

Peripheral Neuropathy

Neuropathy – disturbance of function or pathological change in a nerve:

- in one nerve, mononeuropathy; in several nerves, → if diffuse and bilateral, polyneuropathy.
- neurotoxicity of chemotherapeutic agents and radiation-induced damage to nerves
- Estimates of prevalence - vary considerably.

Development of short or long-term toxicity

– factor dependent (e.g. age, single-dose intensity, cumulative doses, combinations of neurotoxic agents), coexisting neuropathies (for example, diabetic neuropathy), genetic susceptibility, alcohol abuse, impaired drug metabolism, and excretion of active metabolites

Severity, characteristics, and duration of symptom experiences vary greatly with neurotoxic chemotherapeutic agents

paclitaxel	can induce sensory impairment and pain,
vincristine	often causes a sensorimotor neuropathy that also includes motor dysfunction such as foot drop. Can also cause orthostatic hypotension, constipation, paralytic ileus, and bladder dysfunction

Peripheral neuropathies = generally affect the distal parts of extremities symmetrically, and are characterized by a “stocking and glove” phenomenon of the feet and hands, with paresthesia or dysesthesia, including sensations of numbness or tingling.

Time course –

Cisplatin	about one month after the first course of therapy
oxaliplatin,	can typically produce symptoms within 30 to 60 minutes after the infusion

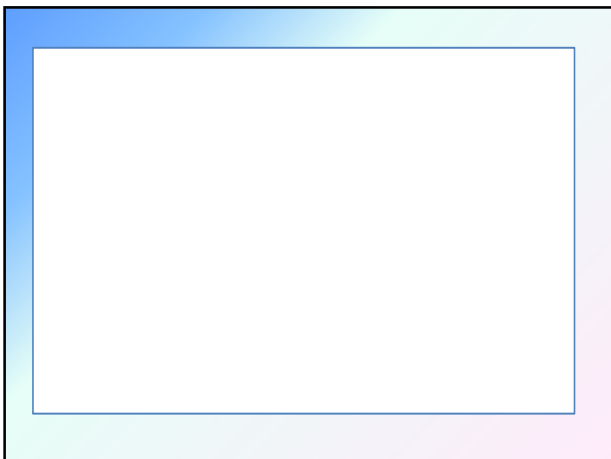
Delayed neurotoxicity has not been well studied, but some survivors experience persistent residual effects of chemotherapy, including paresthesia, dysesthesia, pain, or sensory and motor impairment months and even years after treatment is discontinued.

Kannarkat et al. (2007) Neurologic complications of chemotherapy agents, Curr Opin Neurol 20:719–725.

The usual course of almost all CIPNs is a gradual onset of symptoms that worsens with repeated cycles of chemotherapy

Patients often have a gradual improvement in their symptoms if the offending agent is withheld.

Once therapy is completed, CIPN can be acute, mild, transient, and fully reversed but for some, CIPN can be cumulative, severe, and prolonged



Bakitas (2007) Background Noise The Experience of Chemotherapy-Induced Peripheral Neuropathy Nursing Research September/October 2007 Vol 56, No 5, 323-331

- **Qualitative, exploratory, interpretive, descriptive study with semi-structured interviews**

Purpose was to describe the CIPN symptom experience and the influence of symptoms on everyday life.

Participants represented diversity in age, cancer type, time since diagnosis, neuropathy severity, and neurotoxic chemotherapy agents received.

TABLE 3. Functional Effects of Chemotherapy-Induced Peripheral Neuropathy by Location
 →From Bakitas (2007)

Fingers, hands, and arms

Dressing: Problems buttoning buttons, zipping zipper, fastening bra, putting on earrings or jewelry

Cooking: Problems opening jars, removing cold items from refrigerator, cracking (cold) eggs
Sewing: Problems threading a needle, knitting for very long or at all

Household: Problems working with tools (for home or car repairs); holding the telephone for a long time; picking up pills, coins, or small objects

Work: Problems typing, working with tools (for home or car repairs), holding the telephone for a long time, holding a pen, writing legibly, performing job involving manual or mechanical skills of hands

Leisure: Problems turning book pages, picking up or throwing a ball, using remote or controller for video game, crafts, painting, knitting, sewing

From Bakitas (2007) (continued)

Toes, feet, and legs

Dressing (footwear): Preferred to go barefoot to feel the ground or because shoes were confining, painful, and made feet feel numb or tight; could not tolerate going without socks and shoes; could not wear their usual shoes and switched to wearing loose shoes, sandals, or slippers; more secure in shoes with a heel or wedge; (oxaliplatin) could not go barefoot due to cold hypersensitivity

Mobility: Pain, burning, numbness, leg weakness caused problems with balance, concerns about falling; problems with walking, hiking, running, biking, and standing for prolonged periods; tripping; felt clumsy; shuffling; unsteady gait; difficulty climbing stairs; needed wheelchair, cane, walking aids; holding onto walls or partner while walking

