



SPECIALTY 03 · ANS

Neurology & Pain

Neuropathic pain, dysautonomia, spasticity and sleep.

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.

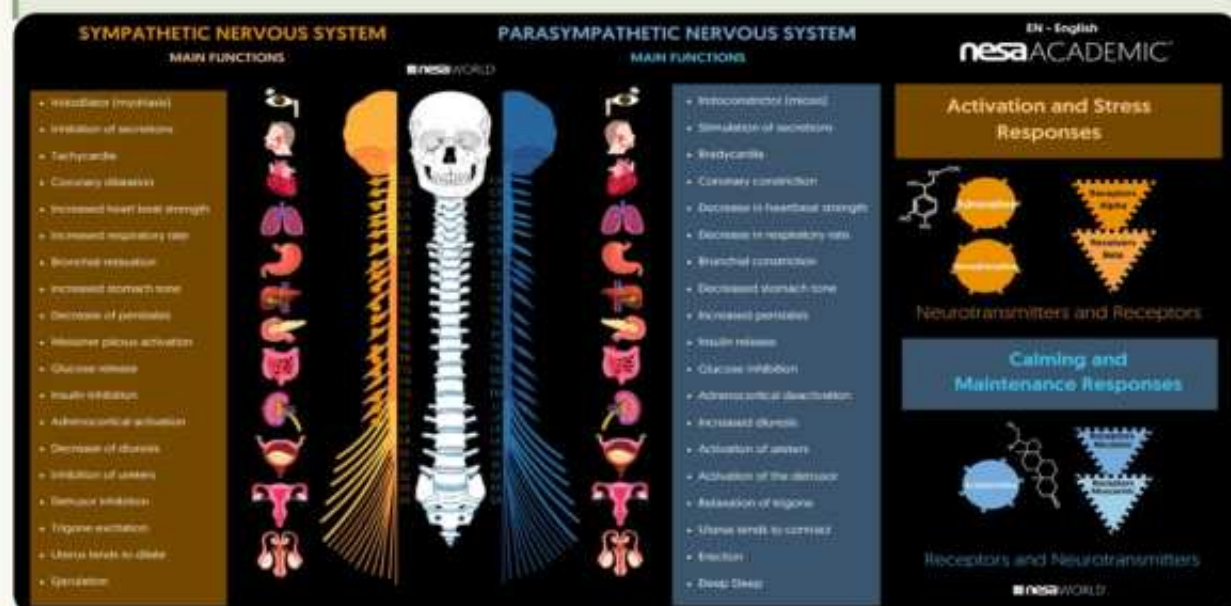


NESA speaks that language

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: pain from the nerve itself

When the pain feels odd —burning, tingling, cramps or electric jabs— without an injury to explain it.

1 PHASE 1 Do you recognise this?

- ✓ Burning or scalding
- ✓ Tingling or "pins and needles"
- ✓ Cramps or electric jabs
- ✓ Pain when skin or clothing brushes you
- ✓ Unusual cold or hot sensations
- ✓ Pain with no visible wound

“ Is your pain electric, burning or tingling?

“ Does it hurt even with a light touch?

3 PHASE 3 The cycle

- 1 Irritated, hyperexcitable nerve.
- 2 A high accelerator amplifies the signal.
- 3 Pain fires on its own → more alertness.

↻ AND IT STARTS AGAIN

4 PHASE 4 How NESA fits in

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

~ It helps lower hyperexcitability and let the brake come in so the nerve signal settles.

5 PHASE 5 With your professional & what you might notice

♥ With your pain physician

NESA **does not replace** your pain physician or your neurologist: it supports their plan (medication, rehabilitation) and never avoids investigating the cause.

✓ What you might notice

- ✓ Less easily triggered pain
 - ✓ Better rest
 - ✓ Better quality of life
 - ✓ Fewer “electric” flare-ups
- It may help; results vary from person to person.*

2 PHASE 2 What happens in the nervous system

Picture a bare wire that sparks and sets off the alarm even when there is no danger. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic - keeps you on alert, closes blood flow and amplifies the signal.

⏸ Brake

Parasympathetic - calms the nerve signal, but cannot kick in.

The nerve becomes **hyperexcitable** and fires pain with no real cause: the “bare wire” that warns on its own.



Calming the nerve signal improves daily life.



Pain after surgery & recovery

When, after the operation, a pain lingers that doesn't fit and recovery drags on.

