Unit 3: Nervous System and Pain Pathways

Nervous System & Pain Pathways for Kalari Uzhichil

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1) Structure and function of the central and peripheral nervous systems

Overview – The nervous system splits into the **central nervous system (CNS)**—brain and spinal cord—and the **peripheral nervous system (PNS)**—all nerves that exit the spine and reach skin, muscles, and organs. Kalari Uzhichil influences both: strokes create sensory input in the PNS that the CNS interprets and uses to reset pain, posture, and mood.

CNS –

- **Brain** integrates sensation, movement, and emotion. The insula and limbic circuits respond well to slow, warm touch, explaining why anxiety eases during steady palm glides.
- **Spinal cord** relays signals and houses segmental circuits (reflexes). Each spinal level has **dermatomes** (skin zones), **myotomes** (muscle groups), and **sclerotomes** (deep tissues). Mapping client symptoms to segments helps target marma work.

PNS –

- **Somatic nerves** carry **afferents** (sensation) from skin/joints/muscles and **efferents** (motor commands) to skeletal muscle.
- **Autonomic nerves** regulate organs and vessels (see section 2).
- **Peripheral nerve structure** includes a fibre wrapped by endoneurium, bundled into fascicles by perineurium, and protected by epineurium—why gentle longitudinal "flossing" strokes can improve nerve glide without compression injury.

Clinical link – Tingling down the lateral arm often traces the **C5–C6** dermatome/myotome; targeted release at **Ani** (axilla marma) and **Kūrpara** (elbow) with shoulder positioning improves brachial plexus glide and symptoms.

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2) Autonomic nervous system: sympathetic vs. parasympathetic roles

Sympathetic (SNS) – Readies the body for action—raises heart rate, diverts blood to muscles, heightens alertness. Overdrive feels like tight shoulders, shallow breath, and racing thoughts.

Parasympathetic (PNS/"vagal") – Promotes rest, digestion, tissue repair. Signs include deeper, slower breathing, warm hands/feet, and a relaxed jaw.

Therapeutic use –

- **To calm SNS –** warm oils, slower cadence, pressure timed to the client's exhale, and broad palm holds over **Hṛidaya** and **Nābhi**.
- **To lift sluggish states –** brisk strokes, light heat with podi-kizhi, and upright finish to avoid post-session drowsiness.

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3) Nerve pathways and their relevance in marma therapy

Dermatomes & myotomes – Each spinal nerve serves a skin strip and a muscle action. Uzhichil sequences can be planned "segmentally" (e.g., **L4–S1** work for sciatica patterns).

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Plexuses –

- **Brachial plexus** (C5–T1) to upper limb—protected at **Ani**.
- **Lumbosacral plexus** (L1–S4) to lower limb—tracks through **Ūrvi** on the thigh.
  Gentle oblique pressure and limb positioning around these marmas improves neural mobility and blood flow.

Nerve–marma intersections – Many marmas sit over nerve crossings: **Mātrikā** (neck) near cervical sympathetic chain, **Sthapanī** (glabella) near trigeminal branches, **Talahridaya** (sole) near tibial/plantar nerves. Respect depth and angle; use "rule of thirds"—no more than one-third of tissue thickness.

Glide principles – Nerves prefer **longitudinal**, **graded** loading with limb movement. Pair thumb holds with small joint motions (e.g., ankle dorsiflexion during **Gulpha** work) to "floss" the tibial nerve.

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4) Understanding pain: acute vs. chronic, and the gate control theory

Acute pain – Short-term, protective; often sharp, linked to tissue injury or inflammation. Strategy is **protect, decongest, calm**: cooling oils (e.g., Murivenna), distal drainage, and gentle holds—no aggressive friction over the lesion.

Chronic pain – Persists beyond expected healing (≥3 months); the nervous system becomes sensitised, amplifying signals even when tissues are safe. Strategy is **desensitise and re-educate**: predictable touch, breath pacing, heat for circulation, graded movement (chuvadukal) to rebuild confidence.

Gate control theory – Non-painful input from large, fast **A-beta** fibres (pressure/vibration) can "close the gate" at the spinal cord to painful **A-delta/C** inputs. Practical translation: steady, confident palm or forearm glides over a painful area reduce perceived pain by flooding the gate with non-threatening sensation. Add rhythmic breathing and the "gate" stays closed longer.