Driving: Trouble feeling the accelerator, brake, clutch pedals of car; switched to driving an automatic rather than standard shift car; felt unsafe because of lack of feeling in feet

Work: Changed responsibilities at work so would not need to stand, reduced hours, increased fatigue resulted in inability to continue prior job responsibilities, needed workplace accommodations

Leisure: Could not use tractor or do yard or gardening; problems doing leisure activities and hobbies; could not shop; less eating out or social activities; could not play tennis, baseball, or basketball

From Bakitas (2007) (continued)

TABLE 4. Remedies Participants Used to Minimize or Control Chemotherapy-Induced Peripheral Neuropathy

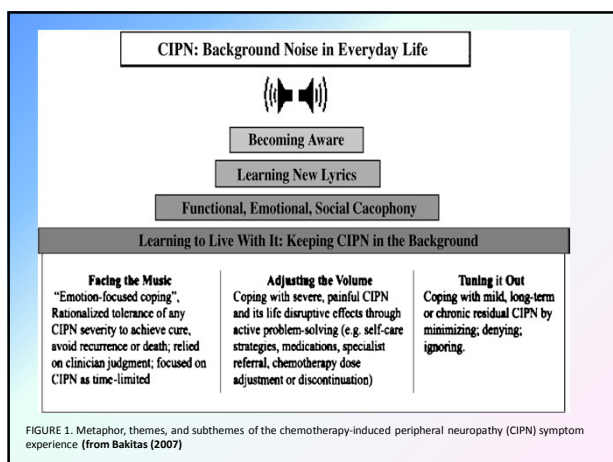
Self-Care (nondrug remedies)
 Got help from friends/family
 Sought information from the Internet, written resources
 Elevated feet
 Found ways to do activities or job sitting down
 Tried to warm feet with blankets or wraps
 Walking or exercise
 Massage or rubbing
 Went to physical therapy
 Got orthotics for shoes
 Transcutaneous Nerve Stimulation (TENS) unit, acupuncture
 Used a wheelchair, cane, or other walking aid
Medications:
 Gabapentin (Neurontin)
 Glutamine
 Opioids: morphine, methadone, oxycodone (Percocet, Oxycontin)
 Vitamins: B, B6, B12, E
 Steroids
 Requested change or clinician decided to change neurotoxic chemotherapy

Bakitas (2007) continued

- **Overarching metaphor, Background Noise, and four major themes:**

- (a) **Becoming Aware**
- (b) **Learning New Lyrics**
- (c) **Functional, Emotional, and Social Role Cacophony**
- (d) **Learning to Live With It.**

Participants described significant physical limitations, emotional distress, and social role impairments due to CIPN



Metaphor: Background Noise (taken from article) Bakitas (2007)

- Background Noise was the central unifying metaphor that captured the essence of CIPN symptom experience in the context of participants' everyday life.
- CIPN could be kept in the background and was not the central focus of the participants' cancer experience except when it became severe.
- It could be overshadowed by other treatment-related (i.e., nausea and vomiting or neutropenic fever) or disease related (e.g., seizures and blood clots) effects.

However, even in the background, CIPN was "annoying," "distracting," and "unpleasant" and could interfere with valued activities and social and work roles.

- Support for the noise metaphor came from participants' comparison of CIPN to sound. Participants made exclamations, noises, or sounds to communicate the unusual or unfamiliar symptom quality.
- For most participants, CIPN was a familiar, constant drone, and they "got used to it."

The author states:

"Chemotherapy-induced peripheral neuropathy caused unique, interrelated patterns of disruption of physical function, daily activities, enjoyment, social relationships, and work role.

The participants described the symptom experience as a whole package (Cacophony) rather than separate emotional, social, or physical functional effects".

"The metaphor of Background Noise highlights the amazing capacity of persons living with cancer to adapt or cope with the adverse effects of disease and treatment. Generally, CIPN was not a central feature of participants' everyday life.

However, participants described how fluctuating CIPN intensity, analgesic efficacy, self-care strategies, and other factors could shift CIPN between background and foreground".

"Three unique coping processes (Facing the Music, Adjusting the Volume, and Tuning It Out) described how participants learned to deal with CIPN. Depending on symptom intensity and disease and treatment demands overtime, participants could use more than one of these coping processes".

[Tager et al. The cognitive effects of chemotherapy in post-menopausal breast cancer patients: a controlled longitudinal study.](#) Update Breast Cancer Research & Treatment. 123(1):25-34, 2010 Aug.

Authors proposed that motor slowing in women treated with chemotherapy could be secondary to peripheral neuropathy rather than an indication of more general declines in cognitive processing. Future studies should control for the independent effects of slowed motor functioning when looking to study possible chemotherapy related cognitive processing deficits