Results of the Leeds Assessment of Neuropathic Symptoms and Signs Pain Scale in Turkey: A Validation Study
Aysen Yucel,* Mustafa Senocak,† Elif Kocasoy Orhan,‡ Ali Cimen,§ and Mustafa Ertas‡

Abstract: Classification of pain and identification of the specific pain mechanisms through utilization of clinical data are helpful to the physician in choosing the appropriate treatment model. For discrimination between different pain types, various tests could be used. The Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) Pain Scale is a scale based on the analysis of data obtained during bedside examination. The LANSS Pain Scale, as first used by Bennett, is a very useful tool that provides immediate information in the clinical setting and helps distinguish nociceptive pain from neuropathic pain. In this study we targeted validation of the LANSS Pain Scale in the Turkish population. A total of 104 patients who consulted the Algology Department of Istanbul Faculty of Medicine Outpatient Clinic were enrolled in our validation study. The sensitivity and specificity of the scale were found to be 89.9% and 94.2%, respectively. These results suggest a high validity level for the Turkish version of the LANSS Pain Scale. We believe that this scale is a useful tool for the differential diagnosis of neuropathic pain and can be used in future pharmacologic studies.

Perspective: Any measures that aid in differentiating neuropathic pain from nociceptive pain would facilitate effective management of pain. In daily practice the simplicity of the classification method is important. The present study suggests that Turkish version of LANSS can be used for the discrimination between neuropathic and nociceptive types of pain.

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Key words: LANSS Pain Scale, pain assessment, neuropathic pain, sensory description.

Neuropathic pain syndromes represent a group of highly heterogeneous clinical conditions. Such heterogeneity is apparent from the presentation of patients with various painful symptoms, including spontaneous continuous pain, paroxysmal pain, or evoked pain, which can be differentiated better with clinical examination. A realistic and rapidly applicable approach should involve a good clinical assessment. It is clear that differentiating the type of pain on the basis of its underlying mechanism can facilitate the decision making for the best therapy for each individual patient, but the challenge is how to achieve this discrimination.11,12,15 In daily clinical practice the simplicity of the classification method and the applicability at bedside examination are extremely important. Numerous instruments to derive the proper clues from presenting clinical signs have been defined and used in an attempt to facilitate correct diagnosis and appropriate treatment measures.1-3,5,8 On the other hand, current pain questionnaires such as the McGill Pain Questionnaire11 or the Brief Pain Inventory5 fail to provide a satisfactory specificity level to fulfill this purpose. In 1997 the Neuropathic Pain Scale was developed for the assessment of symptoms9 and was shown to demonstrate some sensitivity to treatment.1 More recently, the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) Pain Scale2 and the Neuropathic Pain Questionnaire9 have been developed for the diagnosis of neuropathic pain. However, all these tools were introduced in English as a reflection of the originating country, and only some of them were translated and validated into other languages. To our knowledge, none of these scales were available in Turkish. The advantages that LANSS Pain Scale provided over other questionnaires were ease of administration and a relatively easy adaptation into the Turkish language. The aim of this study was to evaluate the sensitivity and specificity of the Turkish version of LANSS Pain Scale in discriminating neuropathic and nociceptive pain types in a local patient population.

Materials and Methods

After approval of the study by the local ethical committee, 104 patients (40 male and 64 female, ages between 17 and 81 years) who had presented to the Algology Department of Istanbul Faculty of Medicine during February through April 2002 were enrolled in this randomized, double-blind study.

After their admission to the Algology Department outpatient clinic, the patients were evaluated by a pain cli-
nician. Differential diagnosis of patients as to neuropathic or nociceptive pain was based on medical history (by use of a special chart developed by the Algology Department involving different questions from those of the LANSS Pain Scale), physical examination, quantitative sensorial tests, electromyography, laboratory examinations, and imaging techniques wherever indicated. Cancer patients and those patients with pain of a presumably mixed origin were excluded.

Randomly selected patients who met the eligibility criteria were asked to participate in the study; randomization was conducted by using a planned visit list.

Translation and back-translation method was used to adapt the LANSS into Turkish. In this process, the scale was first translated into Turkish by a native Turkish translator who spoke English fluently. The scale was then back-translated into English by a native English speaker who had not seen the original English version. The back-translated English version was compared with the original LANSS in English by one of the authors of this paper (A.Y.). Bilingual fluency was required for both translators (Appendix 1 and Appendix 2).

