial nerves related to social engagement).

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The Five States of the Autonomic Nervous System

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SYMPTOMS OF A DORSAL VAGAL STATE

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Stress and the Sympathetic Nervous System

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Faulty Neuroception and Survival

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The Story of Antaeus

The struggle between Antaeus and Heracles was a favorite subject in ancient and Renaissance sculpture.

Antaeus was the son of Poseidon, god of the sea, and Demeter, goddess of the Earth. The Greeks believed that he lived on the edge of the desert in what is now Libya. Antaeus would challenge all passersby to a wrestling match, kill them, and then use their skulls in a temple he was building to his father. Antaeus defeated all opponents until he fought Hercules.

Each time Hercules knocked him down, Antaeus got up and came back even stronger. Hercules quickly realized that he could not beat Antaeus by throwing him to the ground. He guessed the secret of Antaeus's power: when Antaeus came into contact with the Earth—his mother—he would be fortified and regain his strength.

Realizing this, Hercules grabbed Antaeus around the waist and held him aloft, breaking Antaeus's connection to the ground. Hercules was then able to use his colossal strength to crush him in a bear hug.

The story of Antaeus has been used to symbolize the dangers of not keeping ourselves grounded. Hercules displays the psychological and spiritual strength that accrues when, after being “upset,” one becomes grounded again.

SENSING OUR OWN BODIES

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Chapter 4

Testing the Ventral Branch of the Vagus Nerve

Simple Evaluation from Facial Observation

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Objectively Evaluating Vagal Function through Heart Rate Variability (HRV)

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Testing for Vagal Function: Early Experiences

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Discovering the Polyvagal Theory

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***Testing for Vagal Function: Cottingham,
Porges, and Lyon***

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A Simple Test of the Pharyngeal Vagus Branch

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How to Test for Pharyngeal Ventral Branch

Function

Ask the person to sit comfortably in a chair. Then stand in front of him and ask him to open his mouth so that you can see the back of his throat. You will need to see the uvula (the small bulb-shaped structure that hangs down in the back of the throat) and the soft-tissue arches on either side of it. Sometimes you can see these sufficiently with normal light; otherwise, you will need to use a small flashlight. (The flashlight app on an iPhone is perfect for this.)

If the person's tongue is blocking your view of the uvula and arches, ask him to place one of his fingers on the back of his tongue and push it down onto the floor of his mouth. Then you should be able to see the soft palate more easily. (Medical doctors use a tongue depressor for this, but that makes some people gag, and I have never had a client gag using his own finger.)

See the Appendix for a series of drawings of the uvula. In “Uvula 2,” the arches of the soft palate are lifted on both sides by properly functioning *levator veli palatini* muscles. In “Uvula 3,” one side is lifted and the other is not; this indicates dysfunction of the ventral branch of the vagus nerve on the side that is not lifted.

In these drawings, you can see the *levator veli palatini* muscles embedded in the soft tissue, one on either side of the uvula. These muscles are innervated by motor fibers of the pharyngeal branch of the vagus nerve. When they contract, they lift the arches of the soft palate. They are also attached to the auditory (Eustachian) tube between the ears and throat, and pull on it during the act of swallowing. This is why the ears sometimes “pop” with swallowing, as air moves into the middle-ear cavity and pressure is equalized.

When we swallow, these muscles should contract, elevating the soft palate and allowing food to go into the esophagus en route to the stomach, while at the same time preventing food from entering the larynx and lungs. These muscles should also contract when someone makes the sound “ah.” A well-trained singer will use this

muscle to lift the back of the throat before singing the first note of a phrase.

In order to test vagal function, I ask the other person to say, “ah-ah-ah-ah” while I observe the arches on either side of the uvula. These sounds should be percussive and staccato—short, distinct bursts of sound in quick succession, and not a long, drawn-out “aaaaaaaahhhh,” which does not create the desired effect. If there is good function in the pharyngeal branch of the ventral vagus nerve on both the right and left sides, these muscles tighten symmetrically with a clear impulse when the person makes the sounds “ah-ah-ah-ah-ah,” lifting the arches of the soft palate equally on both sides.

If, on the other hand, there is dysfunction of the pharyngeal branch of the ventral branch of the vagus nerve on one side, the nerve impulses do not innervate the *levator veli palatini* muscle on that side, and the arch in the soft palate on that side does not lift when the person says “ah.”

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Therapists Can Test for Vagal Function without Touching

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Chapter 5

The Polyvagal Theory—A New Paradigm for Health Care?

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A Polyvagal approach for psychological and physical conditions

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BUILDING ON STEPHEN PORGES'S SUCCESS

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The Healing Power of the Polyvagal Theory

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Relieving COPD and Hiatal Hernia

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COPD AND HIATAL HERNIA: A CASE STUDY

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Treating a Hiatal Hernia

Following is an osteopathic visceral-massage technique for treatment of a hiatal hernia. It works well as a simple self-help exercise.

I first instruct clients how to do the Basic Exercise (see Part Two). Then I use a simple osteopathic technique to pull their stomach down and to stretch (lengthen) and relax the esophagus. I usually teach them to do this for themselves. With this protocol, I have helped many patients with diagnoses such as asthma, pulmonary fibrosis, and shortness of breath.

The stomach is on the left side of the abdomen, just under the rib cage. Place the fingertips of one hand lightly on the top of where you imagine you can find the stomach. The stomach is soft but palpable. You should be able to feel the stomach if you slowly and gently extend your fingertips into the abdominal muscles. You only want to feel the top surface of the stomach. Under no circumstances should your move be painful. If the person experiences pain, you should stop immediately. Gently pull it

downward toward the feet until you sense the first sign of resistance—usually after pulling it only about one half-inch to one inch (Figure 1). Hold it at that point of slight resistance until the esophagus relaxes. Although you might be tempted to push the stomach down in order to stretch the esophagus, it is not necessary to exert any force. If you have your fingers on the top of the stomach, you will signal the nerves for the esophagus to lengthen, and the stomach will descend in the abdomen, making room for the respiratory diaphragm to descend on the inbreath.



Figure 1. Hiatal hernia treatment

A sigh or a swallow usually accompanies this moment of relaxation. At this point, it feels as if the muscular resistance to the stomach's being pulled down melts. And immediately the person is able to breathe more easily and deeply.

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Diaphragmatic Breathing

Good diaphragmatic breathing is an important element of social engagement. Every person I have observed in my clinic who is in a state of stress or dorsal vagal activity has a disturbed pattern of breathing.

Normal breathing should involve up-and-down movement of the diaphragm. In order to evaluate whether this is happening, I place

my hands lightly on the sides of the chest at the level of the last two ribs. If there is diaphragmatic breathing, I can detect a lateral movement of the lower two ribs on both sides. However, if there is a hiatal hernia, I can feel lateral movement on the right side but almost none on the left.

When we cannot inhale with a normal lowering of their respiratory diaphragm, we find alternative ways to make space for the expanding lungs. One very common way is to lift the shoulders and upper ribs. This is called high costal breathing (“costal” refers to ribs). This breathing pattern is associated with the emotions of fear, anxiety, and panic.

Another common pattern in non-diaphragmatic breathing is to inhale using the abdominal muscles. Sometimes, when we are typically short of breath, the belly is distended, soft, and flabby. The belly muscles are too soft, and when they go slack the intestines descend, pulling the lungs down. Sometimes people call this “belly breathing” and interpret it as a good sign because they can see that the breath is going down into the abdomen. However, it does not actively involve tightening the respiratory diaphragm. People breathing this way often hold their stomach muscles tight on the inbreath. The muscles of their abdomen feel hard. This breathing pattern is associated with anger.

Ideally, the abdomen and chest expand and contract rhythmically, at the same time. The lower two ribs (R11 and R12) move to the sides, down, and back with expansion. The next five ribs up (R6–R10) swing out to the sides; this lateral movement is likened to that of a “bucket handle.” The next group of ribs above those (R5 to R1) lifts straight upward, along with the sternum, in a movement described as the “pump handle.”

If we lose optimal tonus in our diaphragm, we also lose proper tonus in our entire musculoskeletal system. We tend to collapse into our body, and exhibit the breathing of someone who is shut down and manifesting depressive behavior. If, on the other hand, we tighten the diaphragm and push it down onto our gut, we get the body and breathing of someone in a state of anger.

The vagus nerve has both sensory and motor fibers that affect and are affected by the movements of respiration. There are four times as many sensory (afferent, or inward-transmitting) nerve fibers in the respiratory branch of the vagus nerve as there are motor (efferent, or outward-transmitting) nerves, and these are constantly monitoring the functioning of the respiratory diaphragm.

Proper function of the motor fibers of the ventral vagus is necessary to facilitate relaxed, efficient breathing. When the respiratory diaphragm is not working properly and does not descend on the inbreath, we use muscles activated by either our spinal sympathetic chain or our dorsal vagal circuit, so a breathing pattern that fails to make proper use of the diaphragm will communicate through the sensory nerve fibers that we are threatened or in danger. This is one example of how feedback from sensory branches of cranial nerves influences the state of our autonomic nervous system.

Shoulder, Neck, and Head Pain: CN XI, Trapezius, and SCM

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The Levator Scapulae Muscle

We can improve the function of the cranial nerves, and improve the rotation of the head to the right and left, with the Basic Exercise and the Salamander Exercises. But these still might not be enough to allow full freedom in the turning of the head, since many other muscles of the neck are involved in head movement, and tension in any of them can restrict head turning.

If we have pain in our neck on the same side our head is turning toward, then the problem is not cranial nerve XI and the trapezius and SCM. It is most likely coming from another muscle, the *levator scapulae* (“shoulder-blade lifter”). In these cases, working on cranial nerve XI and the trapezius and sternocleidomastoid muscles will probably not remove all of the pain and stiffness.

Janet Travell, David Simons, and Lois Simons, in their book *Myofascial Pain and Dysfunction: The Trigger Point Manual*, nicknamed the *levator scapulae* the “Stiff Neck” muscle.⁵² This pair of muscles reaches down from the top vertebrae to the shoulder blade, along either side of the neck.

I have found that directly massaging the *levator scapulae* gives relief, but only temporarily—the muscle dysfunction quickly returns. The problem is probably that the *levator scapulae* is undertoned. So if you want a more lasting result, Tom Myers suggested massaging the supraspinatus muscle (along the top of the shoulder blade) to improve the tonus of the *levator scapulae*. (See “Supraspinatus” in the Appendix.)

Benjamin Shield suggested another approach. He observed that with a side-bending of the upper cervical vertebrae, you can open the spaces between C1 and C3 to take the pressure off of the spinal nerves that go to the *levator scapulae*. You might try the upper part (Level 1) of the Salamander Exercises, tipping the head to one side to open the spaces between C1 and C3.

THE TRAPEZIUS AND STERNOCLEIDOMASTOID MUSCLES

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USE OF TRAPEZIUS MUSCLES WHEN CRAWLING

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ASYMMETRY IN TRAPEZIUS MUSCLE TENSION

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A NEW PICTURE OF CN XI

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CN XI AND THE VENTRAL VAGUS BRANCH

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The Trap Squeeze Test for Shoulder and Neck Problems

Some of the most common complaints among clients of physical

therapists and body therapists involve stiffness in the neck and pain in the shoulder. As discussed above, these problems usually include a lack of proper tonus of the trapezius and/or sternocleidomastoid muscles, either of which may be chronically tense or flaccid.

Most physical therapists, massage therapists, and body therapists start their treatment by working directly on tight shoulder muscles, without considering the state of the client's autonomic nervous system. When people come to my practice with shoulder problems, I base my approach to this on the research findings of Cottingham, Porges, and Lyon.⁵⁴

As suggested by their research, in order to achieve positive results with fascial release, myofascial release, or release of muscle tensions in general, it is important to have a well-functioning ventral vagus nerve before attempting any other intervention. So I first test the ventral branch of the vagus nerve, or use the following test for CN XI function. This test often takes less time, and is less intrusive than my test for vagal function, in which clients have to open their mouths and say "ah-ah-ah" while I use a flashlight to observe uvula-area movement.

For this test, we only have to squeeze the muscles on the top of the shoulder. The Trap Squeeze Test takes only a few seconds, and is well suited for use on children and people on the autism spectrum, with whom we might otherwise encounter difficulties in getting their cooperation for the usual technique.

To use this form of testing, you first need to practice on several people in order to develop the necessary kinesthetic skills. It is normal to feel uncertain the first few times that you try testing the trapezius muscles. However, you will likely find that you can get the feel of it after a few attempts.

CN XI can be tested by sliding, lifting, and rolling the top of the trapezius muscles (on the tops of the shoulders, halfway to the neck), and comparing them on the left and right sides. Although the trapezius muscle covers a large area, it is very thin.

1. Take hold of the trapezius muscle on each side, squeezing it lightly between your thumb and your first finger (Figure 2). Whereas most novices simply grab the muscle, the lighter you squeeze, the better.
2. If you squeeze lightly and slowly, you should be able to lift the muscle slightly away from the underlying muscles.



Figure 2. Trap squeeze test

3. Compare the tonus of the trapezius muscle on one side with the tonus of the trapezius muscle on the other side. Do the two sides feel the same to you, or is one side harder than the

other? Ideally, both sides should be soft and elastic. However, one side is often soft and elastic, while the other is not. If you squeeze them slowly, with a light pressure, you can feel that the muscle on one side remains relaxed, soft, and pliable if you push deeper into it, while the other side may react to your squeeze by tensing up and feeling hard, even though you are using a very light pressure.

4. I ask the person who I am testing, "When I squeeze, do the two sides feel the same to you, or do they feel different?" If the person answers that they feel different, I ask, "Which side is more tense?" Here is something that I do not understand, but I encounter it often: more than half the time that I do this test, I disagree with the person I am testing as to which side is more tense, or "harder." I do not know why this is so. But I have come to the conclusion that it does not matter in terms of the success of my treatment; the main point is that my client and I agree that there is a difference between the two sides.
5. If we agree that there is a difference, I take this as an indication of dysfunction in CN XI, and I conclude that their autonomic nervous system is not socially engaged, and that they are in a state of either stress or dorsal vagal withdrawal. We can then take the appropriate steps to restore ventral vagal function before proceeding with any further therapeutic techniques.

Health Problems Related to Forward Head Posture

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SCAR TISSUE AS A CONTRIBUTOR TO FHP

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FHP AND SUBOCCIPITAL MUSCLE TENSION

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Relieving Migraine Headaches

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MIGRAINES: A CASE STUDY

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Chapter 6

Somatopsychological Problems

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EMOTIONS AND THE AUTONOMIC NERVOUS SYSTEM

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A SELF-REGULATING AUTONOMIC NERVOUS SYSTEM

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A FRESH LOOK AT COMMON PSYCHOLOGICAL DIAGNOSES

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Anxiety and Panic Attacks

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CASE STUDY: ANXIETY AND PANIC ATTACKS

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TREATING ANXIETY IN CHILDREN

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Antisocial Behavior and Domestic Violence

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“NICE GUY” COMMITS WAR CRIMES

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CASE STUDY: ONGOING DOMESTIC VIOLENCE

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BRAIN CHANGES FROM DOMESTIC VIOLENCE

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MOVING OUT OF THE PAST AND RECONNECTING TO FUTURE DREAMS

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TRAUMA AND THE AUTONOMIC NERVOUS SYSTEM

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DORSAL BRANCH ACTIVITY AND PTSD

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RESTORING FUNCTION AFTER A TRAUMATIC EVENT

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Depression and the Autonomic Nervous System

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CASE STUDY: BIPOLAR DISORDER

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ADHD and Hyperactivity

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Chapter 7

Autism Spectrum Disorders

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HOW PREVALENT IS AUTISM?

