

The Relation Between Pain Intensity, Disability, and the Episodic Nature of Chronic and Recurrent Low Back Pain

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Study Design. An observational study on the course of chronic and recurrent low back pain and its relation to disability and medication use performed on the basis of daily diary recording.

Objectives. To provide a description of daily pain reporting by individuals with self-reported chronic and recurrent low back pain, to study how the intensity and episodic nature of low back pain is related to disability and medication use, and to classify subjects according to Von Korff's categories of chronic low back pain.

Summary of Background Data. The natural history of low back pain has been described, and some classification schemes have been proposed, but little has been reported on pain characteristics and their relation to self-report of disability.

Methods. Daily self-reports of pain intensity, social and work disability, and medication use were collected from 94 participants with self-reported chronic or recurrent low back pain over a 6-month period. A metric for describing the episodic nature of chronic low back pain was developed.

Results. A significant effect of pain intensity on disability was found. During an episode, participants had significantly greater disability and medication use. Work-related disability and medication use was significantly greater in the latter half of an episode.

Conclusions. Pain intensity can affect disability, but the episodic nature of low back pain also affects the ability to function in both work and personal life. Intermittent increases in pain can markedly alter disability. Chronic low back pain should not be treated as a static phenomenon. [Key words: disability, episode, low back pain, pain diary, pain rating] *Spine* 2000;25:834–941

In most cases, low back pain (LBP) is a self-limiting musculoskeletal disorder that typically resolves in 8 to 12 weeks.¹¹ It is difficult to define precisely when pain becomes chronic, but as many as 70% to 80% of individuals continue to have LBP 1 year after the initial onset.¹⁹ The problem is pervasive, representing the second most frequent symptom-related reason why people seek medical care.⁷ Yet, almost two thirds of the people with acute

LBP did not seek medical care.⁵ The disability associated with LBP represents a large cost to society in terms of medical expenses and lost productivity in the workplace.²²

Most LBP research has focused on the underlying pathophysiology, physical evaluation, imaging techniques, and psychosocial factors related to pain responses. Recently, perhaps because of economic pressures, greater emphasis has been placed on the cost effectiveness of diagnostic and treatment techniques.^{2,4,15,21} Despite these efforts, little has been done to describe the daily course of LBP in individuals with chronic or recurrent LBP. Likewise, the relation among the intensity, variability, and episodic nature of chronic LBP and disability has not been described.

As yet, no universal agreement has been reached on what constitutes chronic LBP.^{11,19} Von Korff et al^{19,20} described the clinical course of LBP and proposed a three-level classification scheme based on reported number of days in transient, recurrent, or chronic pain. Realizing that this classification did not fully capture the potentially episodic nature of long-term LBP, Von Korff¹⁹ further defined "flare-ups." These classifications have provided the researcher and clinician with some common grounds for describing the LBP disease state. Most LBP research uses a similar level of resolution. Higher resolution analysis techniques could provide further insight into the effect of the variability and episodic nature of chronic LBP and associated functional capacity.

Certainly, LBP can limit or impair function and capacity. Impairment, as defined by the World Health Organization, is "any loss or abnormality of psychological, physiologic, or anatomic structure or function."^{23(p27)} Disability is defined by the American Medical Association (AMA) guidelines as "an alteration of an individual's capacity to meet personal, social, or occupational demands, or statutory or regulatory requirements, because of an impairment."³ Given these definitions, the purpose of the present work was to explore the pain characteristics reported by individuals with chronic LBP and its influence on their ability to function. Because the definition from the AMA guidelines seems best to embody the concept of function and capacity, for sake of clarity, the term "disability" is used throughout this report.

The authors of this study examined the daily self-report of pain in individuals with chronic and recurrent LBP, as well as the relation of the intensity, variability,

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and episodic nature of LBP to disability and medication use. This study attempts to answer questions in the areas discussed in the following sections.