1 PHASE 1 Do you recognise this?

- ✓ Burning or tingling near the scar
- ✓ Cramps in the operated area
- ✓ Pain out of proportion to the wound
- ✓ Tenderness to touch
- ✓ Slower recovery than expected
- ✓ Poor rest

“ Is the pain after surgery electric or tingling, different from the wound itself?

“ Has your recovery stalled?

3 PHASE 3 The cycle

- 1 Surgery and handling of the nerve.
- 2 Irritated nerve + closed blood flow.
- 3 Post-surgical pain that persists → slow recovery.

↻ AND IT STARTS AGAIN

4 PHASE 4 How NESA fits in

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

~ It helps lower the guard and open blood flow to calm the irritated signal and aid recovery.

5 PHASE 5 With your professional & what you might notice

♥ With your surgical team

NESA **does not replace** your neurosurgeon, pain physician or physiotherapist: it supports your recovery, and they set the plan.

✓ What you might notice

- ✓ Less pain in the area
 - ✓ A smoother recovery
 - ✓ Better rest
 - ✓ More ease through the process
- It may help; results vary from person to person.*

2 PHASE 2 What happens in the nervous system

Picture a *finished building site where some wires were left irritated and keep sounding the alarm*. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.



Accelerator

Sympathetic · keeps the area on guard and closes blood flow.



Brake

Parasympathetic · opens blood flow and aids recovery.

Surgery can leave **irritated, hyperexcitable nerves**; the area stays on alert and recovery slows down.



A calmer signal supports a smoother recovery.



Central sensitisation & chronic pain

When you've had pain for a long time and now it hurts more, in more places, including things that never used to bother you.

1 PHASE 1 Do you recognise this?

- ✓ Pain spreading to more areas
- ✓ Touch, clothing or noise that now bother you
- ✓ Pain that persists after the injury has healed
- ✓ Tiredness and poor sleep
- ✓ Low mood because of the pain
- ✓ More pain than the cause would explain

“ Does it hurt more, and in more places, than at the start?

“ Do things that never used to bother you now hurt?

3 PHASE 3 The cycle

- 1 Ongoing pain over time.
- 2 A more sensitive nervous system (high accelerator).
- 3 More, wider-spread pain → more sensitisation.

↻ AND IT STARTS AGAIN

4 PHASE 4 How NESA fits in

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

~ It helps turn that “volume” down and restore balance so the system stops amplifying.

5 PHASE 5 With your professional & what you might notice

♥ With your pain clinic

NESA **does not replace** your pain clinic or neurologist: it complements pain education, exercise, medication and psychology. It's managed as a team.

✓ What you might notice

- ✓ More manageable pain
 - ✓ Better rest and mood
 - ✓ More activity in your day
 - ✓ Less hypersensitivity to touch
- It may help; results vary from person to person.*

2 PHASE 2 What happens in the nervous system

Picture *an alarm system with the volume turned up to maximum: it goes off at everything*. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic · stays high and amplifies pain signals.

🛑 Brake

Parasympathetic · turns the “volume” down, but cannot kick in.

With ongoing pain the system **turns up its sensitivity** and amplifies signals even when the original injury is gone.





Dysautonomia: what the body regulates on its own

When things the body manages automatically start to fail: blood pressure, pulse, sweating, temperature, digestion.

1 PHASE 1 Do you recognise this?

- ✓ Dizziness when standing up
- ✓ Feeling cold or hot for no reason
- ✓ Difficult digestion
- ✓ Unusual or absent sweating
- ✓ A racing heart
- ✓ Tiredness and brain fog

“ Do you have symptoms that shift, that no one sees but which affect you a lot?

“ Do you feel dizzy when you stand up?

3 PHASE 3 The cycle

- 1 Underlying neurological dysfunction.
- 2 Uncoordinated ANS (accelerator/brake).
- 3 Fluctuating autonomic symptoms → more disruption.

🔄 AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture *the body's autopilot, miscalibrated: it regulates at the wrong moments*. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic · runs out of control and fires responses at the wrong time.

⏸ Brake

Parasympathetic · steadies regulation, but coordinates poorly.

The **ANS (autopilot)** falls out of sync, so blood pressure, pulse, sweating, temperature and digestion misfire beyond your control.



Steadier regulation shows in everyday life.

4 PHASE 4 How NESA fits in

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

~ It helps recalibrate the ANS, giving the brake more weight for steadier regulation.

5 PHASE 5 With your professional & what you might notice

♥ With your neurologist

NESA **does not replace** your neurologist (or cardiology/gastroenterology depending on the symptom): it supports the work-up and treatment, which are done as a team.