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AUTISM AND THE AUTONOMIC NERVOUS SYSTEM

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Hope for Autism: The Listening Project Protocol

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The Role of Hearing in Autism Spectrum Disorders

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THE EVOLUTION OF HEARING

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TREATING HEARING IN AUTISTIC CHILDREN

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Treating Autism

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Technique for Rounding a Flat Back of the Head

I start by feeling the two sternocleidomastoid muscles, and I work on the side that is tighter. I take the top of the child's SCM muscle on that side firmly but gently between my thumb and index finger. This must not cause pain. (See "Sternocleidomastoid" in the Appendix.) I ask one of the parents to hold the foot on the side where we are going to release the SCM, and to gently bend their child's foot down at the ankle joint with one hand, and then with their second hand to bend their child's toes up. After a minute or two, the child relaxes and the sternocleidomastoid muscle is much more relaxed and pliable. When the SCM no longer pulls on one side of the back of the cranium, the part that was flat fills out, becomes rounded, and the two sides become symmetrical. The rationale behind this technique is found in Tom Myers' book *Anatomy Trains*, in which he describes the "superficial front line."⁹³

Then the parent and I evaluate the back of the child's head again. It has always become more symmetrical. When the child comes back for another treatment, I observe that the changes have held.

AUTISM: A CASE STUDY

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SPECIAL CONSIDERATIONS IN TREATING AUTISTIC CHILDREN

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Concluding Remarks

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Part Two

Exercises to Restore Social Engagement

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The Basic Exercise

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BEFORE AND AFTER DOING THE BASIC EXERCISE

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BASIC EXERCISE INSTRUCTIONS

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NOTE: If you become dizzy when you sit up or stand up, it is probably because you relaxed when you were lying down, and your blood pressure dropped. This is a normal reaction. It usually

takes a minute or two before your blood pressure adjusts and pumps more blood to your brain.

CERVICAL VERTEBRAE AND VENTRAL VAGAL DYSFUNCTION

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**WHY DO WE MOVE OUR EYES IN THE BASIC
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Neuro-Fascial Release Technique for Social Engagement

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WHEN TO UTILIZE THE NEURO-FASCIAL RELEASE TECHNIQUE

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TWO-HANDED NEURO-FASCIAL RELEASE TECHNIQUE INSTRUCTIONS

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PROPER APPLICATION OF THE NEURO-FASCIAL RELEASE TECHNIQUE

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The Salamander Exercises

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LEVEL 1: THE HALF-SALAMANDER EXERCISE

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THE HALF-SALAMANDER—A VARIATION

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LEVEL 2: THE FULL SALAMANDER EXERCISE

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Massage for Migraines

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FINDING AND DEFUSING TENSION IN TRIGGER POINTS

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SCM Exercise for a Stiff Neck

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Twist and Turn Exercise for the Trapezius

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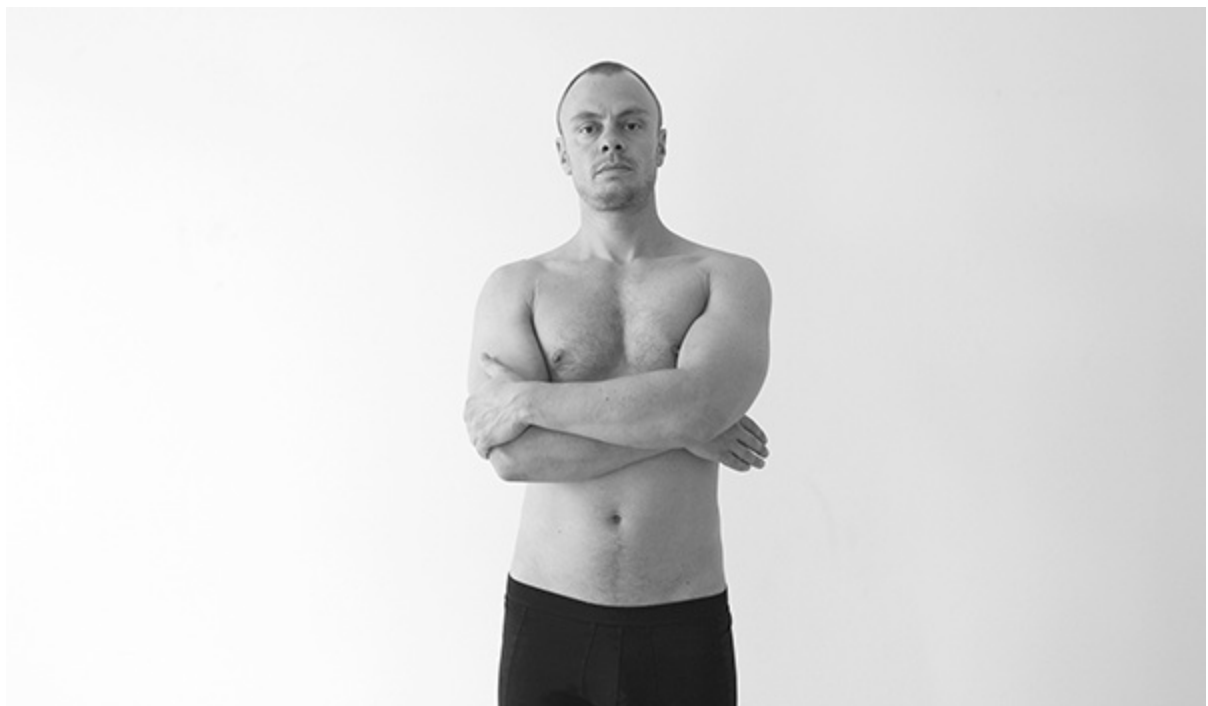
TWIST AND TURN EXERCISE INSTRUCTIONS

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A Four-Minute Natural Facelift, Part 1

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A Four-Minute Natural Facelift, Part 2

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Severing all the Heads of the Hydra

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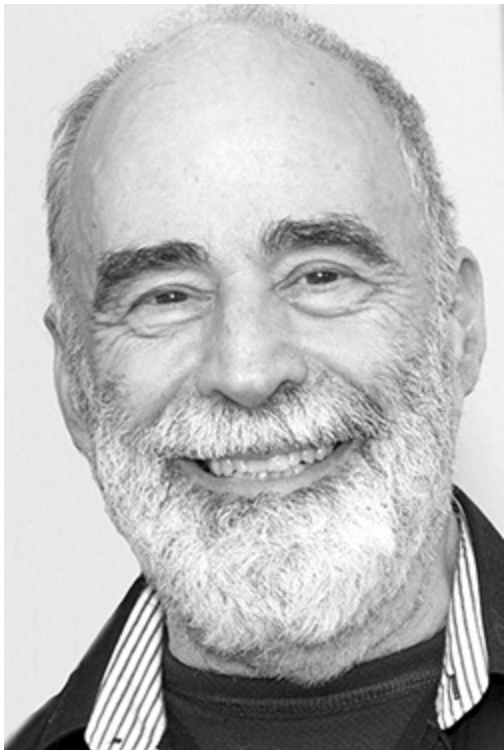
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About the Author

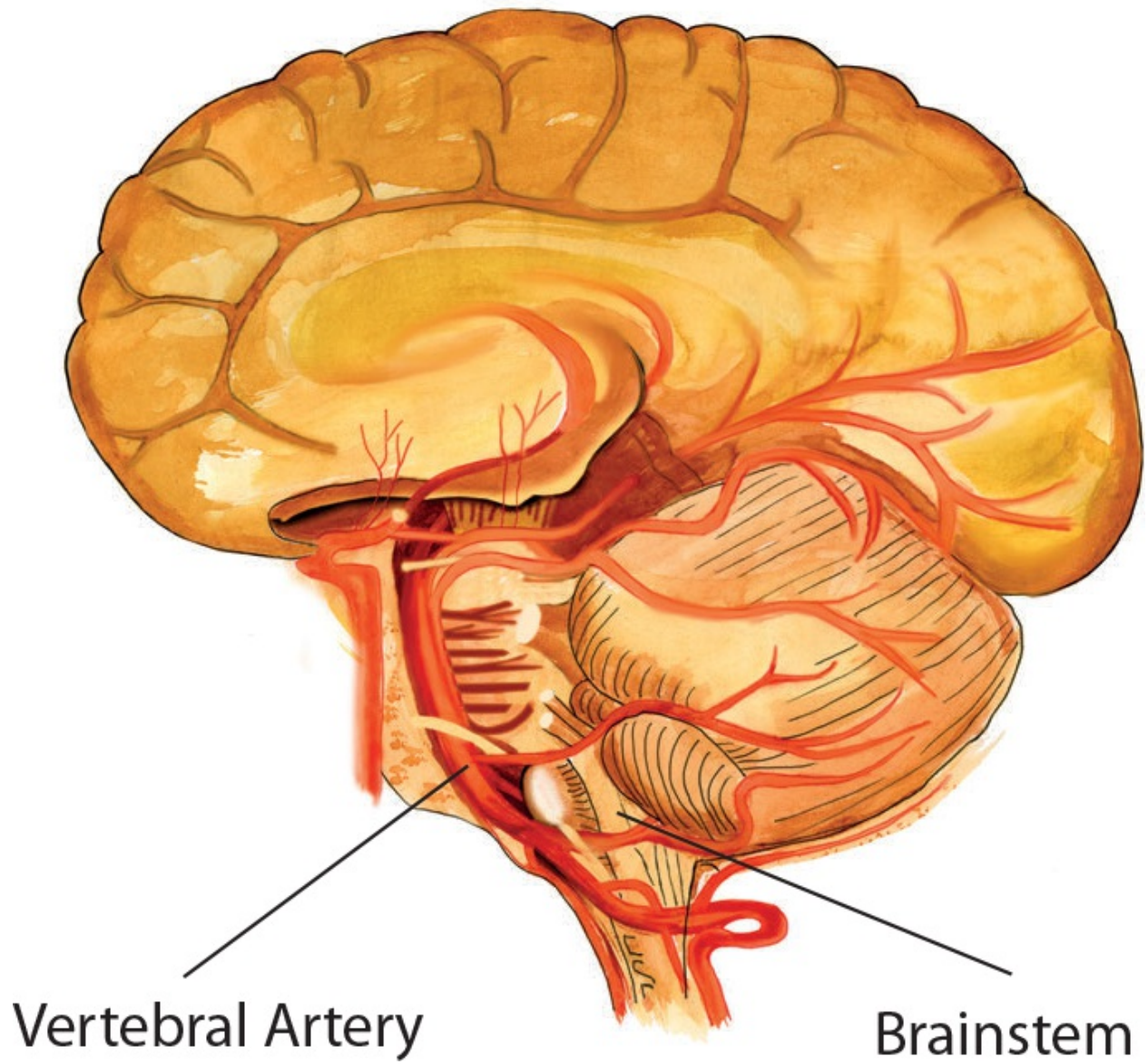


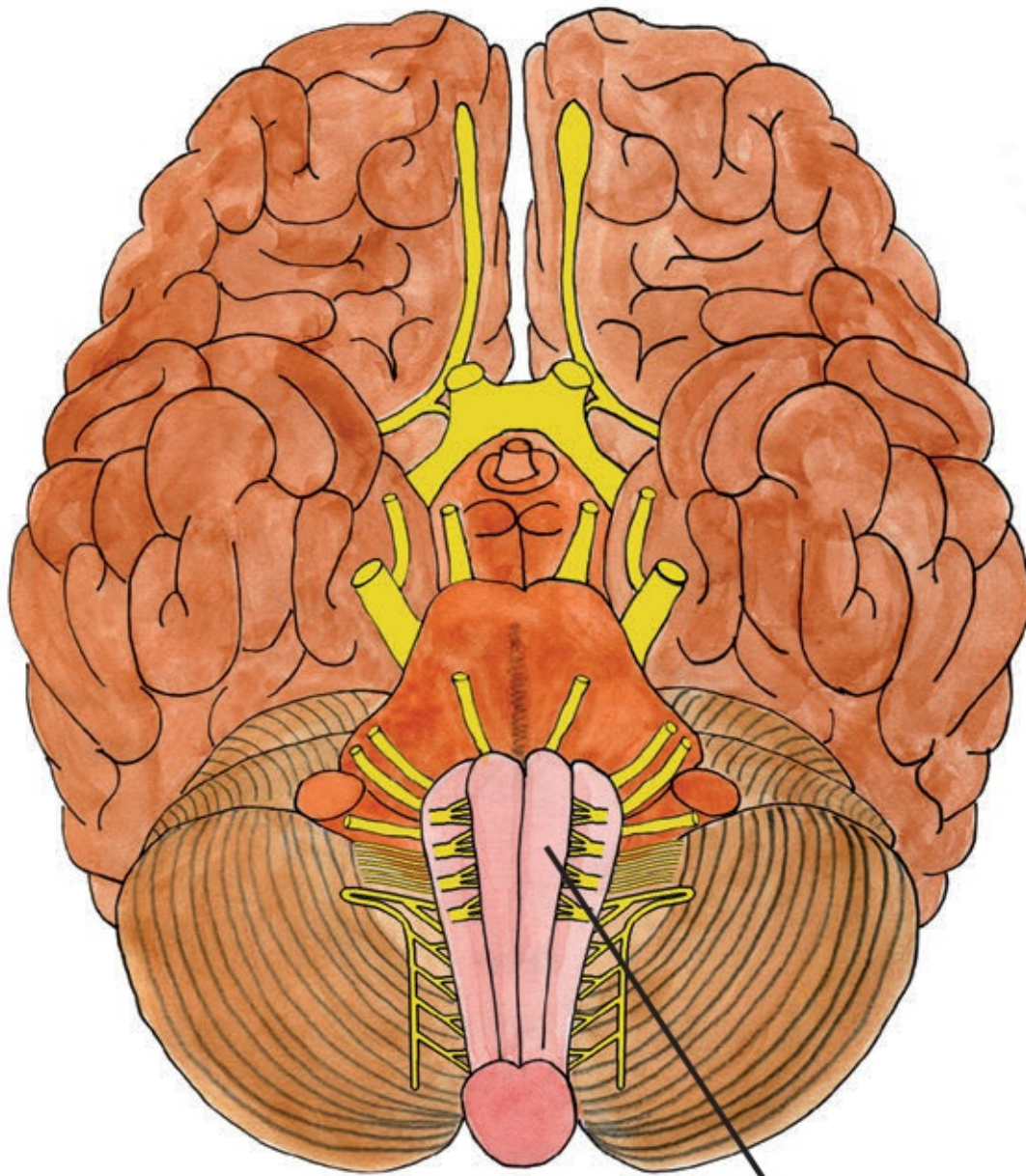
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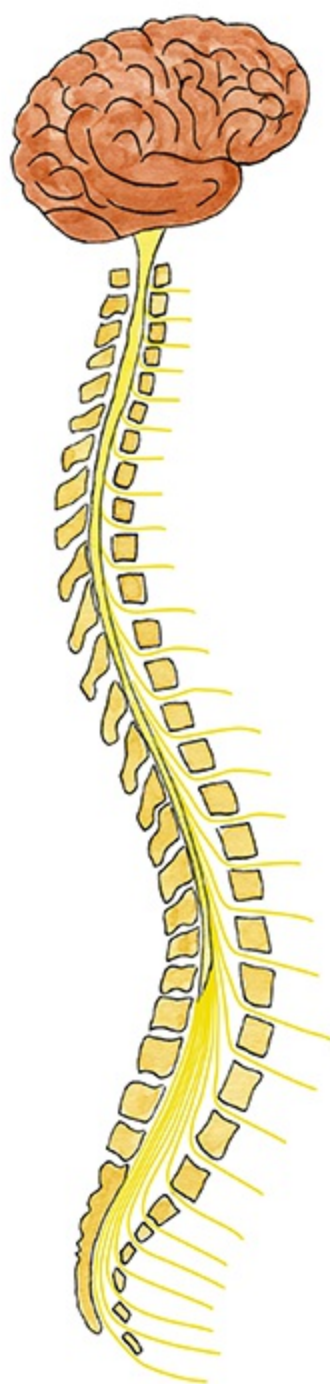
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Appendix





