

## The Neuropathic Pain Scales

**N**europathic pain is defined as pain initiated or caused by a primary lesion or dysfunction of the nervous system. Syndromes such as postherpetic neuralgia, complex regional pain syndrome, peripheral neuropathy, and phantom pain typify neuropathic pain. Advances in the diagnosis and treatment of neuropathic pain have been hampered by the absence of consensus on its diagnostic criteria,<sup>1</sup> the lack of scales to assess the intensity of the neuropathic pain symptoms and follow the response of the patient to treatments, and the lack of questionnaires to determine whether the patient's pain is neuropathic or not. Whereas the McGill Pain Questionnaire has been transformed into a short form to make it more clinically applicable,<sup>2</sup> the neuropathic pain questionnaires lack bedside applicability. This situation may be changing. Recently, several publications have appeared on scales to determine the intensity of the neuropathic pain and questionnaires to distinguish neuropathic from nonneuropathic pain. The newer scales have also been shortened to be applicable to a busy clinical practice.

The Neuropathic Pain Scale (NPS) was designed to assess the distinct pain qualities associated with neuropathic pain.<sup>3</sup> The NPS consists of 10 items. Seven of the 10 items contain the words intense, sharp, hot, dull, cold, and itchy to characterize the patient's pain and the word sensitive to describe the patient's pain reaction to light touch or clothing. One item describes the time quality of the pain (all the time or some of the time). The ninth item describes the overall unpleasantness of the pain, whereas the last item indicates the intensity of the deep and surface pain. All the items are rated on a 0 to 10 scale. The authors noted that 4 items (sharp, sensitive, cold, itchy) distinguished postherpetic neuralgia from diabetic neuropathy and complex regional pain syndrome. Because the characteristics of the pain sensation may indicate the underlying pathophysiologic mechanisms, their findings suggested that the different neuropathic pain syndromes may have different pathophysiologic mechanisms. Postherpetic neuralgia may be secondary to neuronal damage to the central and peripheral nervous systems, and the acute inflammatory response results in injury to the cutaneous sensory nerves.<sup>3</sup> The investigators also noted that almost all of the NPS items were sensitive to the effects of treatment. The authors recommended that the NPS be used to examine the effects of treatment on the specific dimensions of pain experience of patients with neuropathic pain. In a subsequent publication, the authors confirmed the validity of the NPS in detecting changes in the pain symptoms after treatment and noted potential of the NPS for identifying the differential effects of analgesics on specific pain qualities.<sup>4</sup>

The Neuropathic Pain Symptom Inventory (NPSI), developed in France and Belgium, also evaluates the different symptoms of neuropathic pain.<sup>5</sup> The NPSI allows discrimination and quantification of the distinct and clinically relevant dimensions of neuropathic pain syndromes (spontaneous ongoing pain, spontaneous paroxysmal pain, evoked pain, and paresthesia/dysesthesia) that are sensitive to treatment. The pain may be burning, squeezing, or pressure in character. The burning pain represents the superficial component, whereas pressure and squeezing pain represent the deep component of the spontaneous ongoing pain. The authors recommended usage of the psychometric properties of the NPSI to

characterize subgroups of neuropathic pain patients and to verify the response of the patients to various pharmacologic agents or interventions. The final version of the NPSI includes 12 items; 10 are descriptors of the different symptoms, and 2 assess the duration of spontaneous ongoing and paroxysmal pain. A total intensity score is calculated as the sum of the scores of the 10 descriptors. Increases or decreases in the NPSI total score are related to changes in the patient's pain. An English version of the NPSI is available.<sup>5</sup>

The NPS and NPSI evaluate the symptoms of patients with neuropathic pain, determine the efficacy of different treatments, and help elucidate the mechanism(s) of effect of such treatments. The NPS and NPSI do not differentiate patients with neuropathic pain from patients with nonneuropathic pain. Three questionnaires were designed to do this: the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS),<sup>6</sup> the Neuropathic Pain Questionnaire (NPQ),<sup>7,8</sup> and the neuropathic pain diagnostic questionnaire called the DN4.<sup>9</sup> A new validated neuropathic pain screening tool has recently been proposed in the primary care setting. This new screening questionnaire has not been published as a full article, and the questionnaire was not included in the abstract.<sup>10</sup>

The LANSS is a 7-item pain scale that consists of grouped sensory description and sensory examination with a simple scoring system.<sup>6</sup> The first 5 questions ask for the presence of unpleasant skin sensations (pricking, tingling, pins and needles), appearance of the skin (mottled, red, or pink), increased sensitivity of the skin to touch, sudden bursts of electric shock sensations, and hot or burning skin sensations. The last 2 questions involve sensory testing for the presence of allodynia and altered pinprick threshold.<sup>6,11</sup> Different number of points, relative to their significance to neuropathic pain, are given to positive answers for a maximum of 24 points. A score of <12 makes it unlikely that the patient's symptoms are neuropathic in nature, whereas a score >12 make neuropathic mechanisms likely to be contributing to the patient's pain. The initial LANSS scale was validated in an initial group of 60 patients, and the final 7-item scale was validated in another 40 patients. The patients with neuropathic pain were noted to have more allodynia, hyperalgesia, or a raised pinprick threshold. Of the maximum score of 24 points, the median score was 17 for the neuropathic group and 4 for the nociceptive group.<sup>6</sup> The LANSS scale was noted to have 85% sensitivity, 80% specificity, and a predictive value of 82%.