✓ What you might notice

- ✓ Less dizziness
 - ✓ Better digestion
 - ✓ Fewer ups and downs
 - ✓ Better quality of life
- It may help; results vary from person to person.*



Neurological fatigue (multiple sclerosis & others)

When tiredness isn't normal: it comes on suddenly, sleep doesn't shift it and heat makes it worse.

1 PHASE 1 Do you recognise this?

- ✓ Exhaustion that comes on suddenly
- ✓ It doesn't improve with sleep
- ✓ Worse with heat or effort
- ✓ It forces you to stop
- ✓ Brain fog
- ✓ It isn't laziness — it's real exhaustion

“ Does your tiredness come on suddenly and not lift with rest?

“ Is it worse with heat or effort?

3 PHASE 3 The cycle

- 1 Neurological dysfunction (e.g. MS).
- 2 Poorly regulated accelerator, a brake that won't recharge.
- 3 Fatigue builds up → less activity.

↻ AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture a battery that drains very fast and takes a long time to recharge. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.



Accelerator

Sympathetic · poorly regulated, drains extra battery.



Brake

Parasympathetic · recharges and repairs, but cannot kick in well.

The ANS plays a part in fatigue: if the brake doesn't recharge, rest doesn't pay off and energy doesn't last.



Rest that recharges better leaves more energy for the day.

4 PHASE 4 How NESA fits in

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

~ It helps let the brake come in so rest recharges better and energy lasts longer.

5 PHASE 5 With your professional & what you might notice

♥ With your neurologist

NESA **does not replace** your neurologist or rehabilitation team: it supports energy management, adapted exercise and heat control. It's addressed as a team.

✓ What you might notice

- ✓ A little more steady energy
 - ✓ Better rest
 - ✓ Doing a bit more without “running flat”
 - ✓ Less brain fog by the end of the day
- It may help; results vary from person to person.*



Spasticity & tone in hemiplegia

When, after a stroke or injury, one side stays stiff, the muscle pulls and it's hard to move.

1 PHASE 1 Do you recognise this?

- ✓ Stiffness on one side of the body
- ✓ A muscle that pulls or locks up
- ✓ Difficulty moving or stretching
- ✓ Pain from tension
- ✓ Worse with cold, tiredness or stress
- ✓ Held, fixed postures

“ Does one side of your body stay stiff and hard to move?

“ Does the stiffness get worse with cold or stress?

3 PHASE 3 The cycle

- 1 Neurological injury (stroke or other).
- 2 Hypertonia + high accelerator.
- 3 Stiffness, poor blood flow and pain → more tension.

↻ AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture a handbrake stuck on that won't let the wheel roll. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic · high, increases stiffness and closes blood flow.

⏸ Brake

Parasympathetic · lets the muscle ease off, but cannot kick in.

When motor control is lost the muscle goes into **hypertonia/spasticity**; stress or cold set it off.



4 PHASE 4 How NESA fits in

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

~ It helps lower the tone so the muscle eases off and gets blood flow, supporting movement rehabilitation.

5 PHASE 5 With your professional & what you might notice

♥ With your rehab team

NESA **supports** the work of your neurological physiotherapist, neurorehabilitation team, occupational therapist or neurologist (mobilisation, exercise, medication, toxin). It does not replace them.

✓ What you might notice

- ✓ A less stiff muscle
 - ✓ Movement a little easier
 - ✓ Less pain from tension
 - ✓ A better base for rehabilitation
- It may help; results vary from person to person.*



Neurogenic bladder & pelvic floor

When, since the neurological injury, the bladder goes its own way and pelvic floor control changes.

1 PHASE 1 Do you recognise this?

- ✓ Urgency or leaks
- ✓ A sense of incomplete emptying
- ✓ Loss of pelvic floor control
- ✓ Difficulty emptying
- ✓ Recurrent infections
- ✓ Impact on independence and mood

“ Do you notice urgency, leaks or difficulty emptying since your neurological problem?

“ Does it feel like control isn't what it used to be?

3 PHASE 3 The cycle

- 1 Altered neurological signal.
- 2 Accelerator/brake out of sync.
- 3 Urgency, leaks or retention → more pelvic floor disruption.

↻ AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture a bladder traffic light stuck on red or green at the wrong moment. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.



Accelerator

Sympathetic · contraction at the wrong time (urgency, leaks).



Brake

Parasympathetic · relaxes to empty, but coordinates poorly.

The bladder and pelvic floor are governed by the ANS; when the signal fails, **accelerator and brake fall out of sync**.