■ Intensity and Classification of Low Back Pain

Is disability related to pain intensity? Are there differences in social (social, family, or recreational) disability, work-related disability, and medication use between subjects classified by Von Korff's definition of chronic and recurrent LBP?

■ Episodic Nature of Low Back Pain

What constitutes an "episode" or "flare-up" in the population with chronic or recurrent LBP? Do individuals with chronic or recurrent LBP report a greater degree of disability on days during an episode than on nonepisode days? Does disability vary with the length of an episode? Is disability reporting greater as an episode progresses?

■ Method

Participants. Advertisements were placed in local newspapers to recruit persons with a history of persistent or recurring LBP for participation in an 18-month study of a postural intervention for LBP. Of the 124 potential participants who successfully completed the initial telephone screening, 8 were rejected for medical reasons. Of the 116 participants who began the study, 94 participants with chronic or episodic LBP completed a 6-month baseline (nonintervention) phase of a postural study and were included in the analysis.

The selection criteria for inclusion in the postural study required that the prospective participant have 1) a history of persistent or recurrent LBP, 2) an age of 30 to 60 years, 3) no present care of a physician or practitioner, 4) no filing of a workers' compensation claim, 5) no history of low back surgery, and 6) no current pregnancy or other mitigating medical conditions.

Potential participants currently receiving treatment were excluded from the study to minimize confounding of results by the mode or method of treatment. The exclusion of potential participants with active workers' compensation claims avoided the potential influence of financial incentives and the potential confounding of results by the tendency toward increased symptom reporting and symptom magnification in that group.¹⁶

Written informed consent was obtained after the risks and benefits of the experimental protocol were explained in detail. The method and results of the posture study are discussed by Snook et al.¹⁴

Experimental Protocol. At the beginning of the 6-month study period, participants provided an in-depth medical history and received an orthopedic physical examination by one of the authors (B.W.). They then were instructed in the daily pain scoring procedure, with particular emphasis on techniques for improving compliance and scoring consistency. Participants were given a 6-month supply of prestamped, addressed diaries. They were instructed to fill out the diaries daily at the same time of day and mail them in on a weekly basis.

Each diary sheet contained four questions. The first question asked: "How would you rate your back pain today on a 0 to 10 scale, where 0 is "no pain" and 10 is "pain as bad as could be?" A numerical rating scale (NRS) was selected because its

validity as a tool is well documented, and it is easy to comprehend and use.^{9,13} The 0 to 10 scale has been shown to provide a sufficient level of discrimination for patients with chronic pain to use in describing their pain intensity.⁸

Three questions related to work disability, social disability, and medication use were included on the diaries:

"Did back pain prevent you from performing your usual work activities today (work, school, or housework)?" (yes or no)

"Did back pain prevent you from performing any recreational, social or family activities today?" (yes or no)

"Did you take any medication today (including over-the-counter medication)?" (yes or no) "If so, what kind?"

Data Analysis. Daily diary data over 6 months for the 94 participants were entered into a computerized spreadsheet program. Daily pain scores were entered as a value of 0 to 10. "Yes" responses to the work and social disability questions were coded as "1," and "no" answers as "0". Days on which no medication use or nonanalgesic medication use (e.g., antibiotics, antipatients with hypertension) were scored as "0". A score of "1" was given to days on which medication use for LBP was reported (e.g., anti-inflammatory, muscle relaxant). Any ambiguities with respect to a medication were resolved by consulting the *Physicians' Desk Reference*.¹² Any remaining uncertainties regarding a medication were resolved either by telephone conversation with the participant or by direct questioning at the time of the second visit.

Intensity and Classification of Low Back Pain. To test pain intensity and its effect on disability and medication use, participants were divided into two groups of equal size (high and low pain) based on their mean pain scores over the reporting period. A *t* test of the differences between the high and low pain groups was performed. To answer the questions regarding LBP classification (chronic *vs.* recurrent), the data from the 6 months of pain scoring for the 94 participants were converted to a binary format. Days for which a nonzero pain score was reported were coded as a "1". When "0" (no pain) had been entered for the day, that value was retained. The "days in pain" then were summed for each participant.

