Yoga and the Science of Pain

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What Is Pain?

Pain is an unpleasant sensory and emotional experience linked to actual or possible tissue damage, or one that resembles it.

International Association for the Study of Pain, 2020 (paraphrased)

- Pain is always personal.
- Pain is shaped by your body, your mind, and your daily life.
- You can't measure pain just by looking at nerve activity.

Your nerves send danger signals. Your brain weighs those signals against everything it knows, like past experiences, stress, sleep, pain tolerance, and how safe you feel, and then creates the experience of pain.

Acute vs. Chronic Pain



Acute Pain

Pain that happens suddenly and then goes away when healing happens. You sprain your ankle, it hurts, you protect it, it heals, and the pain fades.



Chronic Pain

Pain that lasts longer than about three months, or past normal healing time. (arthritis, back problems, etc.)

Chronic pain has the greatest impact on the nervous system.

Pain as an alarm system

Pain is your body's alarm, and it's there to protect you.

When you live with chronic pain or chronic illness, the alarm can get too sensitive.

Researchers call this sensitization. Basically your brain and spinal cord start to magnify the pain signals as a way of protecting you.

Pain can worsen and spread, and overall sensitivity to sensory stimulation can increase: sensitivity to light, sound, smells, temperature, along with fatigue and poor sleep. Your whole nervous system becomes on high alert.



Think of a smoke detector. It's supposed to go off when there's a fire. But some smoke detectors go off every time you make toast.

Stress turns up the volume.

When your nervous system is in a constant state of threat, bracing and waiting for the next flare, it's like turning up the sensitivity on that alarm even more.

Stress, poor sleep, and worry can all make pain louder.

Something that's only slightly painful can be more painful on days when you're extra stressed or fatigued.



This doesn't mean your pain is not real. It just means that there is a part of it that can be regulated through nervous system regulation tools.


When you live with chronic pain, and someone says “Have you tried yoga?”

What comes to mind when you hear the word yoga?

COMMON YOGA MISCONCEPTIONS

"You have to be flexible."

Not true. All yoga movements are adaptable.

"Yoga is only stretching."

Some of the most powerful yoga involves zero stretching. It's breathwork, rest, meditation, and learning to take care of your nervous system.

"You have to get on the floor to do yoga."

You can do yoga from anywhere, including a chair, couch, or bed.

"Yoga is for healthy people."

Yoga has been used therapeutically for a very long time. The idea that it's only for bendy, healthy bodies came from marketing in the yoga industry.

"I tried yoga and it made my pain worse, so it's not for me."

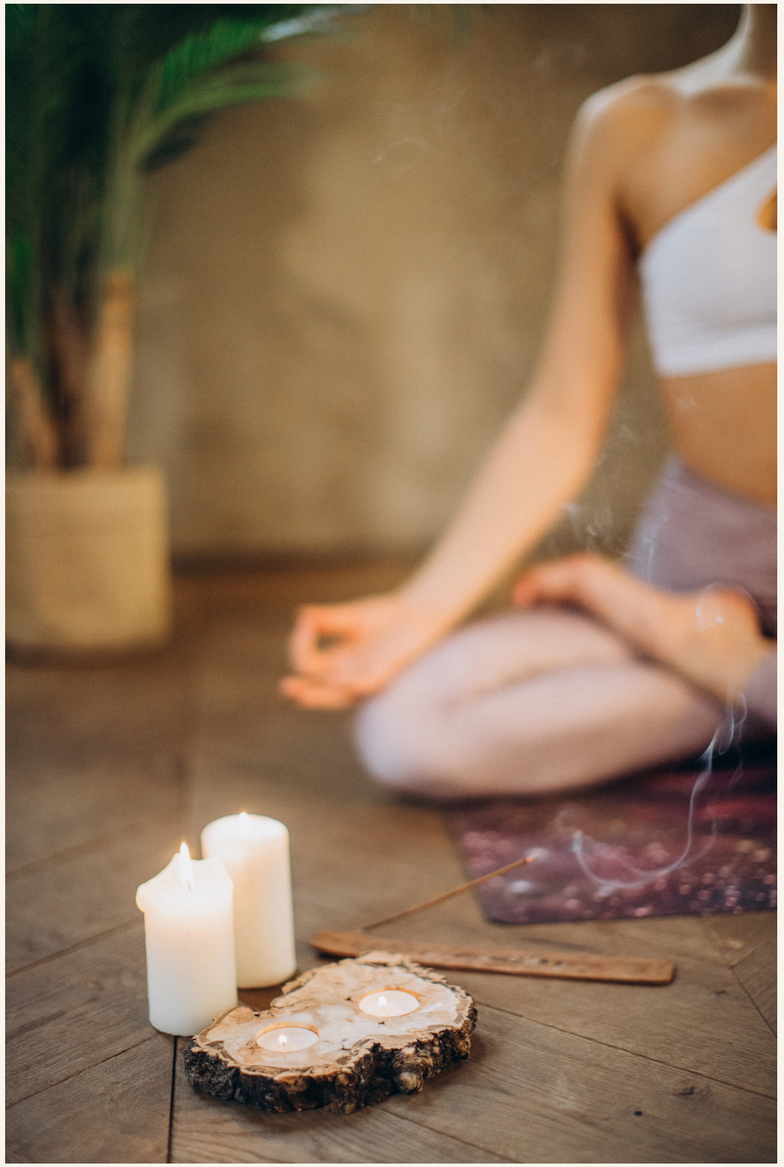
That was probably the wrong class for your body. Too fast, too intense, and nobody adapted it for you. That's exactly why yoga therapy exists: to adapt yoga to the individual.