Steadier control brings more peace of mind and independence.

4 PHASE 4 How NESA fits in

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

~ It helps re-coordinate the filling and emptying phases, supporting steadier bladder and pelvic floor control.

5 PHASE 5 With your professional & what you might notice

♥ With your team

NESA **does not replace** your neurologist, urologist or pelvic floor physiotherapist: it supports catheterisation, medication and re-education.

✓ What you might notice

- ✓ Steadier control
 - ✓ Fewer urges or leaks
 - ✓ More peace of mind
 - ✓ More independence in your day
- It may help; results vary from person to person.*



Neurogenic bowel: constipation & motility

When constipation is difficult and persistent —very common in cerebral palsy and other neurological conditions.

1 PHASE 1 Do you recognise this?

- ✓ Difficult, persistent constipation
- ✓ Bloating
- ✓ Very slow digestion
- ✓ Complicated bowel movements
- ✓ Abdominal discomfort
- ✓ Impact on wellbeing and mood

“ Is the bowel transit very slow and is it hard to go?

“ Do bloating and discomfort appear often?

3 PHASE 3 The cycle

- 1 Underlying neurological dysfunction.
- 2 Digestive brake that won't kick in.
- 3 Slowed bowel (constipation) → more bloating and discomfort.

🔄 AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture a conveyor belt in the gut that has almost ground to a halt. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic · slows transit and motility.

🛑 Brake

Parasympathetic · drives digestive transit, but cannot kick in well.

Gut motility is governed by the ANS; if the **digestive “brake”** doesn't kick in, the bowel slows down.



4 PHASE 4 How NESA fits in

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

~ It helps let the digestive brake in to reactivate motility and a more regular transit.

5 PHASE 5 With your professional & what you might notice

♥ With your team

NESA **does not replace** your neurologist, gastroenterologist or rehabilitation and nursing team: it supports diet, hydration, medication and bowel routine.

✓ What you might notice

- ✓ A slightly more regular transit
 - ✓ Less bloating and discomfort
 - ✓ More wellbeing
 - ✓ A more manageable bowel routine
- It may help; results vary from person to person.*



Proprioception & postural control

When you can't quite tell where your feet or hands are without looking, and you feel unsteady when you move.

1 PHASE 1 Do you recognise this?

- ✓ Feeling unsteady when walking
- ✓ Misjudging movements
- ✓ Trips and stumbles
- ✓ Loss of balance
- ✓ Needing to look to place hands/feet
- ✓ Clumsiness with objects

“ Do you feel unsteady moving without watching where your hands and feet go?

“ Do you lose your balance easily?

3 PHASE 3 The cycle

- 1 Altered proprioceptive signal.
- 2 High accelerator / noise in the signal.
- 3 Poorer balance, posture and coordination → more unsteadiness.

↻ AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture an *internal body GPS* with a *patchy signal*. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic · high, keeps tension and “noise” up.

⏸ Brake

Parasympathetic · cleans up the body signal, but cannot kick in.

Proprioception travels through the nervous system; if it arrives poorly, the brain gets a **patchy “map”** of the body.



A cleaner body signal is the base for improving balance.

4 PHASE 4 How NESA fits in

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

~ It helps lower the noise for a cleaner body signal — the base on which rehabilitation improves balance.

5 PHASE 5 With your professional & what you might notice

♥ With your rehab team

NESA **supports** the work of your neurological physiotherapist, occupational therapist or neurorehabilitation team (balance, proprioception, gait). It does not replace them.

✓ What you might notice

- ✓ Feeling a little steadier
- ✓ Better balance with rehabilitation
- ✓ Better coordination
- ✓ Fewer trips and stumbles

It may help; results vary from person to person.



Sleep quality in neurological conditions

When you sleep poorly and, the next day, pain, fatigue and neurological symptoms all get worse.

1 PHASE 1 Do you recognise this?

- ✓ Hard to fall asleep
- ✓ Unrefreshing sleep
- ✓ Waking up tired
- ✓ Waking up often
- ✓ Pain or spasticity at night
- ✓ Worse pain and fatigue the next day

“ Is your sleep unrefreshing, with everything worse the next day?

“ Do pain or stiffness wake you at night?

3 PHASE 3 The cycle

- 1 High accelerator at night (pain/alertness).
- 2 Light, shallow sleep.
- 3 Less repair → more pain and fatigue by day.

↻ AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture a *body light* that won't switch off at night, just when it's time to *repair*. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic - stays high at night (pain, spasticity, alertness).