Next, participants were classified as having either chronic or recurrent LBP according to the criteria proposed by Von Korff¹⁹: recurrent (pain on fewer than half of the reporting days) and chronic (pain reported on more than half of the days). It was not possible to classify participants as transient (having a single episode fewer than 90 days in duration during the last year) because only 6 months of data were available. In the proposed scheme, these participants were included in the recurrent group. A weekly mean was calculated for the pain, work disability, social disability, and medication use scores for the participants in both groups. The 26 weekly means for each variable for each participant were analyzed to reveal group differences using a mixed model repeated measures analysis.

Episodic Nature of Low Back Pain. To test the effect that the episodic nature of LBP has on the disability variables, the concept of an "episode" was first defined, and then an algorithm to identify episodes was developed. For a working definition, Von Korff¹⁹ provided the following description: "A flare-up refers to a period (usually a week or less) when back pain is markedly more severe than is usual for the patient."^{20,425} An episode (flare-up) was defined as 2 to 9 consecutive days of pain

Table 1. Self-Reported Pain Characteristics, Disability, and Medication Use

Variable	Mean	SD	Range
Pain characteristics			
Pain score	2.84	1.87	0.07–8.06
Days in pain (%)	80.6	28.6	4.4–100
History of LBP (yr)	15.9	8.64	1–37
Disability			
Work (%)	6.65	14.07	0–91.21
Social/recreational (%)	7.34	14.29	0–90.65
Medication use (%)	21.75	25.39	0–100

SD = standard deviation; LBP = low back pain.

scores equal to or greater than two pain score units (on the 0 to 10 scale) above the participant's median pain score for the 6-month period. "Episodes" of 1-day duration were not included because these were believed to be more representative of daily variability. Episodes longer than 10 days occurred with much lower frequency, making this analysis impractical. The median score was used as a threshold in this analysis because the pain scale uses integer units.

The first step was to observe whether disability and medication use differed during episodes. Each reporting day was classified as an episode or nonepisode day, using the definition given earlier. The data for all participants, along with the corresponding disability and medication use scores, were split into episode and nonepisode groups. McNemar's test, a nonparametric test for related sample pairs, was performed.

Second, to test the relation of episode length to the disability and medication use variables, the scores associated with the episode days for all participants were grouped according to the following criteria. Episodes of 2 to 5 days and 6 to 9 days duration were grouped and denoted as "short" and "long" episodes, respectively. Again, McNemar's test of the differences between the short and long episode groups was performed.

The final analysis, based on the episodic nature of LBP, was designed to test whether disability or medication use changed significantly between the beginning and end of an episode. For this analysis, the scores associated with the even-day episodes (2, 4, 6, and 8) were divided equally into "beginning" and "end" halves. For the odd-day episodes (3, 5, 7, and 9), the data for the middle day were omitted, creating equal halves. The data for the beginning and end periods were grouped for all episodes for all participants. McNemar's test was performed between the beginning and end groups for work and social disability and medication use.

■ Results

Table 1 includes age and gender distributions of the test population as well as data on pain characteristics, history, and associated disability. The participants were fairly well distributed by age ($x = 44.2 \pm 7.6$ years) and gender (50 men and 44 women). Participants had a lengthy history of LBP, with a mean duration of 15.9 ± 8.64 years. Most of the participants reported pain located in the low back, with only 29.8% reporting pain radiating to the buttocks or legs. There was a wide range of work and social disability and medication use in the study group.