Referred pain & convergence – Spinal neurons receive mixed inputs; pain in one area may originate elsewhere (e.g., gluteal trigger referring down the leg). Palpate upstream/downstream segments and associated marmas, not just the painful spot.

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5) Reflexes and muscle tone in therapeutic response

Stretch (myotatic) reflex – Rapid stretch → spindle fires → muscle tightens. **Therapy cue –** press and lengthen **slowly**, synchronised with exhale, to avoid a rebound guard.

Golgi tendon reflex – Sustained tension → Golgi organ fires → muscle relaxes. **Therapy cue –** "pin-and-hold" at the tendon while gently moving the limb releases stubborn tone.

Withdrawal reflex – Noxious input → automatic pull-away. **Therapy cue –** avoid sharp, sudden pokes; convert to broad, warm contact if the client tenses.

Reciprocal inhibition – Activating one muscle quiets its antagonist. **Therapy cue –** light isometrics during a hold (e.g., gentle hamstring push while you stabilise) can soften tight hip flexors.

Autonomic tone & muscle baseline – High SNS raises resting tone; PNS dominance lowers it. Finish sessions with vagal cues (long exhale, quiet crown hold) to cement the tone reset.

Summary Tables

A) CNS–PNS overview

Part	Main role	Kalari relevance	Key caution
Brain	Integrate sensation, mood, movement	Slow warm touch calms limbic circuits	Avoid sensory overload (too fast/deep)
Spinal cord	Segmental relay & reflexes	Plan by dermatomes/myotomes	Respect acute radicular pain
Somatic PNS	Skin, muscle, joint signals	Create non-painful input to close the “gate”	Avoid direct pressure on inflamed nerves
Autonomic PNS	Organ & vessel control	Shift SNS↔PNS with pace, heat, breath	Monitor dizziness, BP changes

B) Autonomic comparison

Feature	Sympathetic	Parasympathetic
Core effect	Mobilise (fight/flight)	Restore (rest/digest)
Body signs	Fast pulse, cool hands, tight jaw	Warm extremities, slow breath
Uzhichil cues	Brisk strokes, brief heat for Kapha fog	Warm oil, slow cadence, exhale-timed pressure

C) Nerve pathways & marma intersections

Region	Key nerve/plexus	Related marma	Practical stroke
Neck	Cervical plexus/sympathetic trunk	Mātrikā row	Feather thumb holds; avoid carotid compression
Axilla	Brachial plexus	Ani	Oblique thumb spirals + shoulder positioning
Thigh	Sciatic/femoral	Ūrvi	Broad foot glides with knee flex–extend
Sole	Tibial/plantar	Talahridaya	Centre-sole heel press + ankle mobilise

D) Pain types & interventions

Pain type	Hallmarks	First-line strategy	Progression
Acute	Recent, sharp, protective	Cool oil, distal flush, gentle holds	Add heat & mobility after swelling drops
Chronic	>3 months, variable, fear-avoidance	Predictable warm touch + breath pacing	Graded movement (chuvadukal), education
Referred/neuropathic	Tingling, burning, travel pattern	Nerve-glide strokes along pathway	Strengthen segment, posture retrain

E) Reflexes & tone

Reflex/Phenomenon	What triggers it	Therapist move	Expected change
Stretch (spindle)	Fast lengthening	Slow press on exhale	Less guarding
Golgi tendon	Sustained tension	Pin-and-hold near tendon	Tone drop, “melt”
Withdrawal	Sharp pain	Convert to broad/warm contact	Client stays relaxed
Reciprocal inhibition	Agonist activation	Light isometrics	Antagonist releases

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Key take-aways

1. **Plan treatments by segments and plexuses**—many symptoms make sense only in dermatomal/myotomal maps.
2. **Use pace, temperature, and breath to steer autonomic tone**—calm SNS when stress dominates, energise gently when Kapha heaviness lingers.
3. **Gate control makes pain modifiable in-session**—steady non-painful input plus exhale timing closes the gate.
4. **Work with reflexes, not against them**—slow stretch, sustained holds, and selective isometrics change tone

safely.

5. **Respect nerve–marma junctions**—prefer oblique, graded loading with limb positioning to improve glide without irritation.

Keep these principles at your fingertips and your Uzhichil sessions will communicate clearly with the nervous system—reducing pain, restoring movement, and settling the whole person.