



SPECIALTY 04 · ANS

Rehabilitation & Physiotherapy

Chronic pain, fibromyalgia, recovery and swelling.

12 SHEETS

What NESA modulates (and what it doesn't)

NESA does not treat or cure any of the conditions covered in these sheets. Its non-invasive neuromodulation acts on the **autonomic nervous system (ANS)** to help **relieve the symptoms associated with its dysregulation** —dysautonomia— that accompanies each condition. It does not replace diagnosis, medication or the professional's judgement: it supports them.

IN PLAIN WORDS, FOR THE PATIENT



Your body runs on electricity

Every heartbeat, movement and thought travels as a tiny electrical signal along your nerves.



The ANS is your autopilot

The autonomic nervous system quietly runs your heart, breathing, digestion and sleep — without you thinking about it.



It has an accelerator and a brake

The "sympathetic" switches you on; the "parasympathetic" calms you down. Health is when they take turns at the right time.

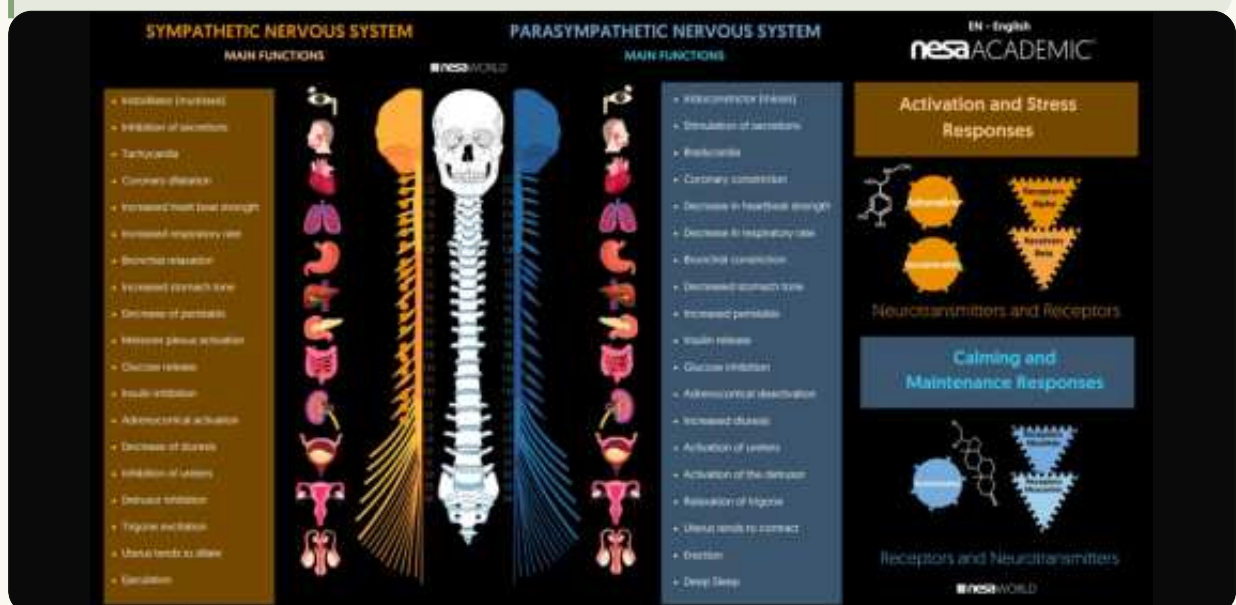


NESA speaks that language

Very gentle microcurrents through hands and feet help the accelerator and brake find their balance again.



Safe and imperceptible. No needles, no heat: the current is so faint it stays below what you can feel. Most people notice nothing during the session.



Main functions of the sympathetic and parasympathetic branches: the physiological ground —the ANS— on which NESA neuromodulation acts.

REFERENCE Goldstein DS, Robertson D, Esler M, Straus SE, Eisenhofer G. *Dysautonomias: clinical disorders of the autonomic nervous system*. Ann Intern Med. 2002;137(9):753–763. · Thayer JF, Lane RD. *A model of neurovisceral integration in emotion regulation and dysregulation*. J Affect Disord. 2000;61(3):201–216.