A neurologist who was blinded to the pain classification of patients administered this Turkish version of the LANSS Pain Scale to the patients. The patients were asked questions about the characterization of pain in the preceding week, and additional sensorial testing was done to determine any current allodynia and the level of pinprick threshold. A 23-gauge needle was inserted into a syringe barrel was used to measure pinprick threshold.4

On the LANSS Pain Scale, a score of 12 or more was classified as neuropathic pain, and a score under 12 was classified as nociceptive pain. The intensity of pain at the time of interview was recorded on a 10-cm visual analogue scale (VAS) (0, no pain; 10, unbearable pain).

The concordance between the initial diagnosis of pain classification and the LANSS Pain Scale results was tested for statistical significance by using Cohen’s kappa.6,7 In testing the intergroup analysis of variance, the Student $t$ test was used for the quantitative parameters, and chi-square test was used for the qualitative parameters. Statistical significance level was accepted as less than or equal to .05.

**Results**

A total of 3 patients were excluded from the statistical analysis of study, 2 of them because of incomplete data collection and 1 because of inadequate level of communication with patient resulting in an inappropriate administration of scale.

Of a total of 101 cases evaluated, 52 were classified with nociceptive pain and 49 with neuropathic pain (Table 1). Gender and age distribution of patients showed no statistical difference between the 2 pain groups (male/female ratio of 19/33 in nociceptive pain group and 19/30 in neuropathic pain group; $P = .816$; age 49.03 ± 15.67 years [mean ± standard deviation] in nociceptive pain group and 53.89 ± 15.61 years in neuropathic pain group; $P = .112$).

The pain scores by LANSS were significantly different between the groups (6.67 ± 0.90 in the neuropathic pain group and 7.16 ± 0.84 in the nociceptive pain group).

The sensitivity of the LANSS Pain Scale in the diagnosis of neuropathic pain was 89.9%, whereas the specificity of scale for nociceptive pain diagnosis was 94.2%. LANSS provided a correct diagnosis ratio of 92.09% in the total group of all patients. For the diagnosis of neuropathic pain, the positive predictive value of LANSS was 93.61%, whereas the negative predictive value was 90.74%. These findings suggested a positive diagnostic value of the scale. In testing for the concordance between clinical diagnosis versus the findings from the LANSS Pain Scale, kappa was 0.841 ($P < .001$). The 0.84 kappa value that was obtained with LANSS Pain Scale in this study was considered in the very good agreement interval, indicating a strong relationship between clinical diagnosis versus scale results6,7 (Table 2). The median LANSS scores obtained in neuropathic versus nociceptive pain groups showed a statistically significant ($P < .001$) difference, with values of 18 and 5, respectively (Table 3).

**Table 1. Etiology of Pain**

<table>
<thead>
<tr>
<th>Pain Specialist’s Diagnosis (Gold Standard)</th>
<th>Neuropathic Pain ($n = 49$)</th>
<th>Nociceptive Pain ($n = 52$)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHN</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>Trigeminal neuralgia</td>
<td>6</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Diabetic polyneuropathy</td>
<td>9</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Atypical fascial neuralgia</td>
<td>5</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Peripheral nerve injury</td>
<td>7</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Failed back surgery syndrome</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Phantom pain</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Post-stroke pain</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Traumatic plexus avulsion</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Headache</td>
<td>9</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Acute lumbar strain</td>
<td>9</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Acute cervical strain</td>
<td>4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Peripheral vascular occlusion</td>
<td>8</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Traumatic tendinitis</td>
<td>5</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Traumatic rib fracture</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Myofascial pain</td>
<td>7</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

PHN, Postherpetic neuralgia.

**Table 2. Classification of Patients With Pain Specialist’s Diagnosis and the LANSS Pain Scale**

<table>
<thead>
<tr>
<th>Pain Specialist’s Diagnosis (Gold Standard)</th>
<th>Neuropathic</th>
<th>Nociceptive</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>LANSS diagnosis</td>
<td>44</td>
<td>3</td>
<td>47</td>
</tr>
<tr>
<td>Neuropathic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nociceptive</td>
<td>5</td>
<td>49</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>52</td>
<td>101</td>
</tr>
</tbody>
</table>