The NPQ contains 12 items to help differentiate neuropathic pain patients from nonneuropathic pain patients.<sup>7,8</sup> From a preliminary 32-item questionnaire, the final NPQ contains 12 items. The 12-item questionnaire has 66.6% sensitivity, 74.4% specificity, and 71.4% accuracy. A stepwise discriminant analysis of the 12 NPQ items identified 3 items as significant predictors. These included tingling pain, numbness, and increased pain due to touch. From these 3 items, the authors offered a short form of the NPQ (Appendix 1).<sup>8</sup> The NPQ short form has 64.5% sensitivity, 78.6% specificity, and 73% accuracy.

The most recent scale was developed by the French Neuropathic Pain Group and called the DN4 (Douleur Neuropathique 4 or Neuropathic Pain 4 questions in French). The DN4 is a simple questionnaire that also attempts to distinguish neuropathic pain from nonneuropathic pain.<sup>9</sup> The 10-item questionnaire consists of sensory descriptors and signs related to bedside sensory examination (Appendix 2). The investigators compared patients with neuropathic pain (traumatic nerve injury, postherpetic neuralgia, and poststroke pain) with nonneuropathic pain patients (osteoarthritis, inflammatory arthropathies, and mechanical low back pain). They noted that several symptoms (pain descriptors and paresthesia/dysesthesia) and signs (evoked pain and sensory deficits) were significantly more frequent in the neuropathic pain group.<sup>9</sup> A cutoff score of 4 has a predictive value of 86%, sensitivity of 82.9%, and a specificity of 89.9%.

The NPS and the NPSI are scales to determine the intensity of the neuropathic pain and follow the response of the patient's symptoms to treatment. The scales

are slightly detailed and more applicable to research. The NPQ, LANSS, and the DN4 help the clinician determine the predominance of neuropathic pain in a patient with mixed pain or someone with equivocal symptoms. Of the 3 questionnaires, the NPQ short form is the shortest but requires simple mathematical calculations. The DN4 has 10 questions that are easily answered by “yes” or “no.” In contrast to the LANSS scale, the points of the positive answers in the DN4 are all the same.

The study by Dr Kaki and colleagues,<sup>11</sup> published in this issue of *Regional Anesthesia and Pain Medicine*, used the LANSS scale to determine the incidence of neuropathic pain in patients with low back pain. In this study, the investigators identified the risk factors for neuropathic pain in patients with back pain. The study by Kaki et al is a preliminary study. The LANSS may not be the best questionnaire to identify patients with neuropathic pain. Additional studies are needed to compare the accuracies, sensitivities, and specificities of the LANSS, NPQ, and the DN4 in identifying patients with neuropathic pain. Several questions need to be addressed in future studies. In low back pain patients with predominant neuropathic pain mechanisms, will the addition of gabapentin<sup>1</sup> or drugs in the same category make the treatment effective? If the appropriate treatment is instituted early, will it prevent the development of chronic low back pain? Patients with low back pain comprise the majority of patients seen in pain clinics, and results of controlled studies on these patients have profound significance.

In summary, the neuropathic pain questionnaires open the door for easier identification of patients with predominant neuropathic pain mechanisms, assess the intensity of the symptoms, determine the efficacy of treatments, and assist investigators in performing fruitful research on neuropathic pain.

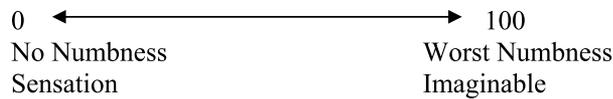
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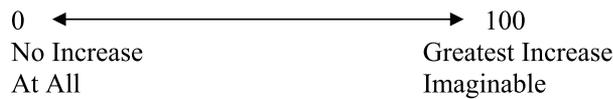
1sf. Numbness: rate your usual pain:



2sf. Tingling pain: rate your usual pain:



3sf. Increased pain due to touch: rate your usual pain:



Scoring Worksheet:

Item	Score	Coefficients	Product
1sf. Numbness	_____	.017	_____
2sf. Tingling Pain	_____	.015	_____
3sf. Increased Pain due to Touch	_____	.011	_____
Constant			_____
Total Discriminant Function Score:		=	_____

Discriminant Function Score Below 0: \_\_\_\_\_ Predicts **Non-Neuropathic Pain**  
 Discriminant Function Score at or Above 0: \_\_\_\_\_ Predicts **Neuropathic Pain**

**Appendix 1.**

Interview of the Patient

Question 1: Does the pain have one or more of the following characteristics?

	Yes	No
1. Burning	—	—
2. Painful cold	—	—
3. Electric shocks	—	—

Question 2: Is the pain associated with one or more of the following symptoms in the same area?

	Yes	No
4. Tingling	—	—
5. Pins and needles	—	—
6. Numbness	—	—
7. Itching	—	—

Examination of the Patient

Question 3: Is the pain located in an area where the physical examination may reveal one or more of the following characteristics?

	Yes	No
8. Hypesthesia to touch	—	—
9. Hypesthesia to prick	—	—

Question 4: In the painful area, can the pain be caused or increased by

	Yes	No
10. Brushing	—	—

TOTAL SCORE: \_\_\_\_\_

Note: A score of 1 is given to each positive item and a score of 0 to each negative item. The total score is calculated as the sum of the 10 items, the cut-off value for the diagnosis of neuropathic pain is 4/10.

**Appendix 2.**