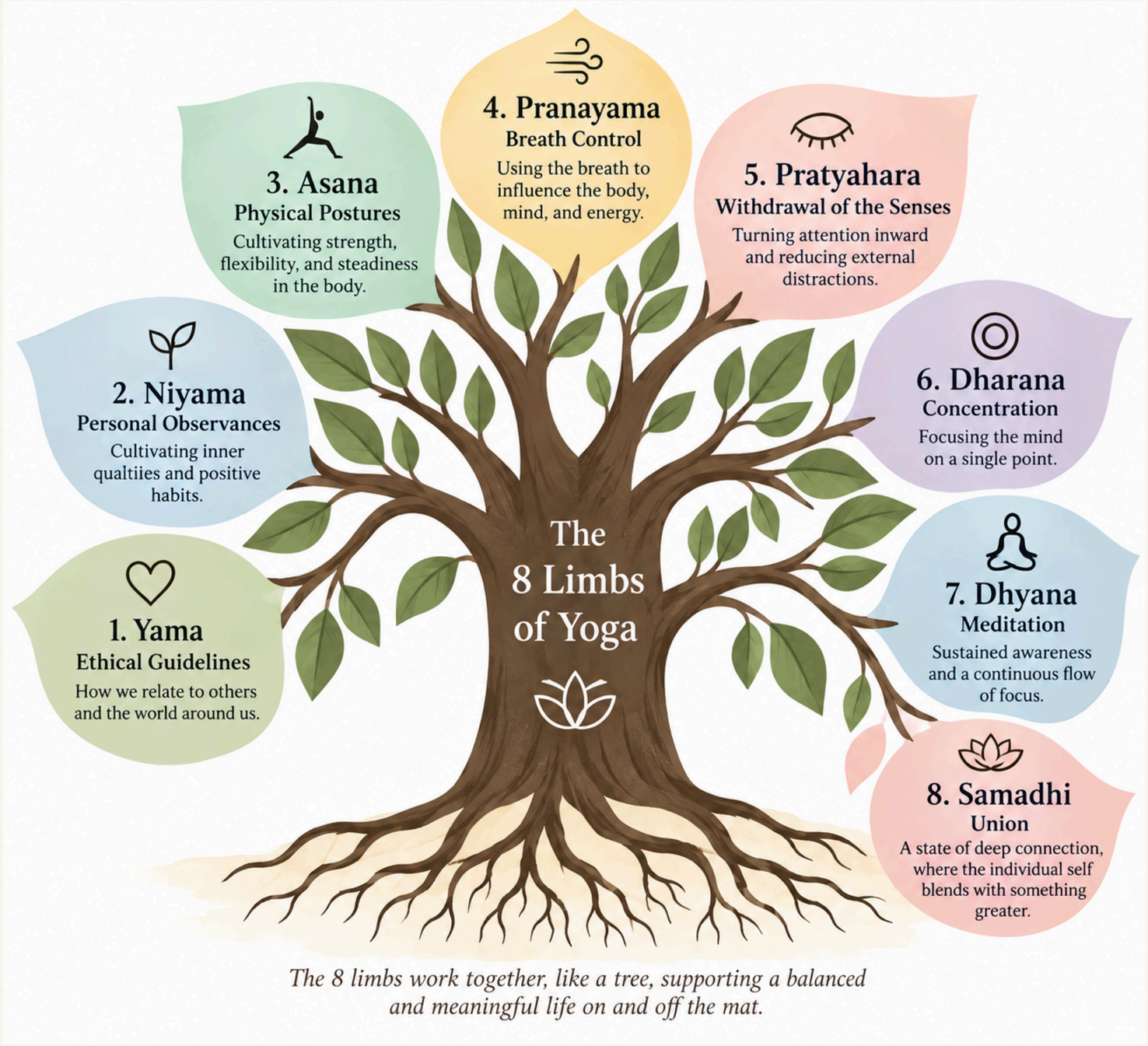
What Yoga Really Is

Yoga means to yoke or join, as in bringing body, mind, and spirit together.

Yoga is an eight-limbed path, and the postures are only one of those eight limbs.