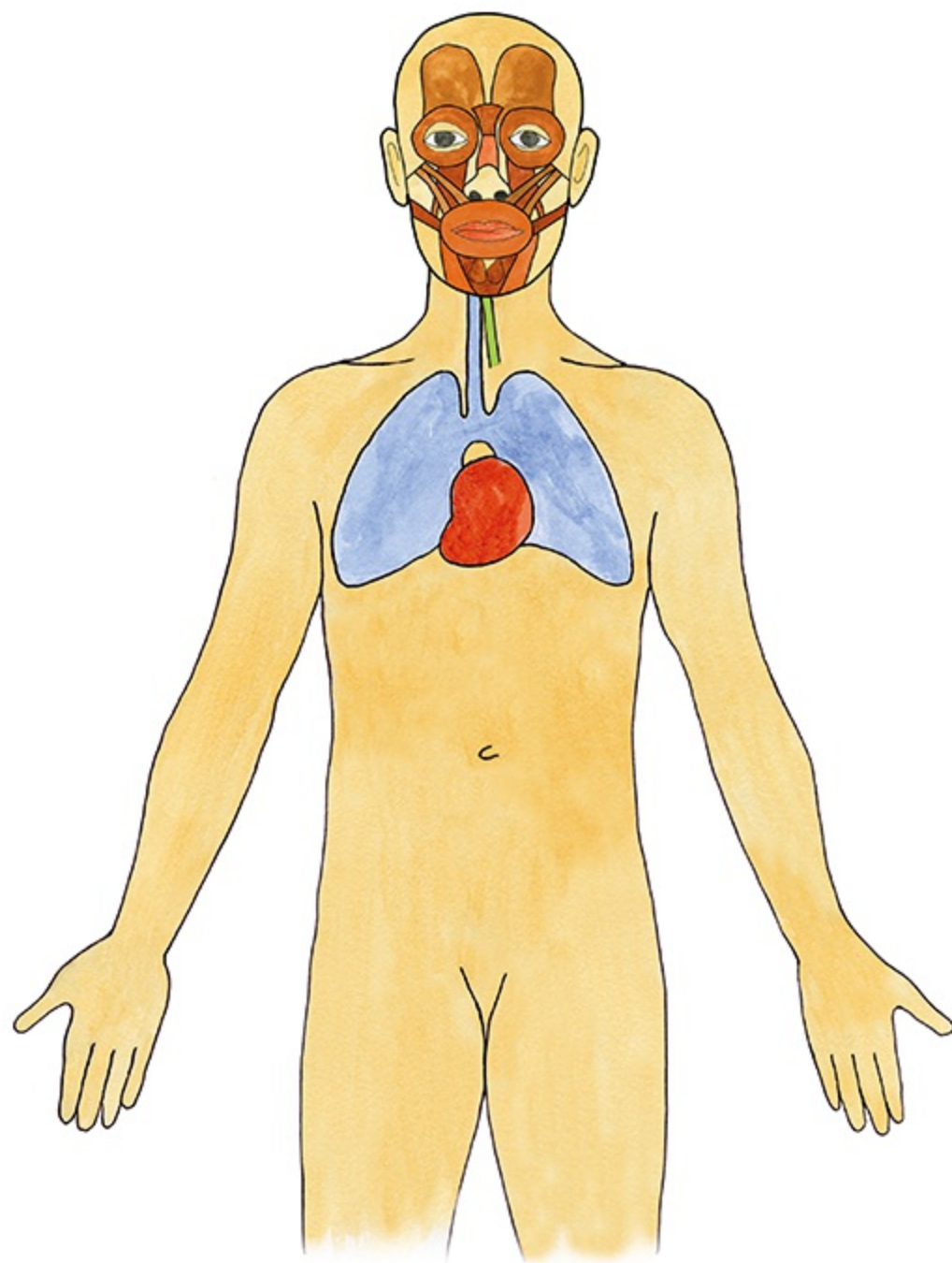
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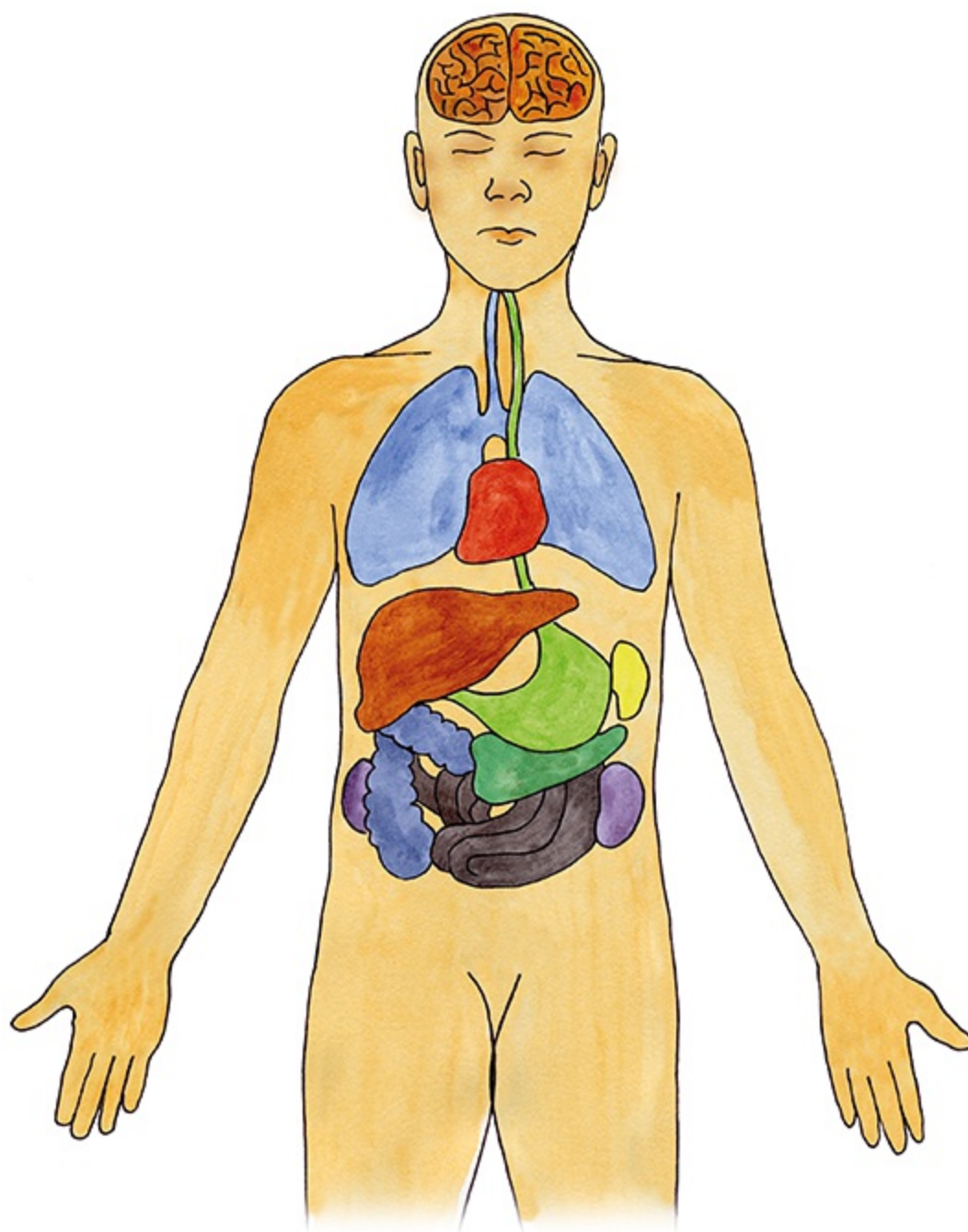
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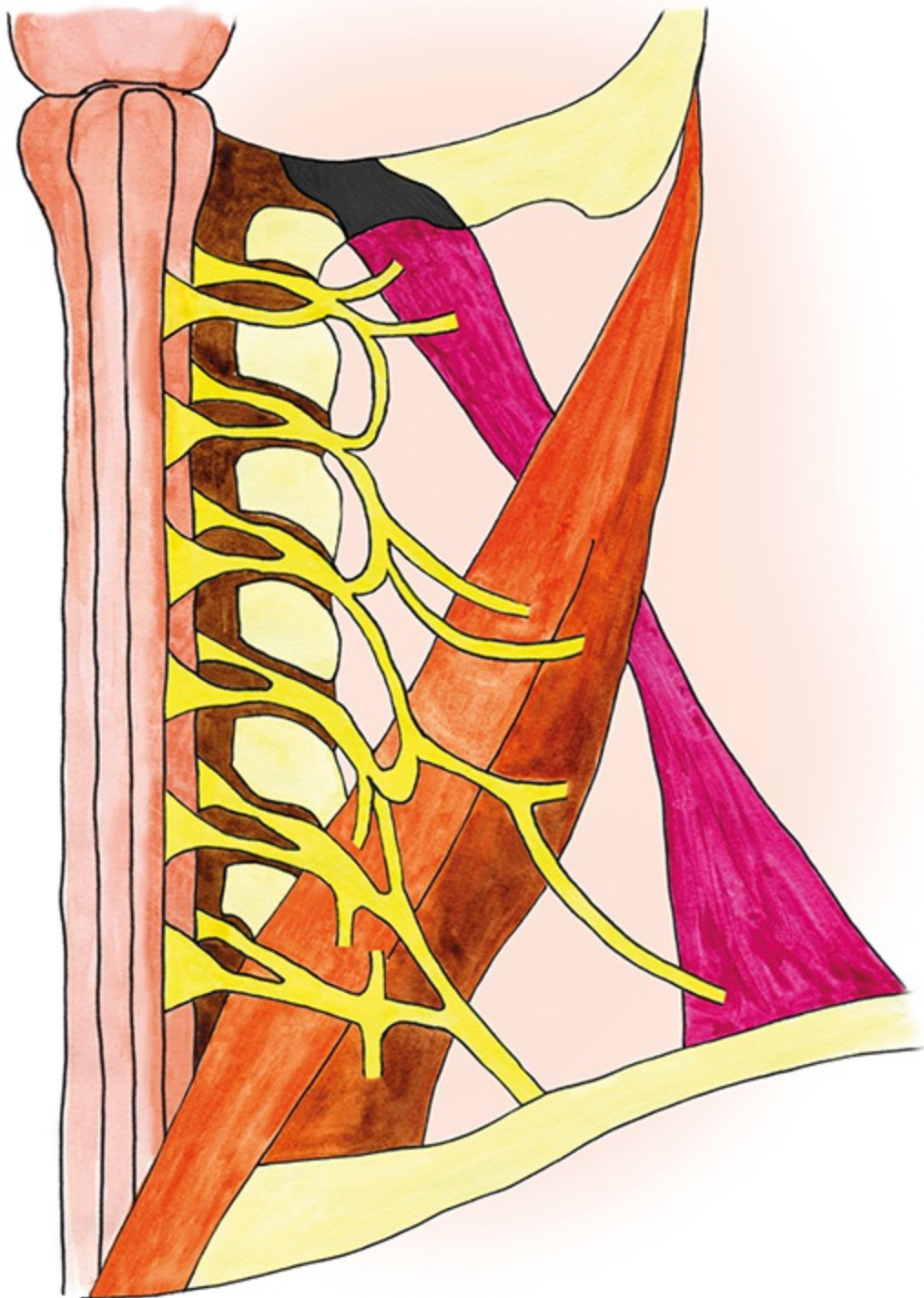
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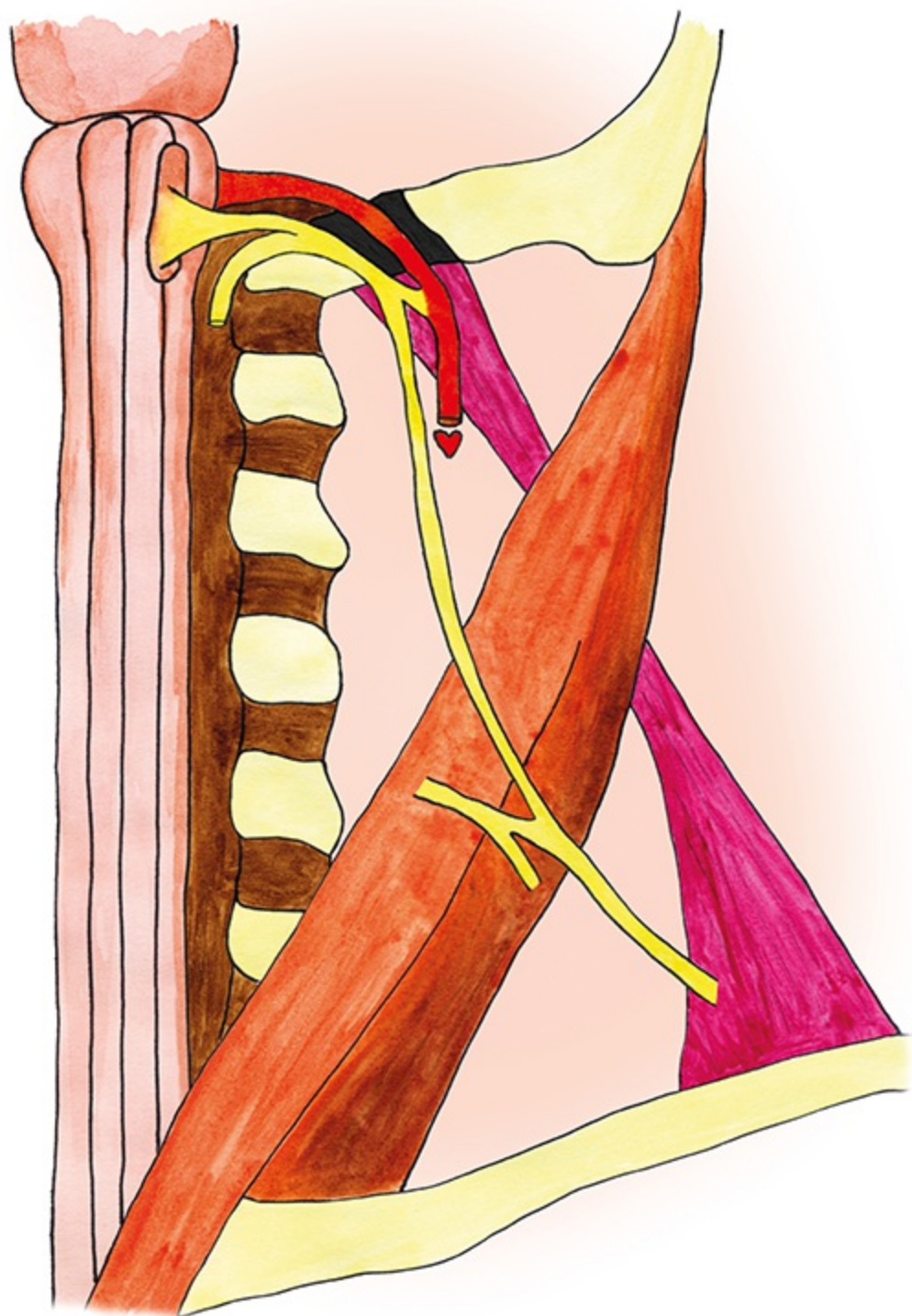