Table 2. High vs. Low Pain Intensity*

Variable	Group	N	Mean	SD	P Value
Pain score	H	47	4.28	1.42	< 0.001
	L	47	1.41	0.54	
Disability ratio	Work	H	0.10	0.19	< 0.001
		L	0.03	0.05	
	Social	H	0.11	0.19	< 0.001
		L	0.03	0.05	
Medication use ratio	H	0.25	0.27	< 0.001	
	L	0.18	0.23		

* Ratios = disability- or medication use-days/number of days in reporting period.

SD = standard deviation; H = high; L = low.

Intensity and Classification of Low Back Pain

As might be expected, the *t* test showed that participants with higher pain intensity ratings reported significantly higher work and social disability rates and greater medication use (Table 2). According to Von Korff's¹⁹ criteria, 77 of the participants (81.9%) were classified as chronic, and 17 (18.1%) were classified as recurrent. Table 3 reports the outcome of the mixed model repeated measures analysis based on the Von Korff classification scheme. The chronic group also had a significantly higher mean pain score (3.32) than did the recurrent group (0.70). However, by definition, the groups differed in the proportion of 0 or pain-free days reported.

A more equitable method of comparison was developed, whereby pain-free days reported by all participants were omitted from the analysis. When pain-free days were omitted, the pain score for the chronic group (3.43) was still significantly higher than for the recurrent group (2.54), although the difference was markedly reduced. No significant difference in work disability was found between the chronic and recurrent groups, although the chronic group reported a significantly higher rate of social disability and medication use.

Episodic Nature of Low Back Pain

As might be expected, given the large number of samples available for the analyses, the relation between the work

Table 3. Chronic vs. Recurrent LBP*

Variable	Group	N	All Pain Scores			"0" Pain Days Removed		
			Mean	SD	P Value	Mean	SD	P Value
Pain score	C	77	3.32	1.71	< 0.001	3.43	1.48	0.019
	R	17	0.70	0.44		2.54	0.66	
Disability ratio	Work	C	0.07	0.15	0.112			
		R	0.04	0.05				
	Social	C	0.08	0.16	< 0.001			
		R	0.04	0.06				
Medication use ratio	C	77	0.25	0.27	< 0.001			
	R	17	0.08	0.06				

* Ratios = disability- or medication use-days/number of days in reporting period. Mean pain scores calculated with and without "0" pain days included. SD = standard deviation; C = chronic; R = recurrent.

Table 4. Episodes and Disability Reporting*

A.	Nonepisode Days	Episode Days	
Work			
No disability	14,401	1422	
Disability	861	272	
Total (%)	15,262 (5.6%)	1694 (16.1%)	N = 16,956
Social			
No disability	14,282	1405	
Disability	964	283	
Total (%)	15,246 (6.3%)	1688 (16.8%)	N = 16,934
Medication Use			
No medication	12,276	983	
Medication	2994	712	
Total (%)	15,270 (19.6%)	1695 (42.0%)	N = 16,965
B.	Short Episodes (2 to 5 days)	Long Episodes (6 to 9 days)	
Work			
No disability	842	539	
Disability	147	105	
Total (%)	989 (14.9%)	644 (16.3%)	N = 1633
Social			
No disability	746	500	
Disability	180	90	
Total (%)	926 (19.4%)	590 (15.2%)	N = 1516
Medication use			
No medication	520	335	
Medication	407	262	
Total (%)	927 (43.9%)	597 (43.9%)	N = 1524
C.	Beginning of Episode	End of Episode	
Work			
No disability	694	661	
Disability	116	149	
	14.3%	18.4%	N = 1620
Social			
No disability	676	657	
Disability	121	140	
	15.2%	17.6%	N = 1594
Medication use			
No medication	485	442	
Medication	311	354	
	39.1%	44.5%	N = 1592

* Results of McNemar's test (raw numbers of reports). Percentages (in parentheses) indicate the proportion of disability reports to the column total. All results significant at $P < 0.01$.

and social disability and medication use scores during episode and nonepisode days, short and long episodes, and at the beginning and end of episodes all proved to be significant ($P < 0.01$). The results of these analyses are presented in Table 4.

