



6. Table(s) of Tools to Measure Oncology Nursing-Sensitive Outcome: Peripheral Neuropathy

This table includes tools specifically designed to assess and measure chemotherapy-induced peripheral neuropathy that have been used in patients with cancer.

**Table 6A. Description of Tools
Tools for Grading Neuropathy: Toxicity Grading Scales**

Name of Tool	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
World Health Organization Toxicity Criteria Miller et al., 1981	None	Paresthesias and/or decreased deep tendon reflexes	Severe paresthesias and/or mild weakness Mild weakness	Intolerable paresthesias and/or motor loss	Paralysis
Eastern Cooperative Oncology Group	None	Decreased deep tendon reflexes Mild paresthesias Mild constipation	Absent deep tendon reflexes Severe constipation Mild weakness	Disabling sensory loss, severe peripheral neuropathic pain, obstipation, severe weakness, bladder dysfunction	Respiratory dysfunction secondary to weakness, obstipation requiring surgery, paralysis confining patient to bed or wheelchair
National Cancer Institute of Canada Common Toxicity Criteria*					
Sensory Neuropathy	None	Loss of deep tendon reflexes or paresthesia (including tingling) but not interfering with function	Objective sensory loss or paresthesia, interfering with function, but not interfering with activities of daily living (ADL)	Sensory loss or paresthesia interfering with ADL	Permanent sensory loss that interferes with function
Motor Neuropathy	None	Subjective weakness but no objective findings	Objective mild weakness, interfering with function but not interfering with ADL	Severe paresthesia, moderate objective abnormality, severe functional abnormality	Paralysis

Name of Tool	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
<p>Ajani Motor Neuropathy Ajani, 1990</p> <p>Sensory Neuropathy</p> <p>Motor Neuropathy</p>	<p>None</p> <p>None</p>	<p>Paresthesia and decreased deep tendon reflexes</p> <p>Mild transient muscle weakness</p>	<p>Mild objective abnormality, absence of deep tendon reflexes, mild to moderate functional abnormality</p> <p>Persistent moderate weakness, but ambulatory</p>	<p>Severe paresthesia, moderate objective, severe functional abnormality</p> <p>Unable to ambulate</p>	<p>Complete sensory loss, loss of function</p> <p>Complete paralysis</p>
<p>Total Neuropathy Scale</p> <p>Sensory Symptoms</p> <p>Motor Symptoms</p> <p>Pin Sensibility</p> <p>Vibration Sensibility</p> <p>Reflexes</p>	<p>None</p> <p>None</p> <p>None</p> <p>None</p> <p>None</p>	<p>Limited to fingers or toes</p> <p>Slight difficulty</p> <p>Reduced in fingers and toes</p> <p>Reduced in fingers and toes</p> <p>Reduced ankle reflex</p>	<p>Extension to ankle or wrist</p> <p>Moderate difficulty</p> <p>Reduced to ankle</p> <p>Moderate difficulty Reduced to ankle</p> <p>Absent ankle reflex</p>	<p>Extension to knee or elbow</p> <p>Requires assistance</p> <p>Reduced to elbow or knee</p> <p>Reduced to elbow or knee</p> <p>All reflexes reduced</p>	<p>Extension to above the knee or elbow, functionally disabling</p> <p>Functionally disabling</p> <p>Reduced above elbow or knee</p> <p>Reduced above elbow or knee</p> <p>All reflexes absent</p>



Name of Tool	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
Total Neuropathy Scale (Continued)					
Autonomic symptoms	None	1	2	3	4 or 5
Vibration sensation	Normal-125	126-150	151-200	201-300	> 300
Sural amplitude	Normal or reduced < 5%	76%-96%	51%-75%	26%-50%	0%-25%
Peroneal amplitude	Normal or reduced < 5%	76%-96%	51%-75%	26%-50%	0-25%
National Cancer Institute, Common Terminology Criteria for Adverse Events					
Neuropathy cranial	None	Asymptomatic, detected on examination or testing only	Symptomatic, not interfering with ADL	Symptomatic, interfering with ADL	Life threatening, disabling
Neuropathy motor	None	Asymptomatic, weakness detected on exam or testing only	Symptomatic weakness, interfering with function, but not interfering with ADL	Weakness interfering with ADL, bracing or Assistance to walk indicated	Life threatening, disabling
Neuropathy sensory	None	Asymptomatic, loss of deep tendon reflexes, paresthesia (including tingling) but not interfering with function	Sensory alteration or paresthesia (including tingling) interfering with function but not interfering with ADL	Sensory alteration or paresthesia interfering with ADL	Disabling

* The National Cancer Institute's Common Terminology Criteria for Adverse Events has a grade 5 toxicity category for all neuropathy items: death.