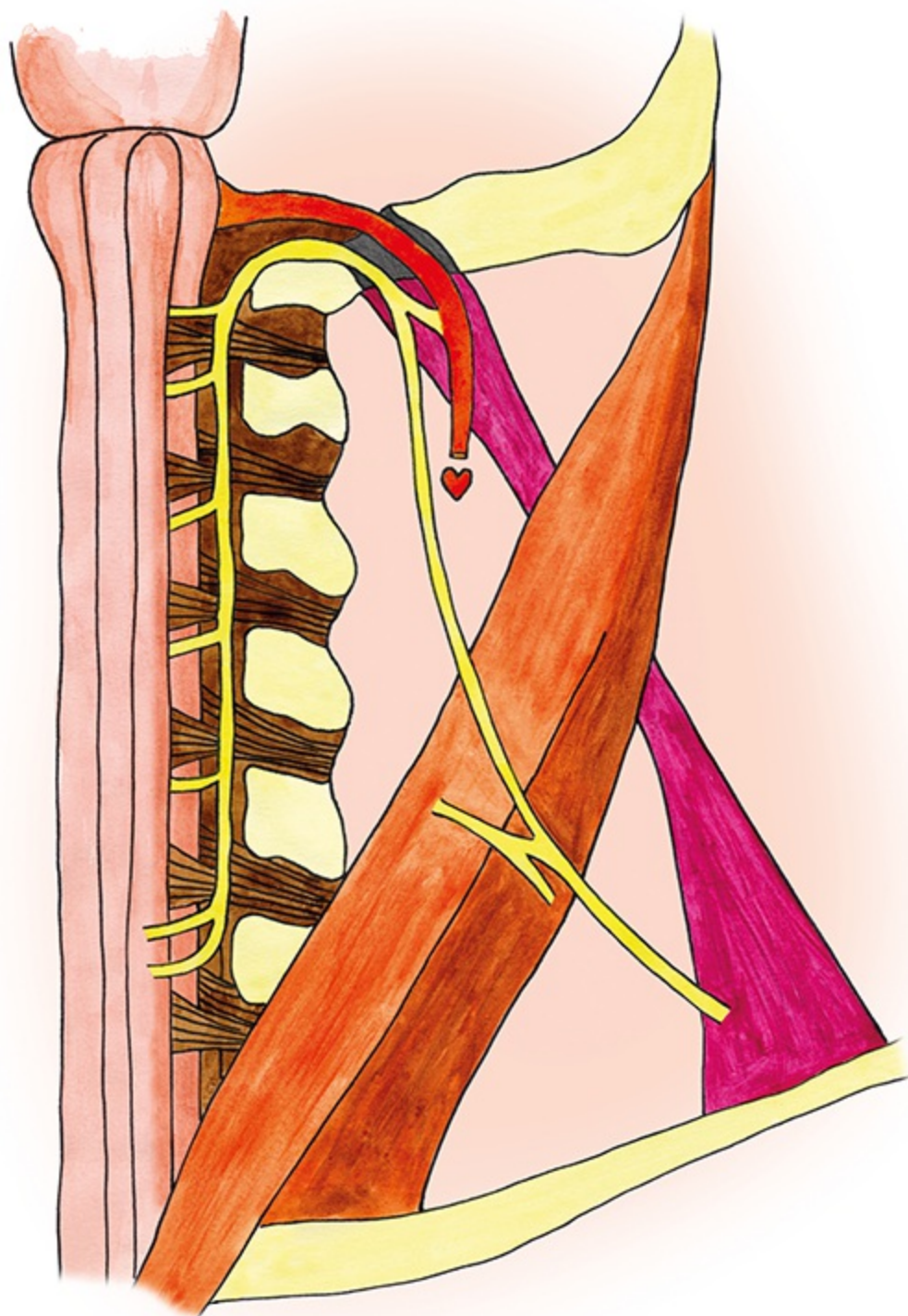
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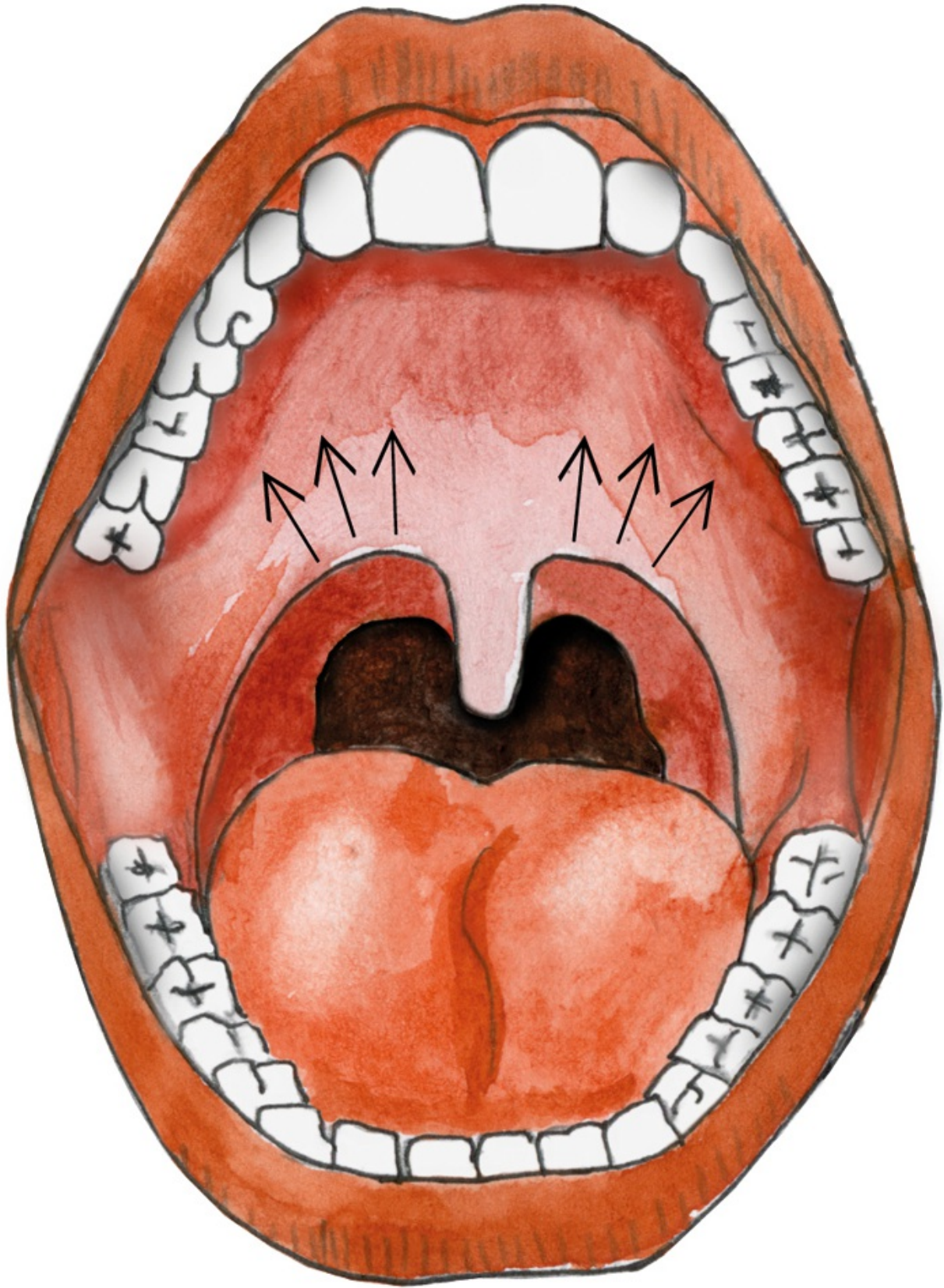