The rest include how we treat ourselves and others, breathing practices, turning our attention inward, focus, and meditation. Historically, the postures were largely there to help people sit comfortably for meditation.





The 8 limbs work together, like a tree, supporting a balanced and meaningful life on and off the mat.

Neuroplasticity

Sensitization happens because of neuroplasticity.

The nervous system learned to be extra sensitive, which means it can learn to calm down too.

SAMSKARAS

In yoga philosophy, we call patterns that are built over time samskaras.

These samskaras are like grooves that are worn over time into your brain. The more you go down the same path, the deeper the groove gets.

The good news is you can start making new tracks.



Breath

Breathing is the only automatic system in your body that you can also control on purpose.

It's basically a remote control for your nervous system.

What happens when you become more mindful of your breath?

Breath and Brain Chemistry

It's less about oxygen and more about carbon dioxide (CO2).

Fast, shallow breathing

- Blows off too much CO2
- Blood vessels in the brain narrow, so less oxygen actually reaches your brain
- Nerves get more excitable: tingling, lightheadedness, brain fog
- Goes hand in hand with stress chemicals like adrenaline

Slow breathing with a longer exhale

- Keeps CO2 in a healthy range
- The vagus nerve releases acetylcholine, which slows your heart rate
- Linked to lower stress hormones
- Yoga practice has been linked to more GABA, a calming brain chemical

PRACTICES

Extended exhale
In for 4, out for 6.

Rectangle breathing
Slows and steadies your breathing rhythm.

Physiological sigh
Two inhales through the nose, one long exhale. A fast reset.

Fast breathing
Energizing, but it lowers CO2 and can bring on dizziness. Go gently.

Movement

Gentle movement done within your limits sends your brain the message **"this is safe."** That's different from pushing through, which sends the message **"danger, danger."**

The Vagus Nerve

What it is

Vagus comes from Latin for "wandering." It wanders from your brainstem down through your throat, heart, lungs, and gut, like a long communication cable connecting brain and body.

Why it matters

It's a big part of the "rest and digest" part of your nervous system.



Your nervous system has a gas pedal and a brake. The stress response is the gas. The vagus nerve is a big part of the brake. When you live with chronic pain, the gas pedal tends to get stuck down. We want to strengthen the brakes.

The Hopeful Part

The vagus nerve's fibers carry information from the body up to the brain. It listens to what's going on in your body.

Your body can send safety signals up to your brain using the vagus nerve.

Vagal tone: This is how responsive your brakes are. It can be supported over time, like a muscle that gets stronger with use.

PRACTICAL WAYS YOGA SUPPORTS IT

- **Slow breathing with a longer exhale**
- **Humming**
- **Gentle movement**
- **Orienting to your surroundings using all 5 senses**
- **Restorative yoga**
- **Connection with other people**

Yoga Won't Cure Chronic Pain

But it can make it more manageable through nervous system regulation and by cultivating resiliency.

Calms the stress response

In a review of 42 studies, yoga was linked to lower cortisol and a lower resting heart rate.

Pascoe et al., 2017, Psychoneuroendocrinology

Changes how the brain handles pain

Experienced yoga practitioners tolerated pain more than twice as long as non-practitioners and had more gray matter in the insula, a brain area involved in processing pain.

Villemure et al., 2014, Cerebral Cortex

Builds resiliency and coping

In an 8-week program for women with fibromyalgia, pain dropped 24%, fatigue 30%, and depression 42%. Participants also used healthier coping strategies like acceptance and relaxation.

Carson et al., 2010, Pain

Works as well as physical therapy

For chronic low back pain, yoga worked as well as physical therapy, and both groups were less likely to need pain medication than people who only got educational materials.

Saper et al., 2017, Annals of Internal Medicine

But it works best if you are cultivating a yoga practice that works for your specific needs, and many times that comes from a more personalized experience.

What is yoga therapy?

Yoga therapy is different from a group yoga class.

It is an individualized approach.

Yoga therapy starts with assessments, assessing your physical capacity, your goals.

It changes with you as your goals change.

It is a collaborative process between you and a yoga therapist, and you will be given an individualized wellness plan to support your journey.

Example yoga therapy session

1

Assessment
Your yoga therapist may ask you questions about your sleep, digestion, physical symptoms. They may do physical assessments, assessing posture and range of motion.

2

Discussion of goals
Where you are currently and where you want to be

3

Discussion of possible practices
Your yoga therapist may talk to you about practices that will fit into your daily life and help you develop a routine that suits you.

Let’s practice

How to Work With Me

Free

- The Power of Being Enough mini course
- Free meditations on Insight Timer
- Free yoga practices on YouTube
- Fine on the Outside podcast available on Spotify

Membership

- Structure and consistency help make changes
- $37/month for Hello Pain Peeps members (normally $47)

1:1 Yoga Therapy

- The most personalized support
- Book a free consultation

Send questions to tiffanyshepeardyoga@gmail.com or @tiffanychronicillnessyoga on Instagram