Neuropathic pain and your nervous system

When you feel cramps, tingling or burning without anyone touching you.

1 PHASE 1 Do you recognise this?

- ✓ Cramps or “electric shocks”
- ✓ Burning
- ✓ Worse at night
- ✓ Tingling or numbness
- ✓ Pain from light touch
- ✓ Odd patches of sensitivity

“ Do you feel cramps or burning for no clear reason?

“ Does even clothing brushing your skin bother you?

3 PHASE 3 The loop

- 1 The nerve gets irritated.
- 2 The alarm rises and blood flow worsens.
- 3 More pain that irritates the nerve further.

↻ AND IT STARTS AGAIN

2 PHASE 2 What’s happening in your nervous system

Picture *a frayed wire sparking for no reason*. Your nervous system has an “accelerator” and a “brake”, and right now they’re out of balance.

⚡ Accelerator

Sympathetic · over-revved: it keeps the nerve's alarm on.

⏸ Brake

Parasympathetic · barely engages: the nerve doesn't settle.

In neuropathic pain, **the system stays over-excited** and poor blood flow to the nerve worsens the signal.



A calmer nerve tolerates movement better.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps **calm the over-excitement** and improve blood flow for a steadier signal.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: it readies a calmer system for mobility and desensitisation.

✓ What you may notice

- ✓ Fewer cramps and less burning
 - ✓ A steadier signal
 - ✓ More tolerance to movement
- Results vary from person to person.*



Chronic pain and your nervous system

When it hurts more, and for longer, than it should — and it won't go away.

1 PHASE 1 Do you recognise this?

- ✓ Pain lasting months
- ✓ Hurts more than expected
- ✓ Spreads to other areas
- ✓ Fatigue
- ✓ Low mood or irritability
- ✓ Fear of moving

“ Have you had pain for more than 3 months?

“ Does it hurt more than it should?

3 PHASE 3 The loop

- 1 The pain persists.
- 2 The system stays on alert.
- 3 That alert amplifies the pain further.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture **the pain's volume turned up to maximum**. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

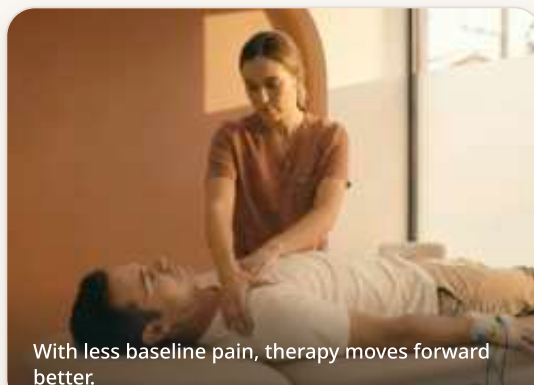
⚡ Accelerator

Sympathetic · over-revved: it raises the pain “gain”.

⏸ Brake

Parasympathetic · doesn't engage: the body can't lower the alarm.

In chronic pain, **the system amplifies the signal** and a stuck accelerator turns the “volume” up.



With less baseline pain, therapy moves forward better.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps turn down the “volume” of pain by rebalancing accelerator and brake.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: with less baseline pain, exercise and manual therapy progress better.

✓ What you may notice

- ✓ Days with less pain
 - ✓ More activity
 - ✓ Better mood
- Results vary from person to person.*



Fibromyalgia and your nervous system

When almost everything hurts, you sleep badly and you're always exhausted.

1 PHASE 1 Do you recognise this?

- ✓ Widespread body pain
- ✓ Tender points
- ✓ Unrefreshing sleep
- ✓ Fatigue
- ✓ Brain fog
- ✓ Stiffness on waking

“ Do many areas hurt at once?

“ Do you wake up tired even after sleeping?