Table 6B. Description of Tools

Tools to Measure Oncology Nursing-Sensitive Outcome: Peripheral Neuropathy

The FACT tools are available online at no charge at www.facit.org. However, there is an additional charge for the tool psychometrics, administration and scoring instructions.

Name of Tool	Author and Year	Domains or Factors	# of Items	Scaling	Scoring	Language	Comments
Functional Assessment of Cancer Therapy/Gynecologic Oncology Group-Neurotoxicity (FACT/GOG-Ntx)	Calhoun et al., 2000, 2003	Physical well-being Social well-being Emotional well-being Functional well-being Additional concerns (related to neuropathy)	7 7 6 7 11	0-4 not at all- very much	Scoring available at www.facit.org for additional charge	English Many other language translations of this tool are available	Two groups of women with ovarian cancer completed the FACT/GOG-Ntx. One group (A) was chemotherapy-naive with newly diagnosed ovarian cancer and a second group (B) with known neurotoxicities. Cronbach's alpha ranged from 0.84-0.90 for the 38-item FACT/GOG-Ntx total and from 0.71-0.88 for the individual subscales with the exception of Social Well-Being subscale (0.51-0.53) due to the fact that many patients chose not to answer the satisfaction with sexual activity question. Validity was determined by criterion-related and concurrent validity. The FACT/GOG-Ntx was able to differentiate between the patients with no neurotoxicity (Group A) and those with known chemotherapy-induced neuropathy (Group B). The separation of these two clinically distinct groups was > one standard deviation for over 6 months. Correlation coefficients for objective and subjective measures of neuropathy find sensory rating ($r = 0.19-0.73$), motor ($r = 0.20-0.64$), and

Name of Tool	Author and Year	Domains or Factors	# of Items	Scaling	Scoring	Language	Comments
FACT/GOG-Ntx (Continued)							autonomic ($r = 0.03-0.49$) to have significant relationship to the Ntx subscale over time. Strength and reflexes revealed a moderate association with the Ntx subscale and Quantitative Sensory Testing (QST) showed a less degree of association over time.
Functional Assessment of Cancer Therapy – Taxane (Version 4)	Cella et al., 2003	Physical well-being Social well-being Emotional well-being Functional well-being Additional concerns	7 7 6 7 16	0–4 not at all– very much	Scoring available at www.facit.org for additional charge	English Many other language translations of this tool are available	FACT-Taxane: Cronbach's alpha for the 16-item taxane subscale ranged from 0.84-0.88. Criterion-related validity was determined for responsiveness to expected change by comparison of the FACT-Taxane with Karnofsky performance status in a sample of lung cancer patients receiving taxanes. There were no significant differences at baseline (prechemotherapy); however, significant group differences were observed at 6 and 12 weeks by decreases in scores from baseline indicating measurable neurotoxicity.
Peripheral Neuropathy Scale	Almadrones et al., 2004	Peripheral neuropathy	11	1–4 Not at all– very much	11 items are summed for a score of 11-44. Higher scores indicate higher degree of patient-reported	English	Cronbach's alpha (reliability) .91 for the 11-item PN scale. Construct validity was done using exploratory factor analysis with items 9,10, 13, 16, & 18 loading on Factor 1 (Hand Neuropathy) and items 11, 14, 17 & 19 loading onto Factor 2 (Foot Neuropathy). At T2, peripheral neuropathy was significantly associated with the Common Toxicity Criteria score,



Name of Tool	Author and Year	Domains or Factors	# of Items	Scaling	Scoring	Language	Comments
Peripheral Neuropathy Scale <i>(Continued)</i>					peripheral neuropathy		supporting the validity of the PNS.