The distribution of episodes by their lengths is presented in Figure 1a. Figures 1b through 1d show the mean work and social disability and medication use ratios as a function of episode length.

Discussion

The participant group had a 15.9-year mean history of LBP symptoms and a mean pain score of 2.84. The lengthy history is not unusual when considered in light of the selection criteria. Two thirds of the people who have had back pain in the past can be expected to have some

symptoms every year.⁶ The mean pain score might appear to be low for a population with chronic LBP, but this may result from the nature of the measurement and selection criteria. The pain score measurement was an average of LBP over a 6-month period and did not reflect the episodic nature of LBP. The mean pain score during an episode was 5.35, and the maximum reported score was 10.

The pain score also may have been influenced by the selection criteria. Participants were excluded if they currently were under medical care, had a history of back surgery, or had filed a compensation claim. It could be argued that these excluded cohorts may have had more severe symptoms, which could have altered the results.

Similarly, disability was low, with work and social disability rates of 6.65% and 7.34%, respectively, as reported during the 6-month data collection period (Table 1). The participants in this study tended to be a highly functioning group, with all but a few participants reporting active employment in the home or workplace.

The exclusion of participants with compensation claims could be offered as an explanation for the lower than expected disability ratings. However, the number of individuals who file generally is a small proportion (0.75% to 2%) of the total number of individuals with LBP.^{1,10} The disability rating scale used in the diary also may have contributed to the relatively low levels of disability reported. The "all or none" nature of the binary rating system could have compelled participants experiencing relatively low levels of disability to underreport. Another possible explanation for the relatively low pain scores and disability ratings for this group could be that individuals have adapted physiologically and/or psychologically to the pain over the long term.

The exclusion of subjects currently under the care of health practitioners for their LBP could lead to the question of whether the sample adequately represented the chronic LBP population as a whole. The test participants, for the most part, had received medical evaluation and treatment of some form for LBP in the past, but their pain had persisted. It seems likely that although the test population may have been skewed toward long-term chronic LBP, it may represent a significant proportion of people classified as having chronic LBP. Although health statistics tend to emphasize problems that receive medical care or produce significant disability,¹⁷ Verbrugge and Ascione¹⁸ noted that "this excludes the majority of symptoms—those treated solely on one's own with drugs or other home remedies, which cause minimal or no change in planned activities, or are simply given no care whatsoever."¹⁹ It also may suggest that these individuals may have developed coping and/or functional strategies for dealing with their persistent symptoms.⁵

According to the Von Korff¹⁹ criteria, 81.1% of the participants were classified as having chronic and 18.9% as having recurrent LBP. The chronic group reported greater work and social disability (7% vs. 4% and 8% vs. 4%, respectively), although the magnitude of the re-