⏸ Brake

Parasympathetic - the sleep “repair mode”, but it isn't in charge.

At night the **brake** should lead (deep sleep = repair); if the accelerator stays high, sleep is light and doesn't restore.



More restorative rest improves daytime pain and fatigue.

4 PHASE 4 How NESA fits in

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

~ It helps activate the brake for more restorative rest — the base on which pain, fatigue and regulation improve.

5 PHASE 5 With your professional & what you might notice

♥ With your team

NESA **does not replace** your neurologist, pain physician or rehabilitation team: it supports sleep hygiene and the management of night-time pain.

✓ What you might notice

- ✓ Sleeping a little better
 - ✓ Waking more rested
 - ✓ Better daytime pain management
 - ✓ Less accumulated fatigue
- It may help; results vary from person to person.*



Tinnitus: the ear that “rings” with no sound

When you hear a ringing, buzzing or whistling that won't stop —especially in quiet or at night.

1 PHASE 1 Do you recognise this?

- ✓ Constant ringing, buzzing or whistling
- ✓ Louder in quiet or at night
- ✓ Trouble sleeping and concentrating
- ✓ Anxiety or low mood from the noise
- ✓ Worse with stress or a poor night
- ✓ Tiredness

“ Do you hear a noise that doesn't come from outside and won't quieten?

“ Does it get louder when you're tense or sleep badly?

3 PHASE 3 The cycle

- 1 Phantom auditory signal.
- 2 High accelerator turning up volume and emotion.
- 3 More perceived noise + worse sleep → more alertness.

🔄 AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture a badly tuned radio playing with no station; when the body is on alert, the volume goes up. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.



Accelerator

Sympathetic · stress and poor sleep turn up the tinnitus “volume”.



Brake

Parasympathetic · lowers alertness and noise, but cannot kick in.

Tinnitus is a “phantom” signal the brain pays too much attention to; the accelerator turns up its volume and emotion.



Lowering alertness helps the noise fade into the background.

4 PHASE 4 How NESA fits in

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

~ It helps activate the brake, lower alertness and the tinnitus “volume” and improve sleep, so the noise moves into the background.

5 PHASE 5 With your professional & what you might notice

With your ENT specialist

NESA **does not replace** your ENT specialist, audiologist or audiological speech therapist: it supports the hearing work-up, sound therapy/TRT and stress management. It never avoids investigating the cause.

What you might notice

- ✓ A less intrusive ringing
 - ✓ Better sleep
 - ✓ Less anxiety
 - ✓ Better concentration
- It may help; results vary from person to person.*



Insomnia: when the body won't switch off

When at night you can't power down, you toss and turn and your mind won't stop —and the next day everything is worse.

1 PHASE 1 Do you recognise this?

- ✓ Hard to fall asleep
- ✓ Waking and not getting back to sleep
- ✓ More pain, tinnitus or low mood the next day
- ✓ A mind that won't stop
- ✓ Unrefreshing sleep
- ✓ Tiredness and low energy

“ Do you struggle to power down at night while your mind keeps going?

“ The next day, do pain, mood or energy get worse?

3 PHASE 3 The cycle

- 1 High accelerator at night.
- 2 Body “switched on”, sleep that won't come or stays light.
- 3 Less repair → more pain, fatigue and alertness the next day.

↻ AND IT STARTS AGAIN

2 PHASE 2 What happens in the nervous system

Picture an off-switch that won't respond at night; the body stays “switched on”. Your nervous system has an “accelerator” and a “brake”, and right now they are out of balance.

⚡ Accelerator

Sympathetic · high at night (worry, pain, alertness).

⏸ Brake

Parasympathetic · shifts the body into “rest mode”, but isn't in charge.

Sleep needs the **brake** to lead; with the accelerator high the body never shifts into rest mode and sleep doesn't restore.



Falling asleep sooner and deeper improves everything else.

4 PHASE 4 How NESA fits in

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

~ It helps activate the brake to fall asleep sooner and reach deeper, more restorative sleep — the base on which the rest improves.

5 PHASE 5 With your professional & what you might notice

♡ With your sleep team

NESA **does not replace** your doctor, sleep clinic or psychologist: it supports sleep hygiene, CBT for insomnia and the management of pain or stress.

✓ What you might notice

- ✓ Falling asleep a little sooner
- ✓ Waking more rested
- ✓ Better daytime mood
- ✓ More energy

It may help; results vary from person to person.

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

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Neurology & pain

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3. 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.

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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