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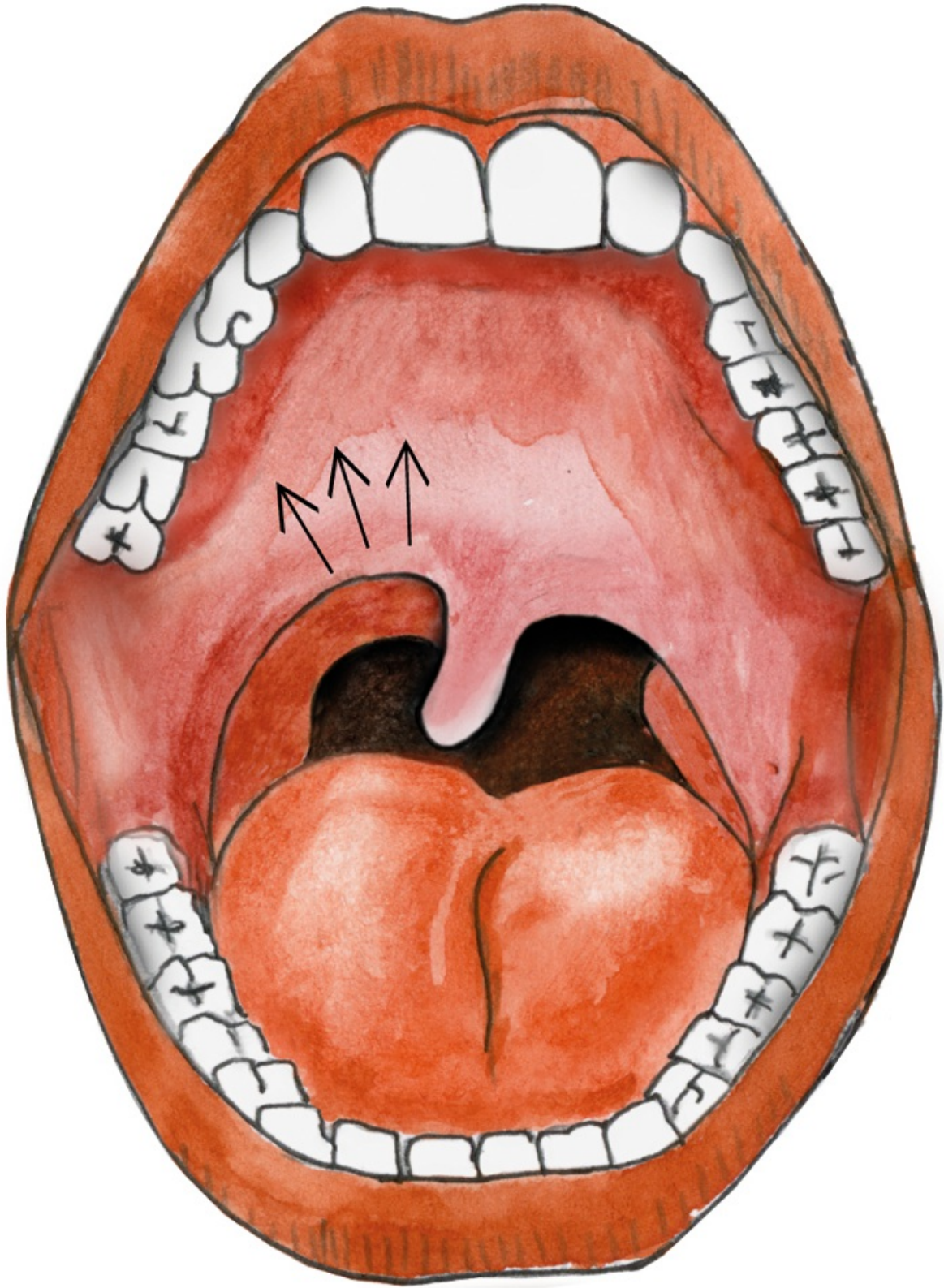
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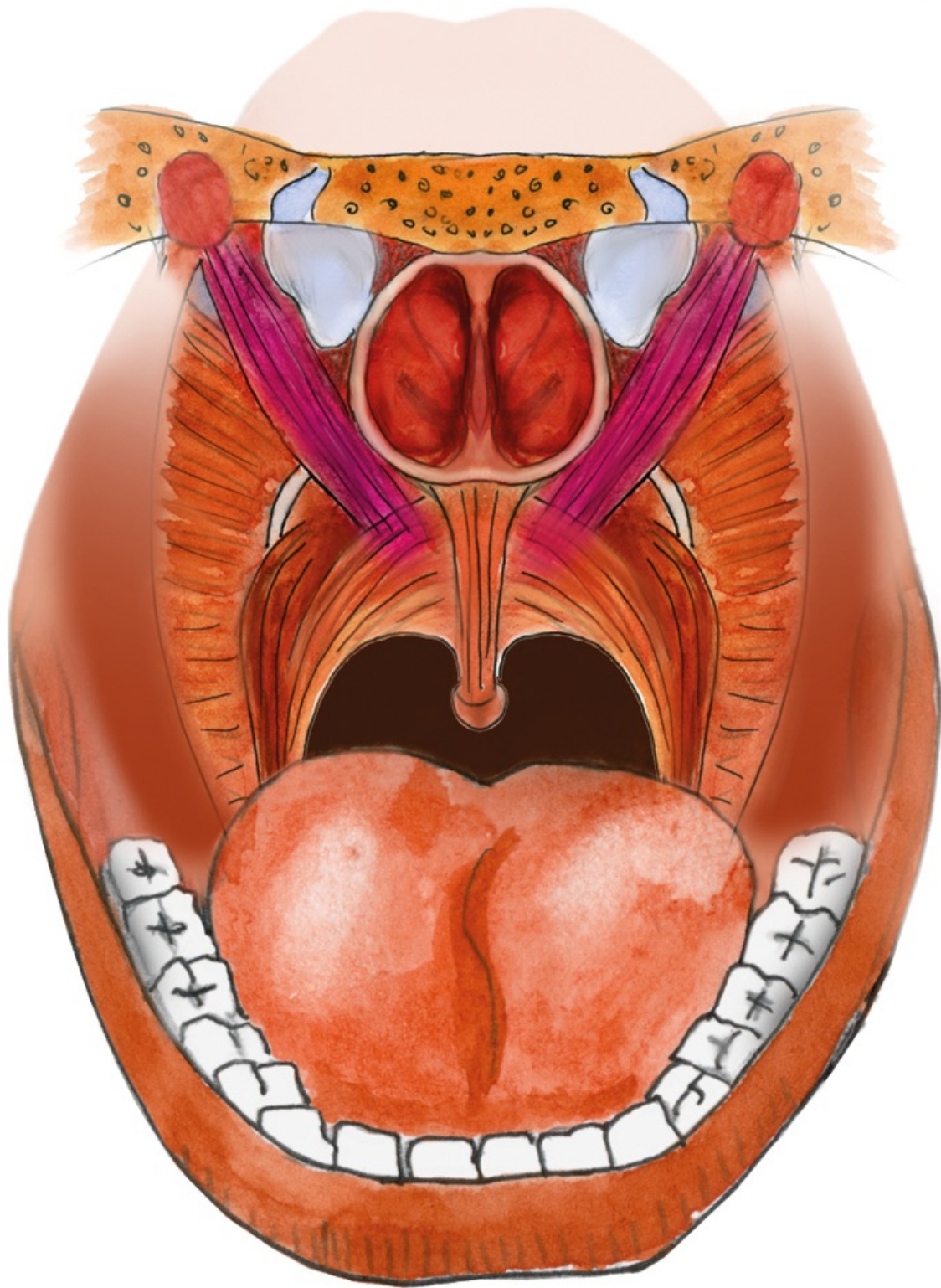
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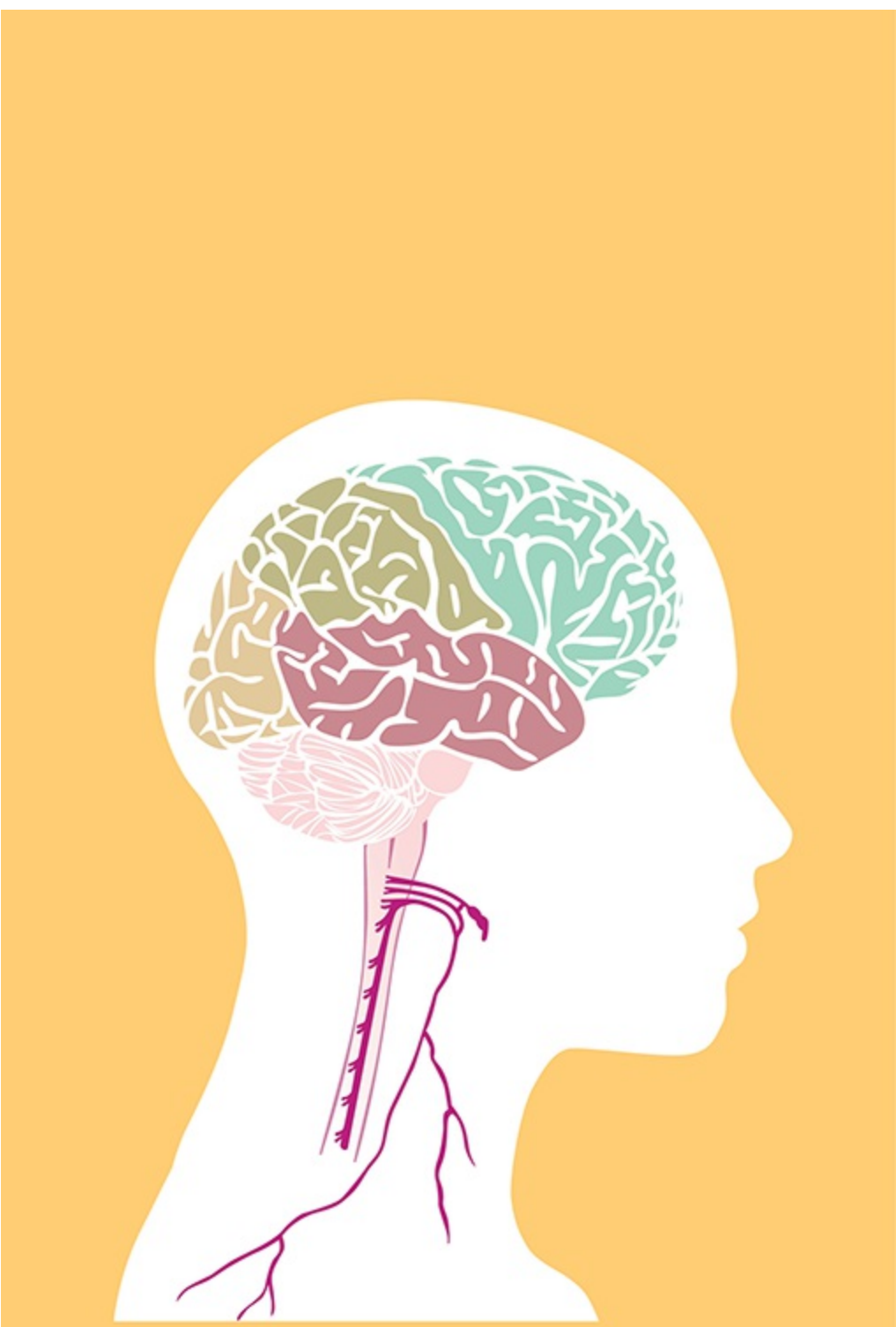