LANSS, Leeds Assessment of Neuropathic Symptoms and Signs.
Bennett reported the LANSS Pain Scale as an accurate test results of this study, which proved sensitivity and specificity and 30 patients with nociceptive pain. On the basis of the pathic pain, to 60 patients, 30 patients with neuropathic that is of great importance for the evaluation of neuro- allowed a concise inquiry of pain in a shorter time and to this syringe system. He applied this new scale, which ened another scale called the LANSS Pain Scale by add- cooporation. On the basis of these findings, Bennett de- and easy way of assessment that in return improved patient method for the evaluation of small fibers provided a simple advantages of this inexpensive and less time-consuming those from 48 healthy volunteers and reported that the study, however, the findings provide important data about the validity of pain intensity measures in the assess- ment of patients with neuropathic pain. Classification of pain plays an important role as a deter- inant of the therapeutic response, prognosis, morbidity, and related risk factors of condition. Thus the method used for the differential diagnosis should be reliable. Subjective pain expressions, especially those descriptions of sensorial pain, are commonly used in the distinction of neuropathic pain. Chan et al have suggested a sim- ple method for the assessment of pain based on the use of a syringe system, which can easily be applied in diabetes clinics with a heavy population of patients. In their study they compared the results from 44 diabetic patients with those from 48 healthy volunteers and reported that the advantages of this inexpensive and less time-consuming method for the evaluation of small fibers provided a simple and easy way of assessment that in return improved patient cooperation. On the basis of these findings, Bennett developed another scale called the LANSS Pain Scale by adding a questionnaire and the parameters of touch-allodynia to this syringe system. He applied this new scale, which allowed a concise inquiry of pain in a shorter time and which also detected the pinprick threshold or allodynia that is of great importance for the evaluation of neuropathic pain, to 60 patients, 30 patients with neuropathic and 30 patients with nociceptive pain. On the basis of the results of this study, which proved sensitivity and specificity levels of 87% and 83%, respectively, for LANSS Pain Scale, Bennett reported the LANSS Pain Scale as an accurate test for the discrimination of neuropathic pain. In our study we measured the sensitivity and specificity of scale as 89.9% and 94.2%, respectively. These results suggested a higher validity level for the LANSS Pain Scale than the results from the study by Bennett. Also the diagnostic concordance rate in our study (kappa = 0.841) was higher than that of the study by Bennett (kappa = 0.65). In our study the sample groups consisted of patients with a diagnosis of either one of the two distinct pain categories, and those patients in whom both nociceptive and neuropathic mechanisms were thought to contribute to the pain experience were excluded. However, acute strain conditions and peripheral occlusion cases were common in the nociceptive group, probably because these were the types of patients in whom it was easy to exclude a neuropathic component.

Patients with neuropathic pain, especially those who need symptom control, often are those patients who cannot tolerate completing long or complicated questionnaires. Several answers were observed as missing with such complicated questionnaires in this group of patients. The fact that there were no missing answers with this questionnaire of LANSS demonstrated that the scale is easy to adminster, most likely because of simplicity and familiarity of questions. Furthermore, we did not encounter any difficulties in the translation of scale, which frequently are encountered during these types of adaptational translations. Backonja has reported that this method might not be appropriate for those patients with symmetrical presentations of neuropathic conditions, and that the 23-gauge needle could cause bleeding. Our observations do not support his suggestions. We examined the patients with symmetrical presentations of neuropathic conditions by using an adjacent nonpainful area and did not observe any skin lacerations.

Efforts were made to minimize any variations in the clinical assessment of neuropathic pain through use of standardized definitions of pain types; brief explanations were followed by the demonstrations of patient interview and examination techniques. In crowded outpatient clinics, physicians need a simple and less time-consuming diagnostic tool for the assessment of neuropathic pain. In developing countries, the diagnostic tool should also be inexpensive. We started using the LANSS Pain Scale in our daily clinical practice after completion of our validation study. We believe that this scale is a useful tool for the differential diagnosis of neuropathic pain and can be used in future pharmacologic studies.

The introduction of the LANSS into the Turkish language remains important for 2 reasons. First, this represents the first version of any questionnaire in Turkish assessing neuropathic pain. Second, the identification of neuropathic pain is of great importance for both the patient and the clinician, so that an appropriate treatment plan could be developed, possibly also leading to an improvement in the quality of life of the patient. In this study it was shown that the Turkish version of LANSS Pain Scale can be used safely for the discrimination between neuropathic and nociceptive types of pain.

### Table 3. LANSS Scores

<table>
<thead>
<tr>
<th>LANSS Score</th>
<th>Median (Minimum–Maximum)</th>
<th>Mean ± Standard Deviation</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuropathic</td>
<td>18 (0-24)</td>
<td>16.93 ± 4.34</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Nociceptive</td>
<td>5 (0-16)</td>
<td>5.05 ± 3.68</td>
<td></td>
</tr>
</tbody>
</table>

LANSS, Leeds Assessment of Neuropathic Symptoms and Signs.