3 PHASE 3 The loop

- 1 The system over-activates.
- 2 Sleep doesn't restore.
- 3 More pain and fatigue that re-activate.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture *the body's pain thermostat poorly calibrated*. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

⚡ Accelerator

Sympathetic · high:
hypersensitivity and poor sleep.

⏸ Brake

Parasympathetic · low:
restorative rest doesn't arrive.

In fibromyalgia, a **high accelerator** and **low brake** cause hypersensitivity, poor sleep and fatigue.



A better-regulated body rests and copes better.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps recalibrate the thermostat by letting the brake in, with better rest.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: a better-regulated body tolerates gentle, progressive exercise better.

✓ What you may notice

- ✓ Better rest
 - ✓ Less diffuse pain
 - ✓ A little more energy
- Results vary from person to person.*



Trauma recovery & post-surgical

When, after an injury or operation, the area stays swollen and recovery is slow.

1 PHASE 1 Do you recognise this?

- ✓ Swelling that won't go down
- ✓ Heat or tightness in the area
- ✓ Slow recovery
- ✓ Stiffness
- ✓ Pain on loading
- ✓ A feeling of "being stuck"

“ Is the area still more swollen than expected?

“ Does recovery feel stuck?

3 PHASE 3 The loop

- 1 The injury or operation.
- 2 Narrowed blood flow and inflammation.
- 3 Slow repair and more tightness.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture **the blood's road jammed at the repair works**. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

⚡ Accelerator

Sympathetic · narrows blood flow (vasoconstriction) and sustains inflammation.

⏸ Brake

Parasympathetic · opens blood flow to repair tissue.

In recovery, **the accelerator narrows blood flow** and tissue repairs slowly.



Supporting your mobility and strength plan.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps **open up blood flow** to bring oxygen and nutrients and clear inflammation.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: it supports their mobility, strength and drainage plan.

✓ What you may notice

- ✓ Less swelling
 - ✓ Smoother recovery
 - ✓ An earlier return to activity
- Results vary from person to person.*



Low back pain & chronic back pain

When your back hurts almost all the time and feels loaded and tense.

1 PHASE 1 Do you recognise this?

- ✓ Frequent back pain
- ✓ A loaded, stiff feeling
- ✓ Worse when still or standing a while
- ✓ Tension by the end of the day
- ✓ Fear of moving
- ✓ Poor rest

“ Is your back tense almost every day?

“ Does it worsen with stress or tiredness?

3 PHASE 3 The loop

- 1 Protective tension.
- 2 Poor blood flow and pain.
- 3 More fear of moving and more tension.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture **a back permanently on guard, like a fist that won't let go**. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

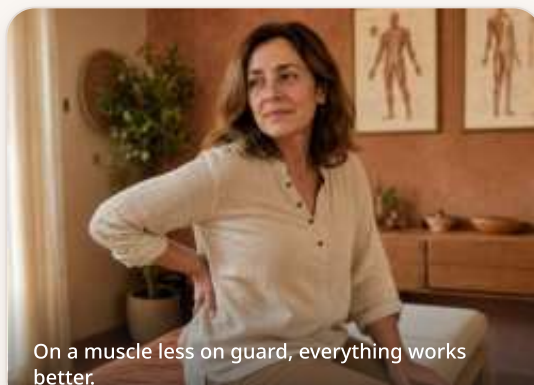
⚡ Accelerator

Sympathetic · high: keeps the muscle “over-protecting”.

⏸ Brake

Parasympathetic · doesn't engage: the muscle can't rest.

In low back pain, **the muscle stays on guard** with poor blood flow, and the pain won't ease.



On a muscle less on guard, everything works better.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps release that **guard** so the muscle can rest and get blood flow.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: on a muscle less on guard, exercise and manual therapy work better.

✓ What you may notice

- ✓ A less loaded back
 - ✓ More mobility
 - ✓ Less pain by day's end
- Results vary from person to person.*



Neck pain & whiplash

When your neck is left stiff and sore, sometimes with dizziness or headache.