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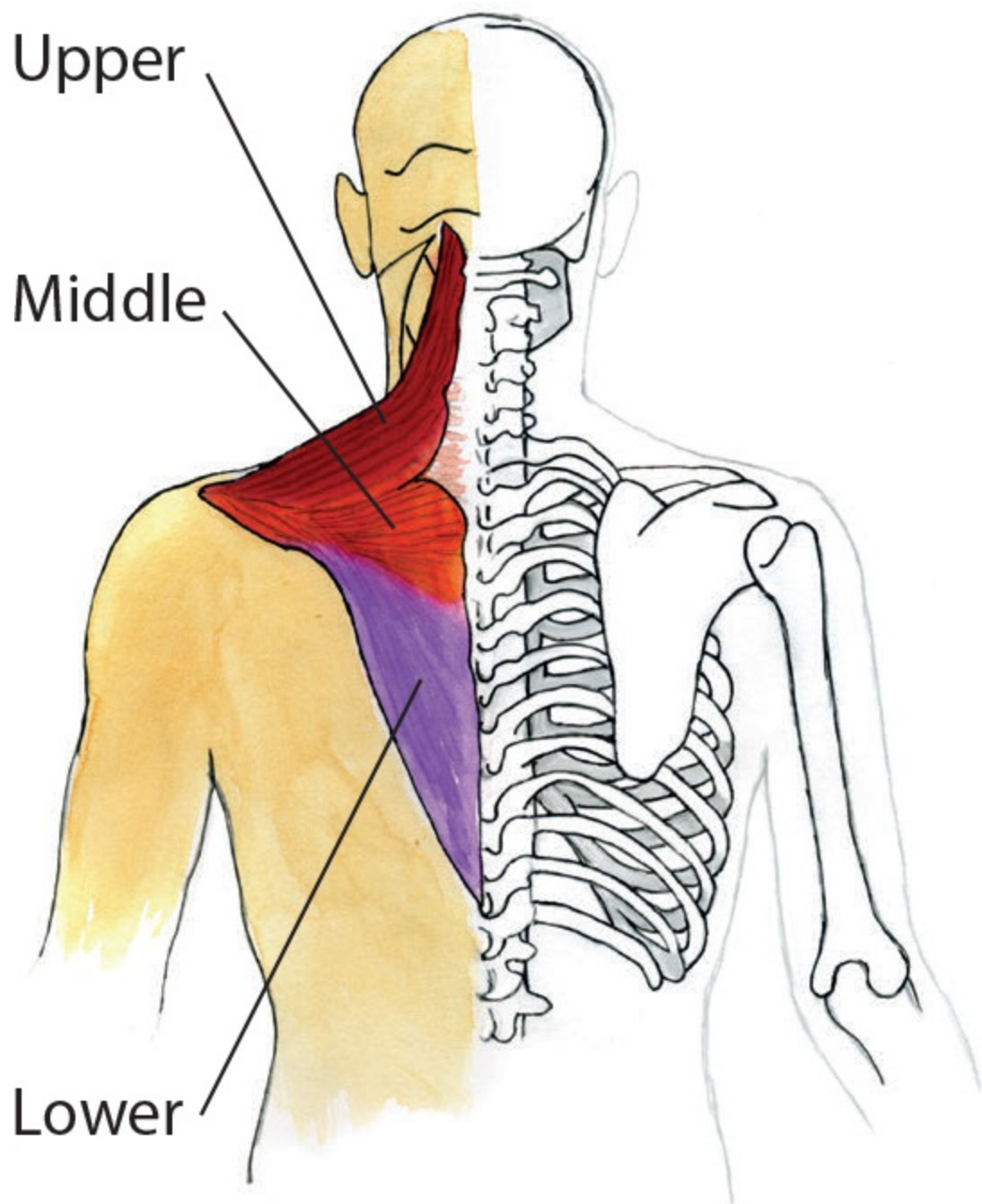
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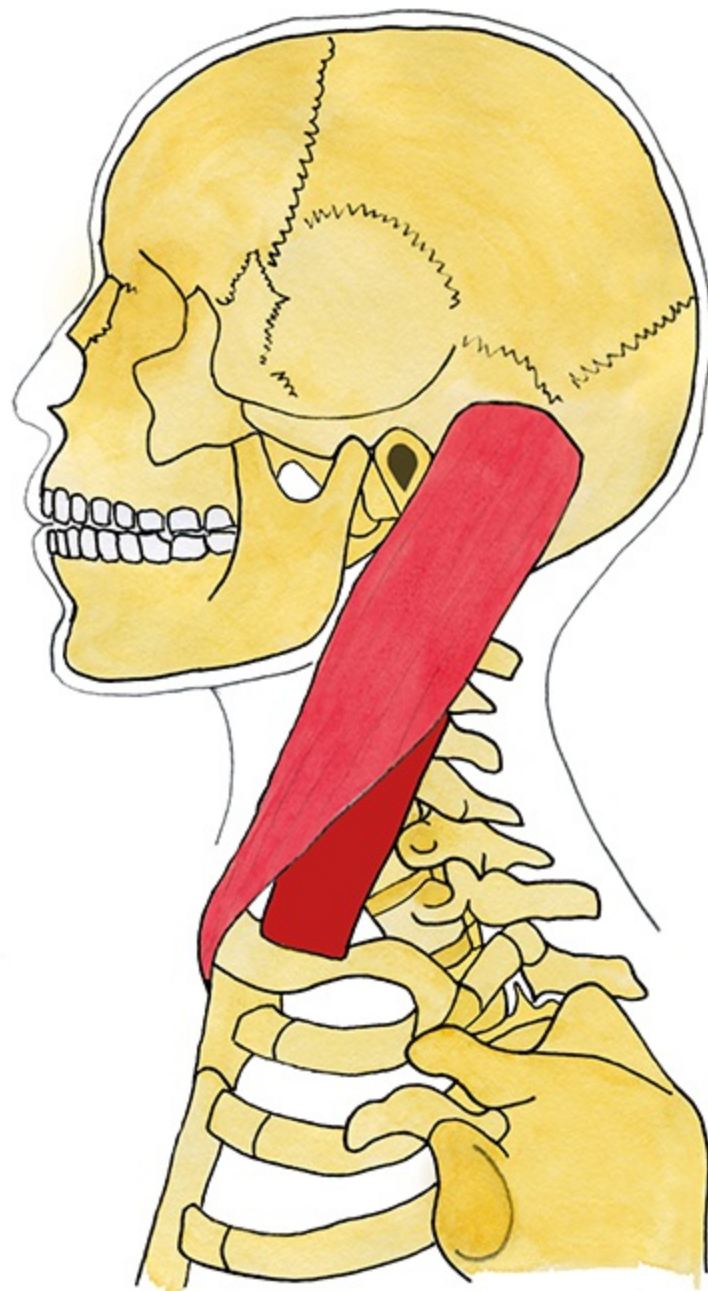
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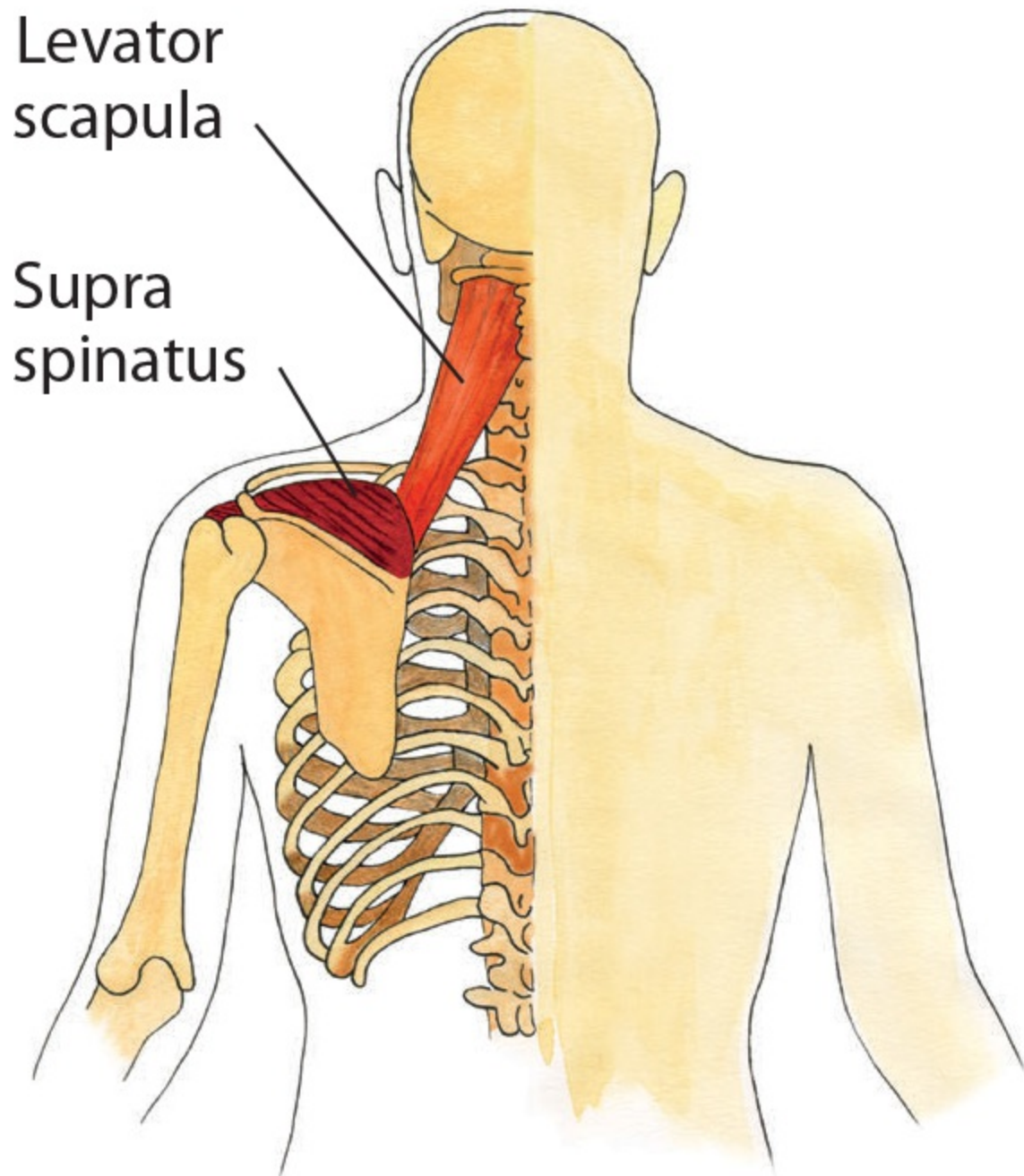
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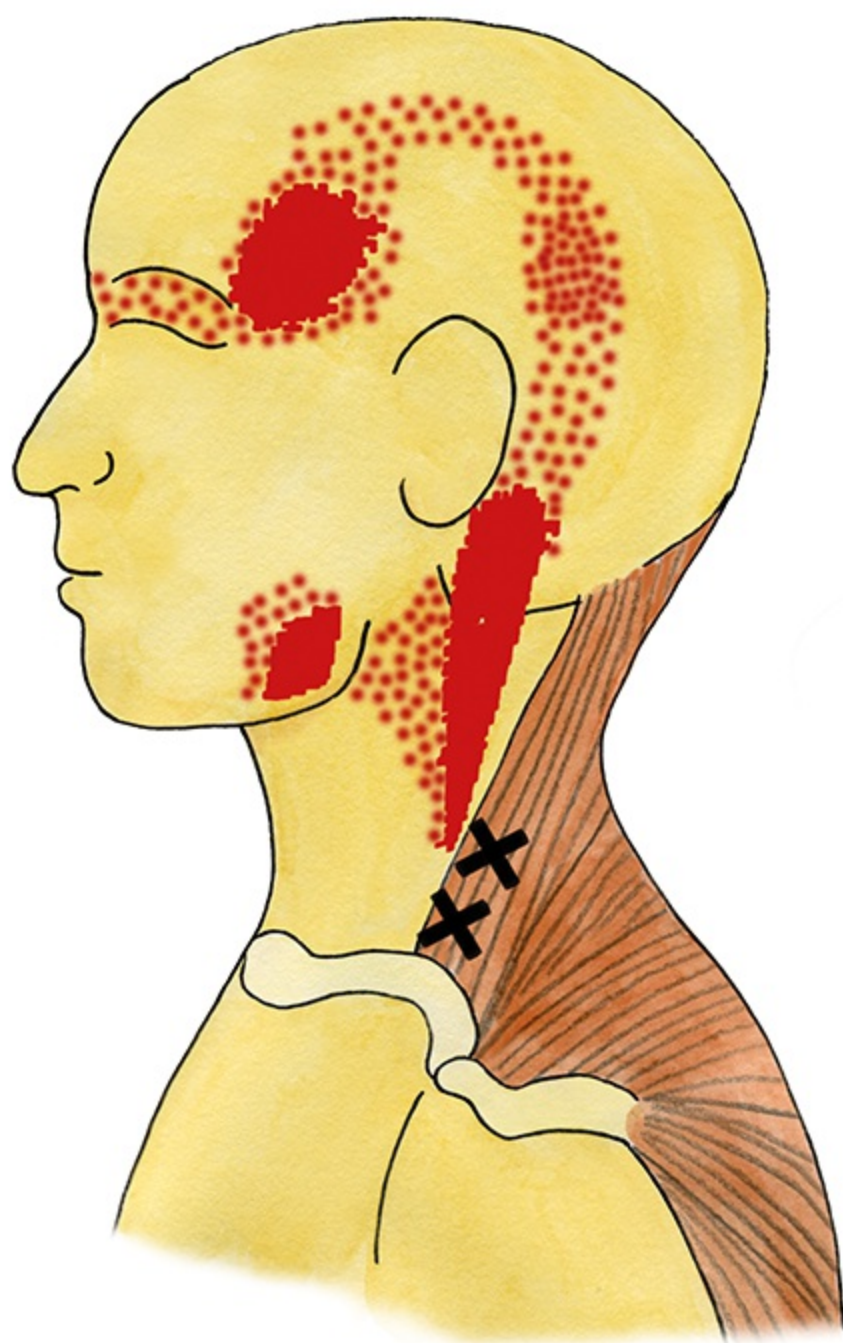