### Discussion

This study demonstrates that the Turkish version of LANSS Pain Scale can distinguish patients with neuropathic pain from those with nociceptive pain. These results suggest a high validity level for the LANSS Pain Scale. Our main objective was to provide a simple and easy to use instrument for daily clinical practice and clinical trial purposes. Thus, we deliberately chose to reduce the number of items evaluating various components of neuropathic pain syndromes in scale to the necessary minimum. Although the sample sizes of our study groups (49 and 51) were relatively small, they were considered adequate for the analyses. Another limitation of this study was the lack of a second physi- cian for the classification and evaluation of the patients. A second pain specialist or neurologist could have been involved in the evaluation and clinical diagnosis of the patients to see the consistency of the LANSS between the physicans. This might raise the question of the possible unreliability of the findings. Despite these limitations of the study, however, the findings provide important data about the validity of pain intensity measures in the assess- ment of patients with neuropathic pain.

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References


Appendix 1. The LANSS Pain Scale (Leeds Assessment of Neuropathic Symptoms and Signs)

NAME

DATE

This pain scale can help to determine whether the nerves that are carrying your pain signals are working normally or not. It is important to find this out in case different treatments are needed to control your pain.

A. PAIN QUESTIONNAIRE

- Think about how your pain has felt over the last week.
- Please say whether any of the descriptions match your pain exactly.

1. Does your pain feel like strange, unpleasant sensations in your skin? Words like pricking, tingling, pins and needles might describe these sensations.
   (a) NO — My pain doesn’t really feel like this .............................................. (0)
   (b) YES — I get these sensations quite a lot ...................................... (5)

2. Does your pain make the skin in the painful area look different from normal? Words like mottled or looking more red or pink might describe the appearance.
   (a) NO — My pain doesn’t affect the color of my skin .................... (0)
   (b) YES — I’ve noticed that the pain does make my skin look different from normal .......... (5)

3. Does your pain make the affected skin abnormally sensitive to touch? Getting unpleasant sensations when lightly stroking the skin, or getting pain when wearing tight clothes might describe the abnormal sensitivity.
   (a) NO — My pain doesn’t make my skin abnormally sensitive in that area ................ (0)
   (b) YES — My skin seems abnormally sensitive to touch in that area ................. (3)

4. Does your pain come on suddenly and in bursts for no apparent reason when you’re still? Words like electric shocks, jumping, and bursting describe these sensations.
   (a) NO — My pain doesn’t really feel like this .............................................. (0)
5. Does your pain feel as if the skin temperature in the painful area has changed abnormally? Words like hot and burning describe these sensations.

(a) NO — I don’t really get these sensations ...................................................(0)
(b) YES — I get these sensations quite a lot .............................................. ..........................(1)

B. SENSORY TESTING

Skin sensitivity can be examined by comparing the painful area with a contralateral or adjacent nonpainful area for the presence of allodynia and an altered pinprick threshold (PPT).

1. ALLODYRIA

Examine the response to lightly stroking cotton wool across the nonpainful area and then the painful area. If normal sensations are experienced in the nonpainful site, but pain or unpleasant sensations (tingling, nausea) are experienced in the painful area when stroking, alldynia is present.

(a) NO, normal sensation in both areas ...................................................(0)
(b) YES, allodynia in painful area only ................................................(5)

2. ALTERED PINPRICK THRESHOLD

Determine the PPT by comparing the response to a 23-gauge (blue) needle mounted inside a 2-mL syringe barrel placed gently onto the skin in a nonpainful and then painful areas.

If a sharp pinprick is felt in the nonpainful area, but a different sensation is experienced in the painful area, eg, none/blunt only (raised PPT) or a very painful sensation (lowered PPT), an altered PPT is present.

If a pinprick is not felt in either area, mount the syringe onto the needle to increase the weight and repeat.

(a) NO, equal sensation in both areas ..................................................(0)
(b) YES, altered PPT in painful area ...................................................(3)

SCORING:

Add values in parentheses for sensory description and examination findings to obtain overall score.

TOTAL SCORE (maximum 24) .................................................................

If score < 12, neuropathic mechanisms are unlikely to be contributing to the patient’s pain.
If score ≥ 12, neuropathic mechanisms are likely to be contributing to the patient’s pain.

Appendix 2. LANSS AĞRİ SKALASI (Leeds Nöropatik Semptom ve Bulgu Değerlendirmesi)

İSİM: ________________________________ TARİH: ____/____/________

Bu ağrı değerlendirmeye formu, ağrıya neden olan sinyalleri taşıyan sinirlerinizin normal çalıșıp çalıșmadığını belirlemeye yöneliktir. Bunun ortaya konması ağrınızın tedavisinde seçilecek yöntemin kararlaştırılması açısından önem taşımaktadır.