1 PHASE 1 Do you recognise this?

- ✓ Neck stiffness
- ✓ Shoulder tension
- ✓ Headache
- ✓ Pain on turning
- ✓ Dizziness or unsteadiness
- ✓ Sometimes tingling in the arms

“ Is it hard to turn your neck without pain?

“ Do you get dizziness or headaches with the tension?

3 PHASE 3 The loop

- 1 Impact or tension.
- 2 The neck goes on alert.
- 3 More stiffness and dizziness feeding the alert.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture **a neck on alert, like after a fright that won't switch off**. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

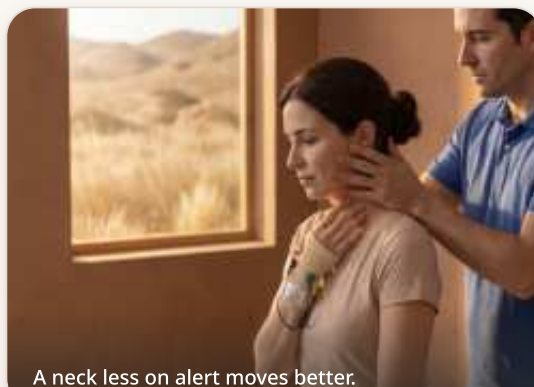
⚡ Accelerator

Sympathetic · triggered: tension, pain and sometimes dizziness.

⏸ Brake

Parasympathetic · won't lower: the neck can't settle.

In neck pain, **the accelerator fired and won't lower**: tension, pain and sometimes headache.



A neck less on alert moves better.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps switch off that alert so the neck can settle and get blood flow.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: a neck less on alert responds better to their mobilisation and exercise.

✓ What you may notice

- ✓ Less stiffness
 - ✓ More movement
 - ✓ Less dizziness or headache
- Results vary from person to person.*



Complex regional pain (CRPS)

When a hand or foot hurts intensely, changes colour and temperature and swells after an injury.

1 PHASE 1 Do you recognise this?

- ✓ Intense, disproportionate pain
- ✓ Swelling
- ✓ Marked sensitivity to touch
- ✓ Colour or temperature changes
- ✓ Local sweating
- ✓ Hard to move the area

“ Does the area change colour or temperature?

“ Is the pain far greater than expected?

3 PHASE 3 The loop

- 1 The injury.
- 2 Autonomic response out of control.
- 3 Pain and swelling that sustain the chaos.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture *an alarm stuck in that part of the body*. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

⚡ Accelerator

Sympathetic · out of control in the area: pain and abrupt changes.

⏸ Brake

Parasympathetic · doesn't stabilise the affected area.

In CRPS, the area's autonomic control goes haywire: pain, colour or temperature changes and swelling.



Supporting desensitisation with care.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps reorder the area's autonomic response towards more stability.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: it supports their desensitisation and gradual movement, key in CRPS.

✓ What you may notice

- ✓ Pain a little more manageable
 - ✓ Fewer abrupt changes
 - ✓ More tolerance to touch
- Results vary from person to person.*



Insomnia & night-time recovery

When you sleep badly, don't rest and so your body never quite recovers.

1 PHASE 1 Do you recognise this?

- ✓ Hard to fall asleep or you wake often
- ✓ Waking up tired
- ✓ Slow recovery
- ✓ Light sleep
- ✓ Pain worsens with poor sleep
- ✓ Irritability

“ Do you wake more tired than when you went to bed?

“ Do you sleep worse when in more pain?

3 PHASE 3 The loop

- 1 The system stays active at night.
- 2 Sleep doesn't come, or it's light.
- 3 Less recovery and more activation.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture *the body's light that won't switch off at night*. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

⚡ Accelerator

Sympathetic · still on at night: deep sleep doesn't arrive.

⏸ Brake

Parasympathetic · doesn't engage: the body won't shift to “repair mode”.

In insomnia, **the brake doesn't engage at night** and the body won't shift into repair mode.



Better rest — the foundation of all recovery.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps engage the brake for more restorative rest.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: better rest improves the response to their daytime work.