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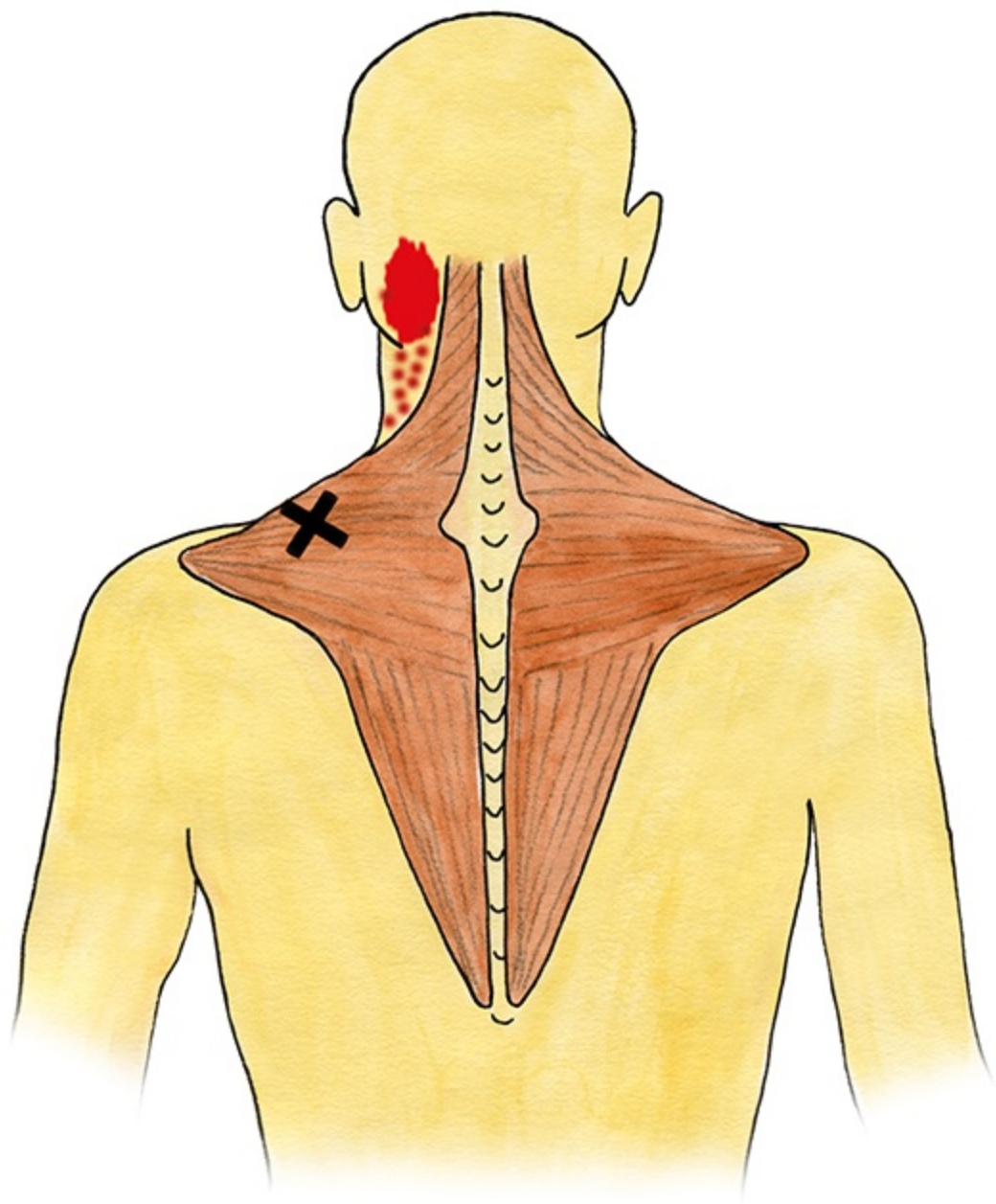
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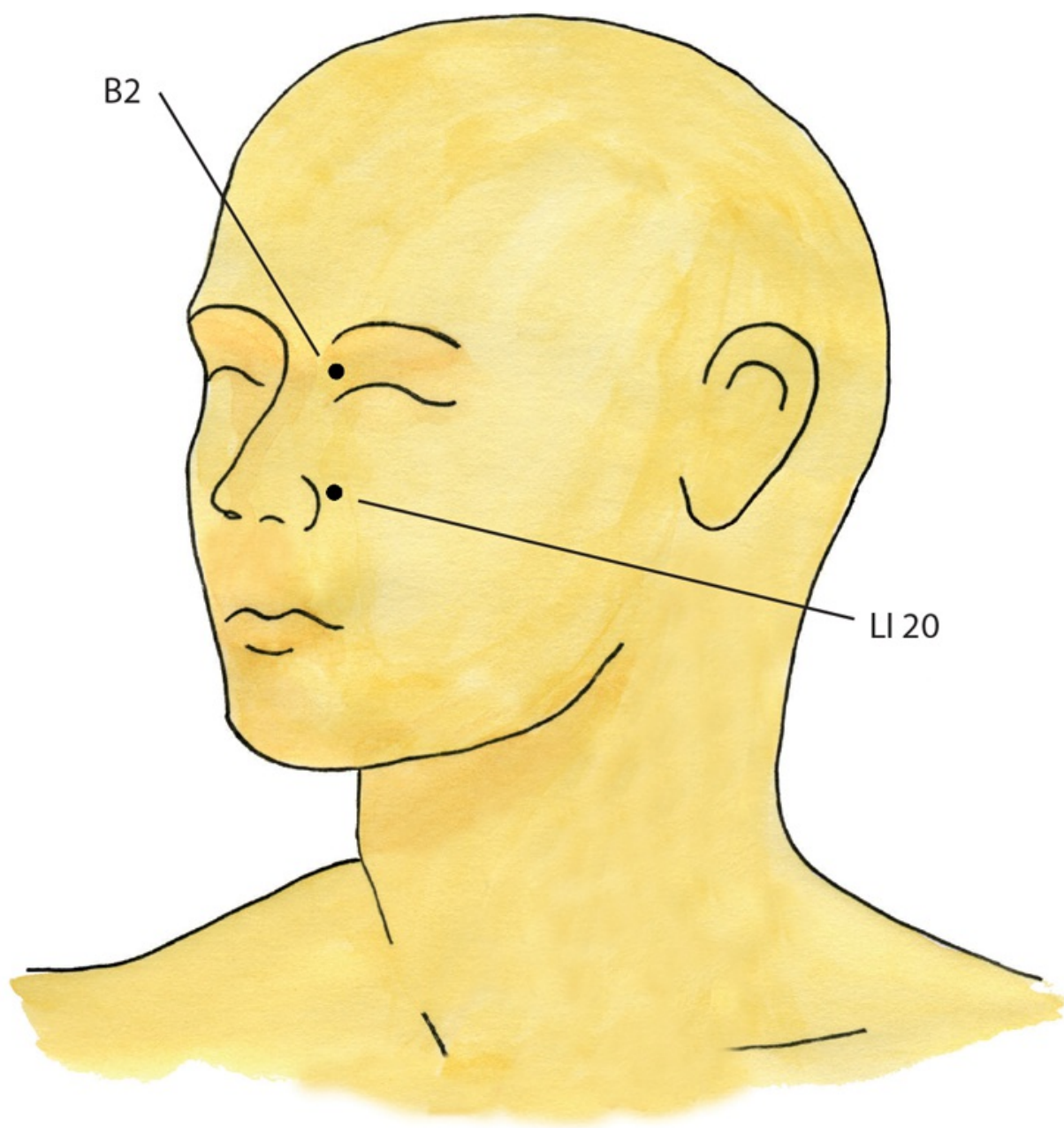
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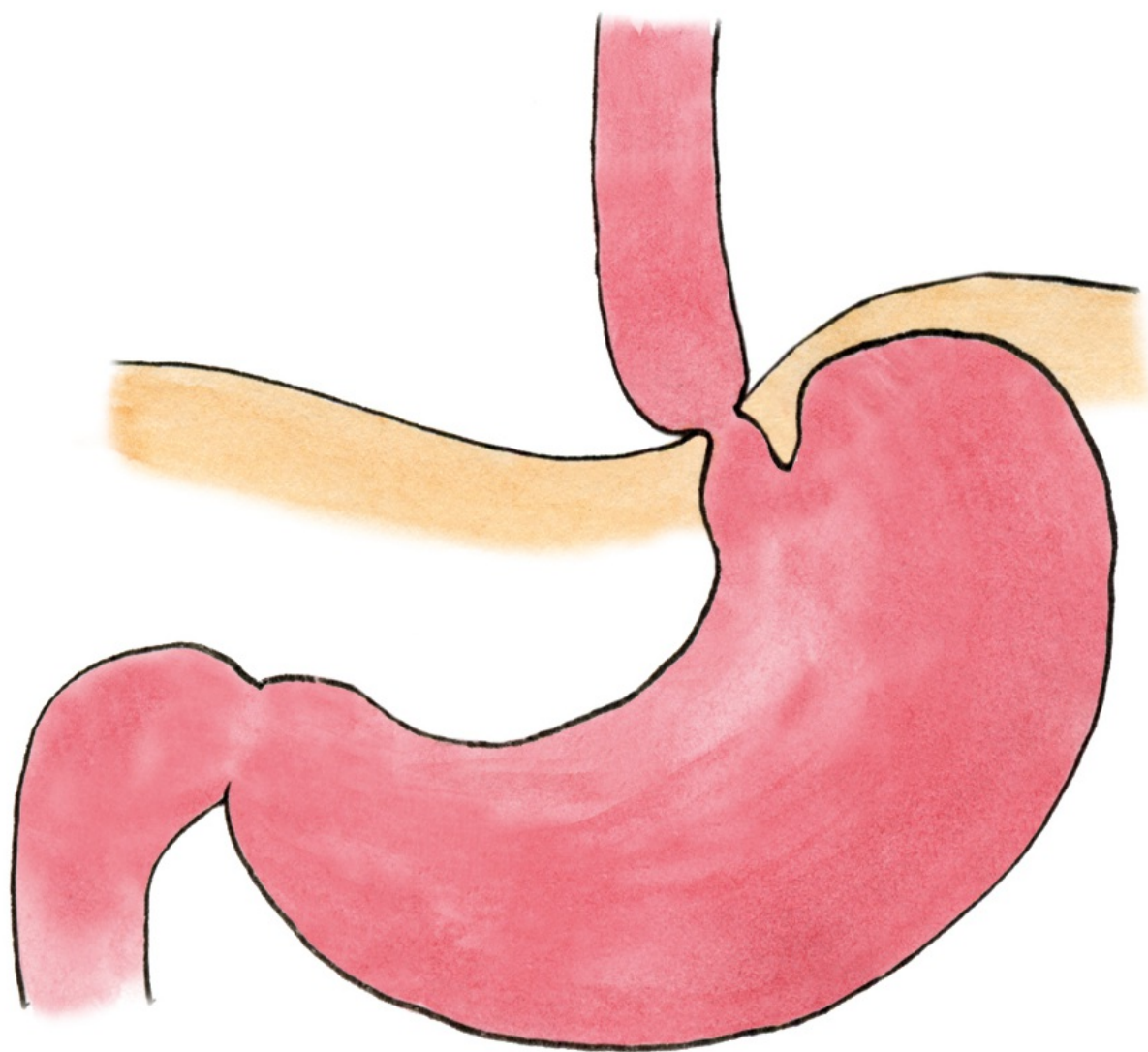
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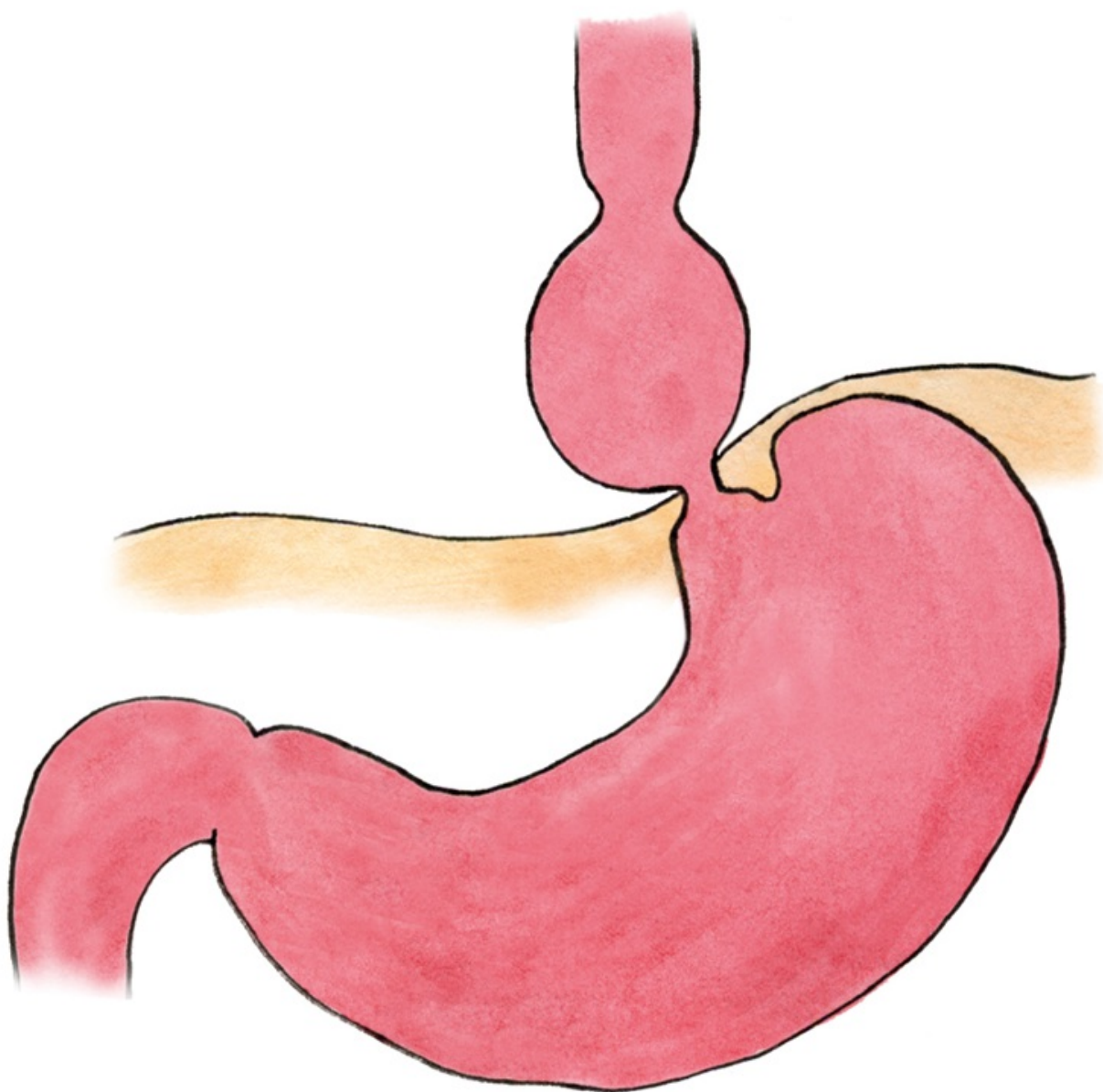