A. AĞRİ ANKETİ

Aşağıdaki soruları cevaplarken;

Geçen hafta boyunca çektiğiniz ağrıınızı düşünün,

Yapılan tanımlamaların şektiğiniz ağrıya tam olarak uyup uymadığını belirtin.

Ağrıınız, cildinizde tuhaf ve hoş olmayan hisler oluşturdu mu? Bu hisler batma, karıncalanma ve sızlama olarak tarif edilebilir.

HAYIR — Ağrımı bu şekilde hissetmiyorum. (0)
EVET — Bunları yoğun olarak hissediyorum. (5)
Ağrı, o bölgede cildinizin normalden farklı görünmesine neden oluyor mu? Bu görünüm benekli, lekeli veya daha kırmızı ya da pembe olarak tarif edilebilir.

HAYIR – Ağrım cildimin renginde değişikliğe neden olmuyor. (0)
EVET – Ağrım cildimin normalden farklı görünmesine neden oluyor. (5)

Ağrıınız, o cilt bölgesini dokunmaya duyarlı hale getiriyor mu? Bu anormal duyarlılık, cildinize hafif bir dokunmayla hoş olmayan bir his oluşması veya sıkı bir giysi giydirildiğinde ağrı hissetmeniz olarak tarif edilebilir.

HAYIR – Ağrı nedeniyle, ilgili cilt bölgemde anormal bir duyuları yok. (0)
EVET – Ağrı bölgemde dokunmaya karşı anormal bir duyuları var. (3)

Ağrıınız ortada belirgin bir neden yokken ve hareketsiz dururken aniden, ve çok şiddetli ortaya çıkyormu? Bu durum elektrik çarpması, sıçrama, zonklama ve patlama şeklinde tarif edilebilir.

HAYIR – Ağrı bu şekilde ortaya çıkmıyor. (0)
EVET – Sıklıkla böyle hissediyorum. (2)

Ağrı bölgesindeki cildin ısısında bir anormallik hissediyor musunuz? Bu anormallik sıcaklık veya yanma hissi olarak tarif edilebilir.

HAYIR – Böyle bir farklılık hissetmiyorum. (0)
EVET – Sıklıkla böyle hissediyorum. (1)

B. DUYU DEĞERLENDİRİMESİ

Cilt duyunusunu değerlendirirken ağrılı bölge, kontralateral veya komşu ağrılı olmayan bölgeler ile karşılaştırarak allodini ve pin-prick eşik değerinde (PPT) değişiklik olup olmadığı araştırılır.

**ALLODİNİ**

Bir pamuk parçası önce ağrılı olmayan bölgeye ardından ağrılı bölgeye hafifçe dokundurarak hastanın yanıtı değerlendirilir. Eğer ağrılı olmayan bölgede duyu normal ancak ağrılı bölgesinde ağrı veya hoş olmayan bir his (karıncalanma, sızlama) oluşuyor ise allodini vardır.

HAYIR – İki bölgede de duyu normal. (0)
EVET – Ağrı bölgesinde allodini var (ağrı olmayan bölge normal). (5)

**PIN-PRICK EŞIK DEĞERİNDE DEĞİŞİKLİK**

Pin-prick eşik değerini belirlemek amacıyla, 2 ml’lik enjektörün içine yerleştirilen 23 G (mavi) bir iğne (iğnenin ucu enjektörden çıkacak şekilde) nazikçe, önce ağrılı olmayan sonra da ağrılı bölgede cildin üzerine konarak iki bölge kıyaslanır.

Eğer ağrıısızs bölgeler keskin bir batma hissi alınırken ağrılı bölgelerde farklı bir his varsa; örneğin his yok ya da kaba, künt bir his (yüksek PPT) veya çok ağrılı bir his (düşük PPT), PPT değişmiştir.

Eğer iki alanda da iğnenin batışı hıssedilmese, iğne enjektörün ucuna takılarak ağrılık etkisi artırılır ve inceleme tekrarlanır.

HAYIR – İki bölgede de eşit his. (0)
EVET – Ağrı bölgesinde PPT değişmiş. (3)

**PUANLAMA**

Toplam puanı elde etmek için, duysal tanımlamalar ve değerlendirme lerin parantez içindeki puanları toplanır.

TOPLAM PUAN (maksimum 24):

Eğer toplam puan <12 ise, nöropatik mekanizmalar hastanın ağrısında ağırlıklı rol oynamaz.
Eğer toplam puan ≥12 ise, nöropatik mekanizmalar hastanın ağrısında ağırlıklı olarak rol oynamaktadır.