✓ What you may notice

- ✓ Sleep a little better
 - ✓ Wake more rested
 - ✓ Better recovery
- Results vary from person to person.*



Sports recovery & overtraining

When you train hard but don't recover: tiredness, dropping performance, more injuries.

1 PHASE 1 Do you recognise this?

- ✓ Persistent fatigue
- ✓ Stalled or dropping performance
- ✓ Worse sleep
- ✓ More injuries or niggles
- ✓ High resting heart rate
- ✓ Little drive to train

“ Do you recover worse between sessions than before?

“ Do you feel tired even when you rest?

3 PHASE 3 The loop

- 1 Heavy training load.
- 2 The brake doesn't engage.
- 3 Poor recovery: more fatigue and injury.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture **an over-revving engine that never cools down**. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

⚡ Accelerator

Sympathetic · chronically dominant: the engine won't cool.

⏸ Brake

Parasympathetic · doesn't engage to recover between efforts.

In overtraining, **the accelerator dominates** and the brake doesn't engage to recover.



Recovering better improves how you adapt to training.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps engage the brake to “cool the engine” between efforts.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: better recovery improves how the body adapts to training.

✓ What you may notice

- ✓ Recover sooner
 - ✓ Sleep better
 - ✓ Less accumulated fatigue
- Results vary from person to person.*



Oedema, circulation & lymphoedema

When the area swells, feels heavy and circulation is sluggish.

1 PHASE 1 Do you recognise this?

- ✓ Swelling in legs or area
- ✓ Marks from clothing or socks
- ✓ Worse by day's end
- ✓ Heaviness
- ✓ Tight skin
- ✓ Sluggish circulation

“ Do your legs swell by the end of the day?

“ Do you feel heaviness or sluggish circulation?

3 PHASE 3 The loop

- 1 Slow return.
- 2 Fluid builds up.
- 3 More heaviness and swelling that stagnate.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture **the return pipe blocked: the water won't come back**. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

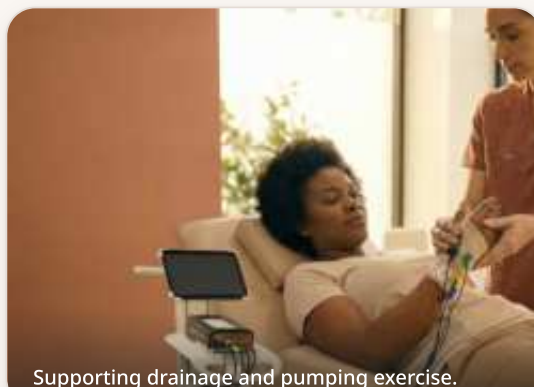
⚡ Accelerator

Sympathetic · high: slows the return and fluid builds up.

⏸ Brake

Parasympathetic · improves tone and venous return.

In oedema, **autonomic tone regulates the vessels**; with a high accelerator, the return slows.



Supporting drainage and pumping exercise.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps improve tone and return so fluid drains better.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: it supports their drainage, bandaging and pumping exercise.

✓ What you may notice

- ✓ Less swelling and heaviness
 - ✓ Lighter legs
 - ✓ A better sense of circulation
- Results vary from person to person.*



Dysautonomia and your nervous system

When you have dizziness, palpitations, fatigue or odd digestion... and nothing adds up.

1 PHASE 1 Do you recognise this?

- ✓ Dizziness on standing
- ✓ Marked fatigue
- ✓ Unusual sweating
- ✓ Palpitations
- ✓ Irregular digestion
- ✓ Poor tolerance to effort or heat

“ Do you feel dizzy when you stand up?

“ Do you have many symptoms that change day to day?

3 PHASE 3 The loop

- 1 The ANS loses balance.
- 2 Shifting symptoms.
- 3 Less activity and more alertness.