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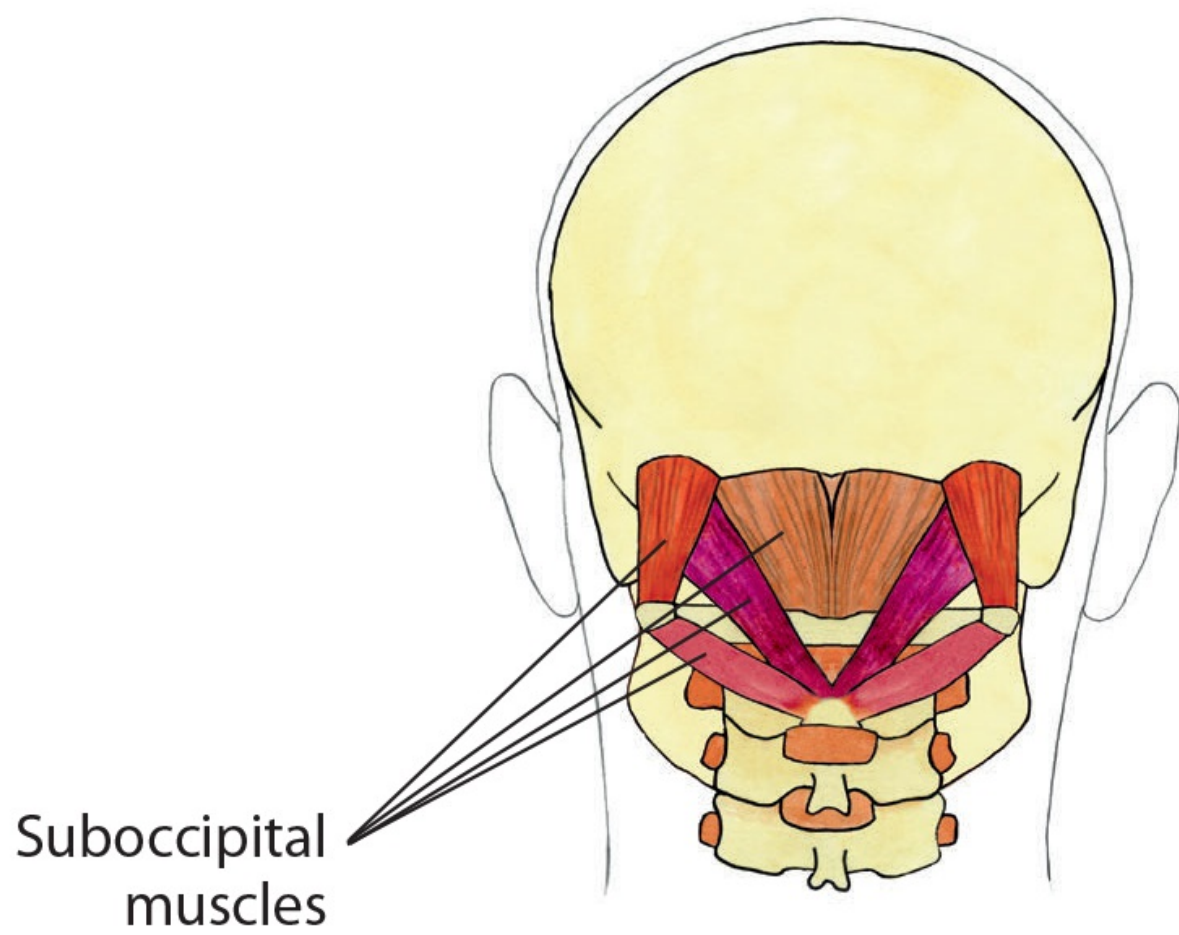
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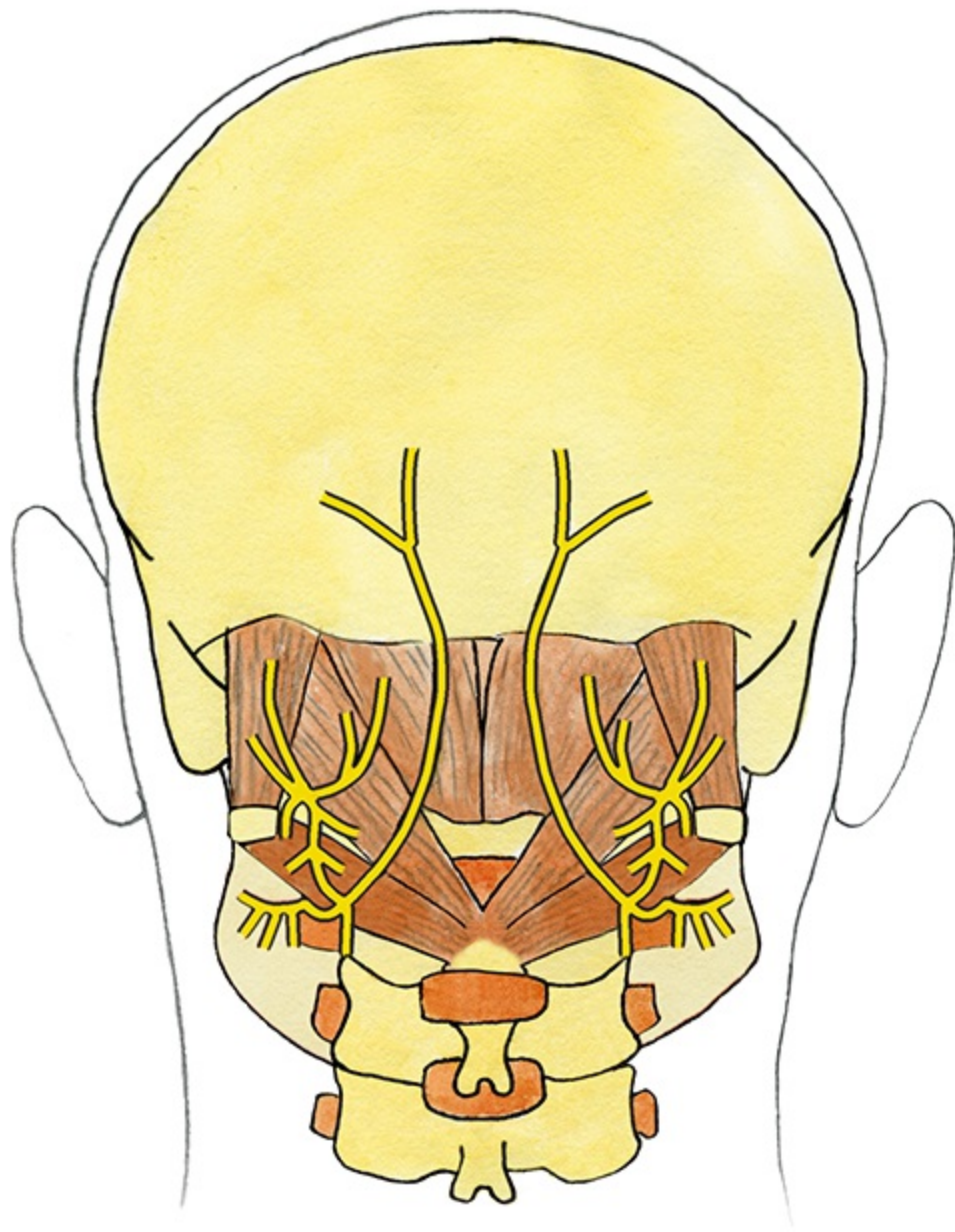
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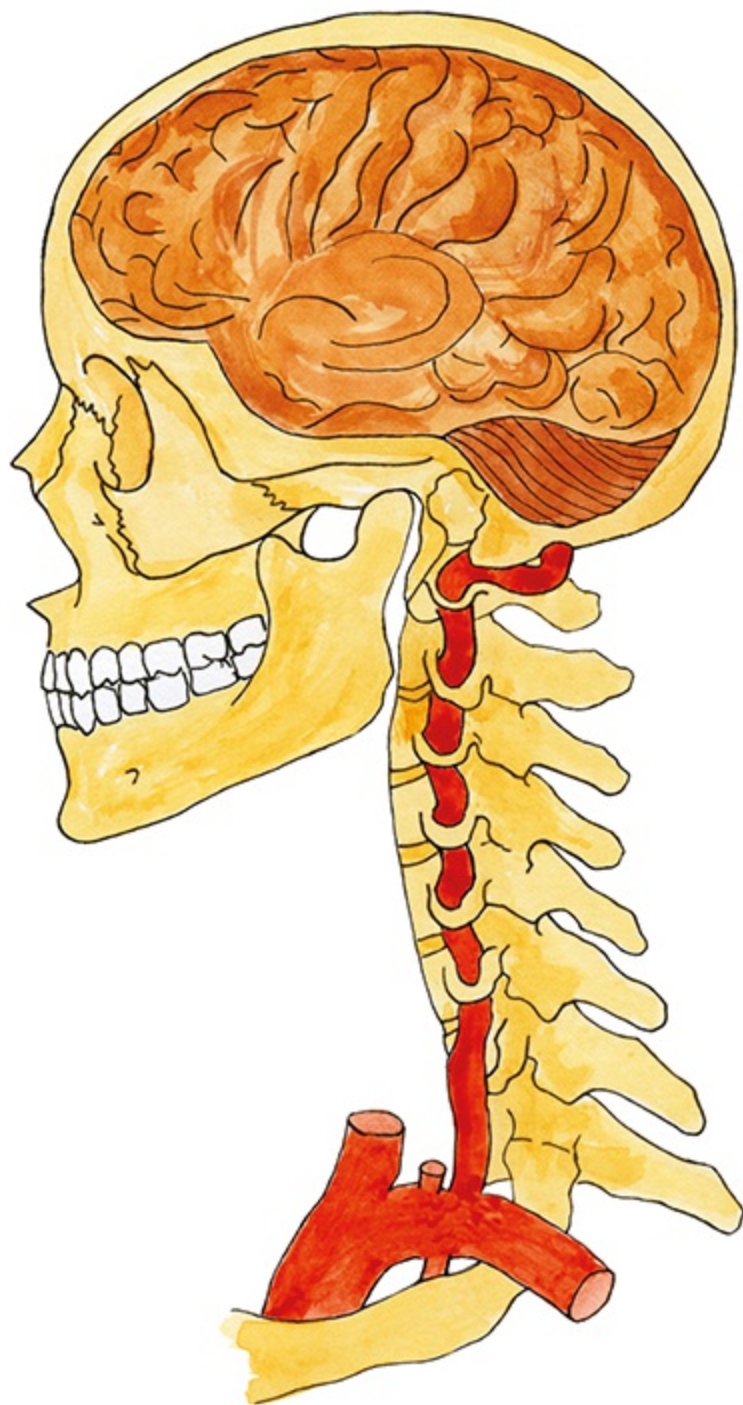
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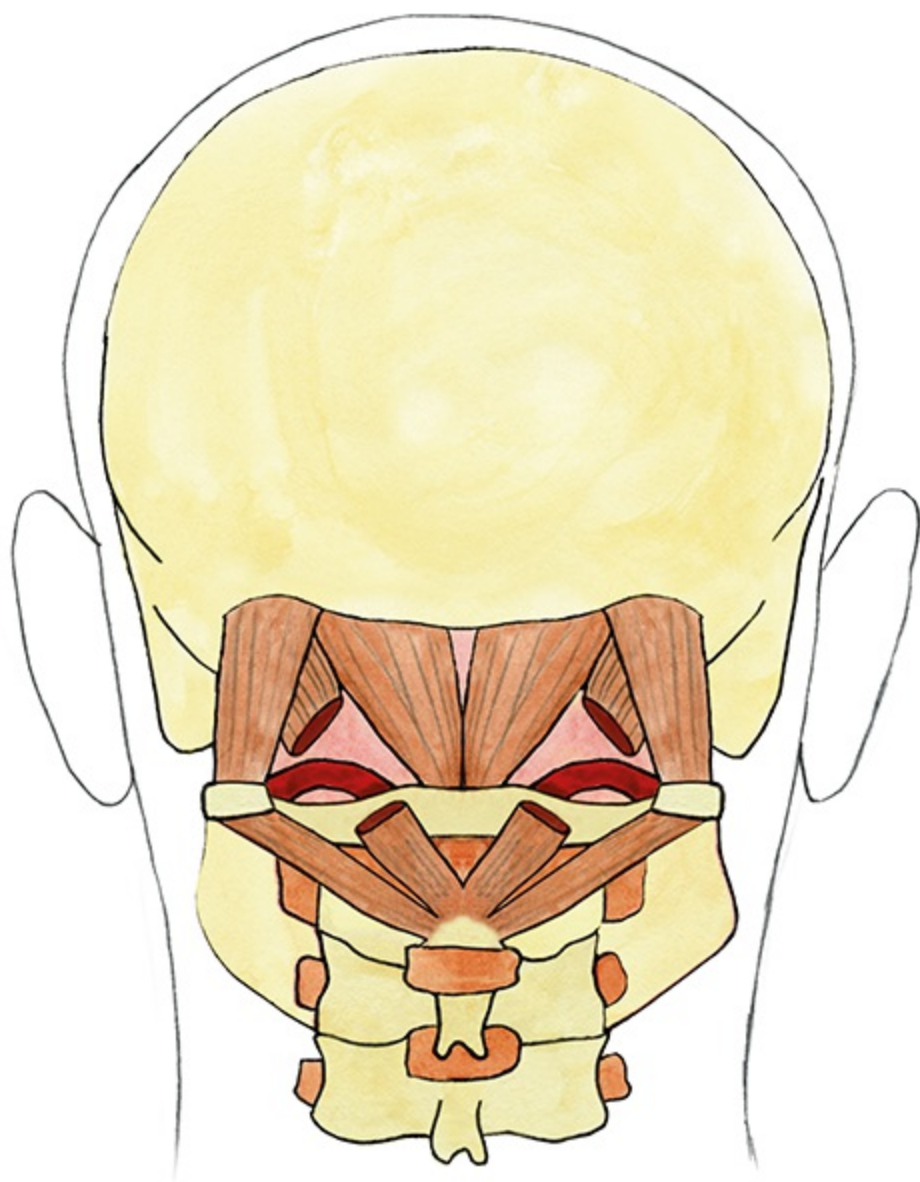
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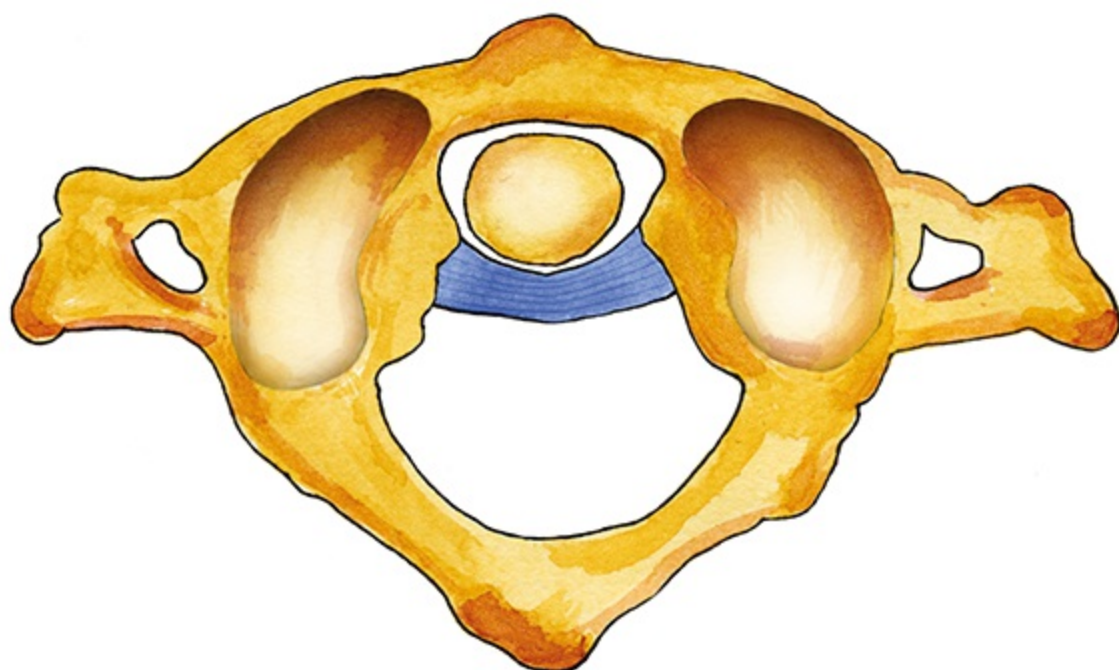
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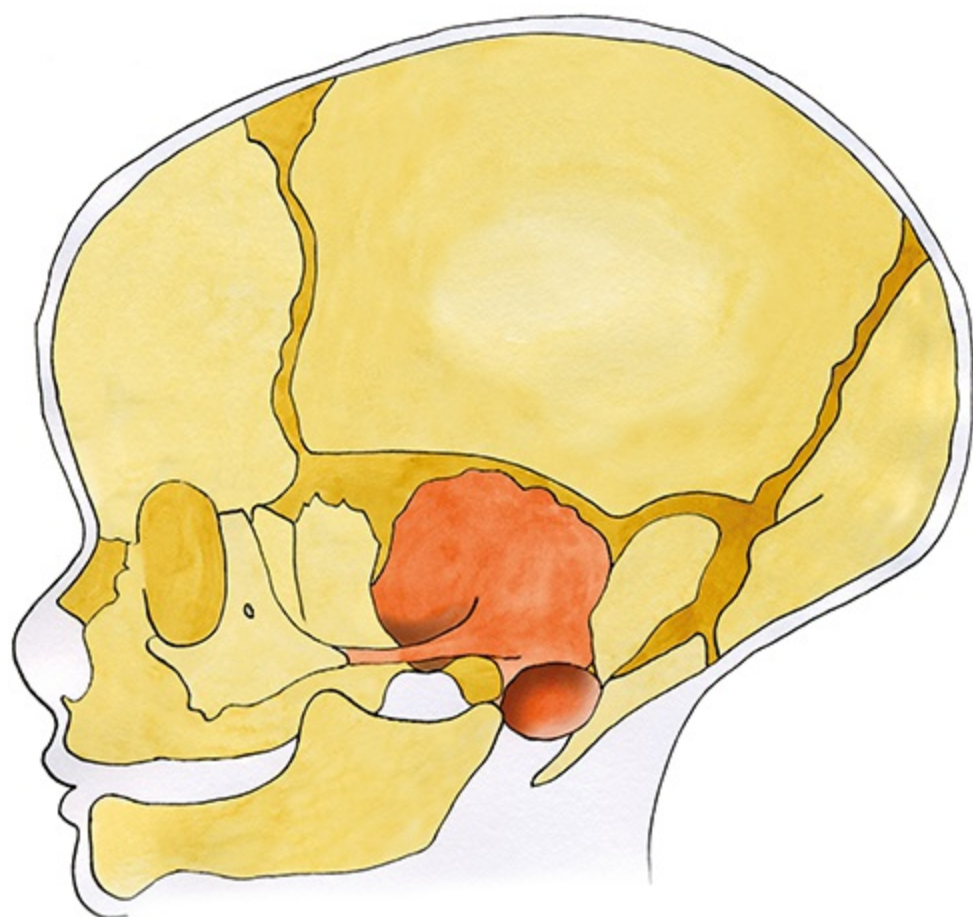
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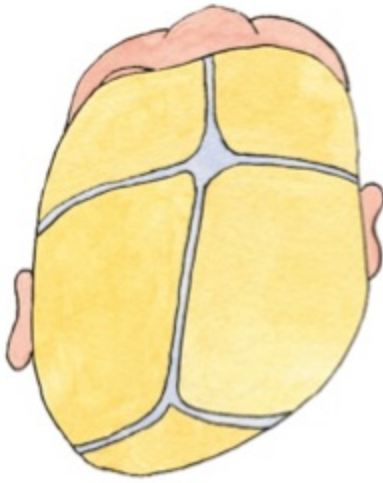
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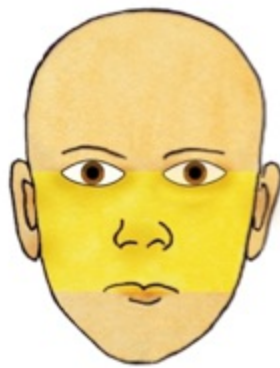
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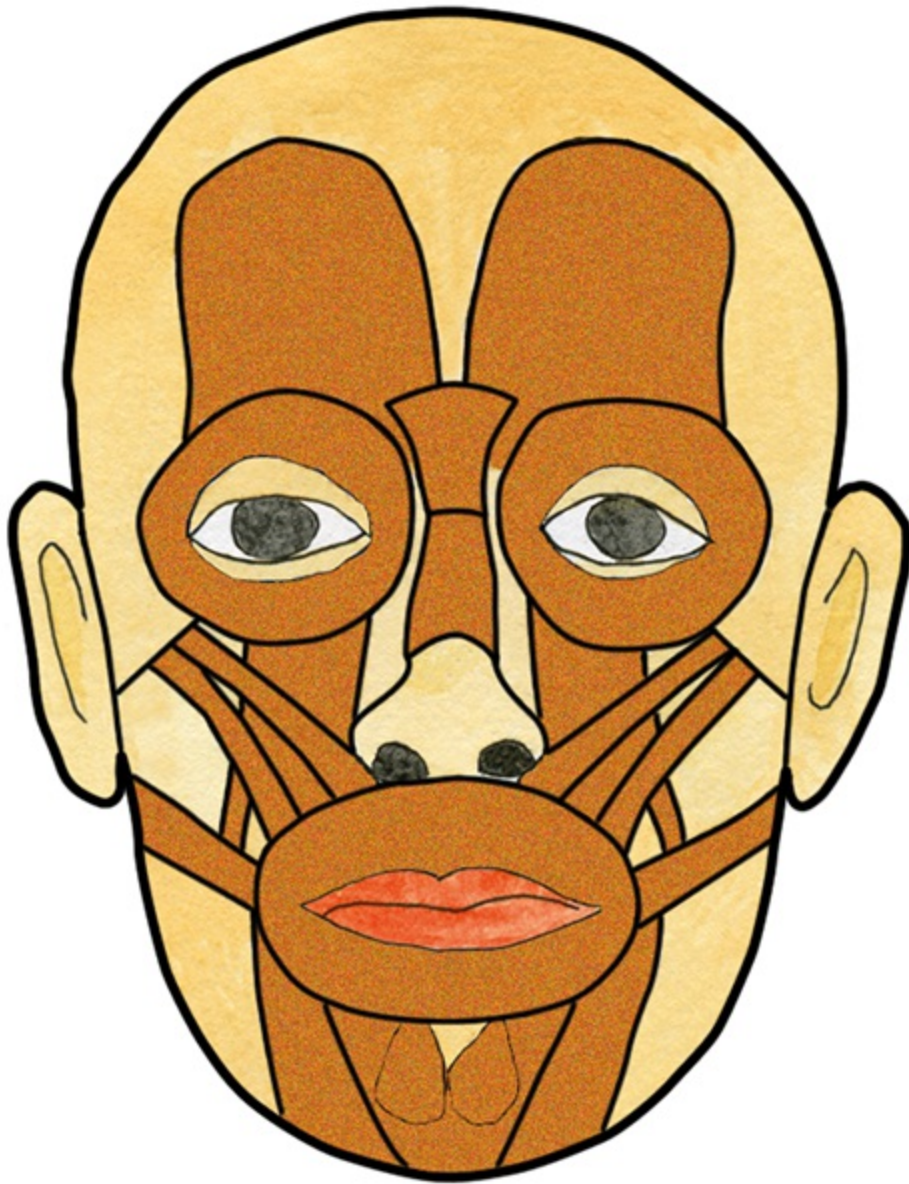
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