↻ AND IT STARTS AGAIN

2 PHASE 2 What's happening in your nervous system

Picture *the body's switchboard miscalibrated, sending crossed signals*. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

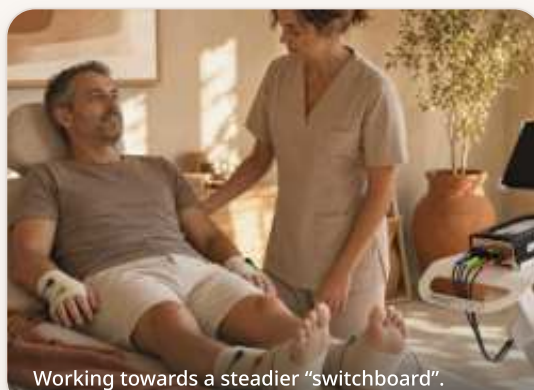
⚡ Accelerator

Sympathetic · out of balance with the brake: crossed signals.

⏸ Brake

Parasympathetic · out of step: variable symptoms.

Dysautonomia is a **direct imbalance between accelerator and brake**; that's why symptoms vary.



Working towards a steadier “switchboard”.

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps recalibrate the “switchboard” by rebalancing the two branches of the ANS.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: it supports their gradual reconditioning and tolerance to effort.

✓ What you may notice

- ✓ Slightly steadier symptoms
 - ✓ Fewer ups and downs
 - ✓ More energy for the day
- Results vary from person to person.*



Stiffness, contractures & spasticity

When muscles are always hard, contractures keep coming back and areas never let go.

1 PHASE 1 Do you recognise this?

- ✓ Muscles hard to the touch
- ✓ A "knot" feeling
- ✓ Muscle tiredness
- ✓ Contractures that return
- ✓ Reduced range of movement
- ✓ Worse with stress

“ Do the same contractures keep coming back?

“ Do you notice areas that never let go?

3 PHASE 3 The loop

- 1 High muscle tone.
- 2 Tension and poor blood flow.
- 3 More stiffness and contracture raising the tone.

↻ AND IT STARTS AGAIN

4 PHASE 4 How NESA fits in

Non-invasive, painless microcurrents, with electrodes on the hands and feet, help your nervous system restore the balance between the **accelerator** and the **brake**.

~ Helps lower that tone so the muscle releases and gets blood flow.

5 PHASE 5 With your physiotherapist & what you may notice

♥ With your physiotherapist

NESA **does not replace** your physiotherapist: on lower tone, stretches and manual therapy work better and last longer.

✓ What you may notice

- ✓ Less hard muscles
 - ✓ Fewer contractures
 - ✓ More range of movement
- Results vary from person to person.*

2 PHASE 2 What's happening in your nervous system

Picture **a rope kept taut that never quite slackens**. Your nervous system has an “accelerator” and a “brake”, and right now they're out of balance.

⚡ Accelerator

Sympathetic · high: keeps the muscle under tension.

⏸ Brake

Parasympathetic · doesn't engage: the muscle won't release or get blood flow.

In chronic stiffness, **high sympathetic tone** keeps the tension and poor blood flow adds rigidity.



On lower tone, stretching lasts longer.

Scientific bibliography

A selection of literature documenting the involvement of the **autonomic nervous system**—vagal tone, heart-rate variability (HRV) and the cholinergic anti-inflammatory reflex—in the symptoms of the conditions addressed. It supports the physiological rationale of the approach; it does not represent a claim of NESA's clinical efficacy for each indication. Ordered by specialty.

● Foundations • ANS, HRV & the anti-inflammatory reflex

1. Thayer JF, Lane RD. *A model of neurovisceral integration in emotion regulation and dysregulation*. J Affect Disord. 2000;61(3):201–216.
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● Rehabilitation & physiotherapy

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3. Hallman DM, Lyskov E. *Autonomic regulation in musculoskeletal pain*. In: Pain in Perspective. 2012.

The references support the physiological relationship between the autonomic nervous system and the symptoms described. Use of NESA under professional supervision; it does not replace treatment or medication.



***We modulate the autonomic nervous system.
Everything else follows.***

Non-invasive neuromodulation of the autonomic nervous system. One root,
many clinical expressions.

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