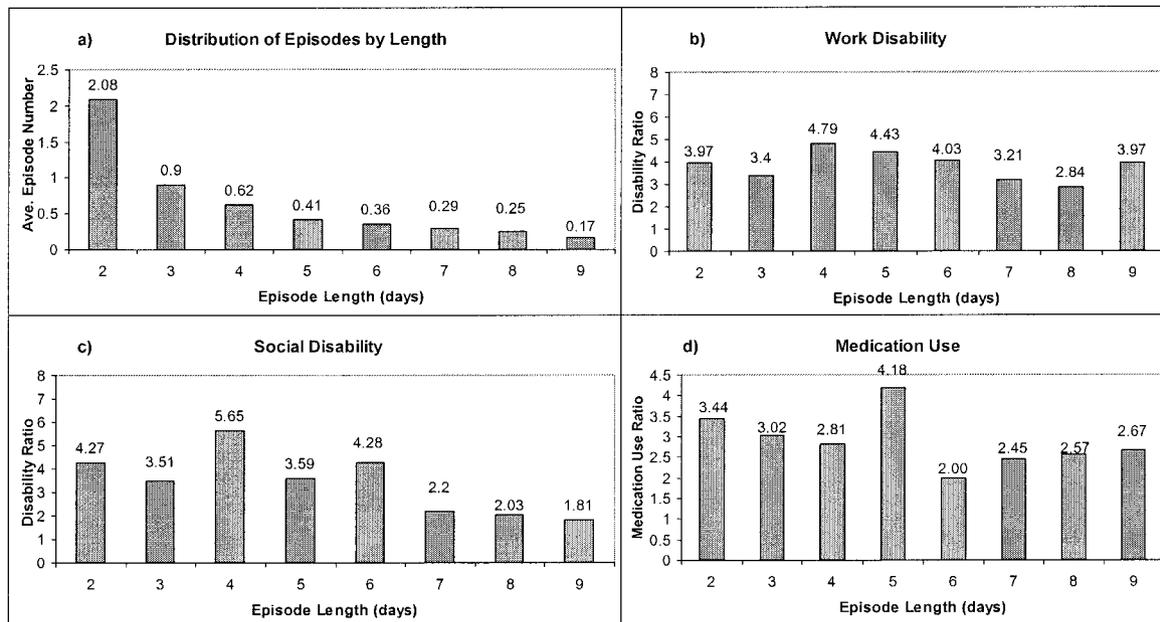


Figure 1. Distribution of episodes, work disability, social disability, and medication use by episode length.

ported disability was relatively low. The difference in reporting was statistically significant for social disability, but not for work disability. The medication use was significantly greater in the chronic than in the recurrent group (0.25% *vs.* 0.08%), suggesting that this may have been an “adaptive” strategy. The higher mean pain scores observed in the chronic group are partly because patients with chronic LBP, by definition, have a greater number of pain days (more than one half of all reporting days) than patients with recurrent LBP (less than one half of all reporting days).

Analysis of mean pain scores with pain-free days omitted revealed closer agreement between groups, although the differences remained statistically significant. In analyzing these results, it must be considered that although the dichotomous classification scheme was based on an accepted criteria, the ranges of reported pain days and disability days were essentially continuous. Some participants reported only very sporadic pain, whereas others reported pain almost every day.

Analysis of the pain intensity effect confirmed an intuitive conclusion: Higher pain levels are related to greater disability and medication use. Although the degree of disability observed in this study generally was low, when participants were grouped by mean pain scores, the disability reported by the high pain group was more than three times greater than for those with lower pain scores. Differences in medication use in this dichotomous grouping, although significant, was not nearly as dramatic as the disparity observed between the chronic and recurrent pain groups.

The investigation into the episodic nature of chronic LBP produced interesting findings. The number of episodes was shown to decrease rapidly with increasing ep-

isode length, with an incidence rate of 0.25 or fewer episodes 8 days or longer per 6-month period. This suggests that the algorithm for defining episodes proposed in this study is in good agreement with the observation that most episodes resolve within a period of 1 week or less.¹⁹

Disability and medication use were observed to be related strongly to episode periods. Work and social disability were more than four times as likely to occur during periods classified as episodes than during nonepisode days. Medication use was more than twice as likely during episodes.

When investigating the effect of the length (short *vs.* long) or the progression (beginning *vs.* end) of an episode, the differences in disability, although significant, were much smaller in magnitude than observed in the previous analyses. The subtle differences based on the duration or progression of an episode would seem to be of little clinical significance.

The patterns of individual pain reports over time can be quite unique. Figures 2a through 2d are graphic representations of pain intensity over the 6-month study period for four participants selected to demonstrate the great variability in pain “patterns” observed in the study population. Figure 2a presents the pain scores for a participant with a median pain score of “0” and intermittent short-duration episodes. By contrast, Figure 2b represents a participant with a consistently high pain score (median, 8) and two noticeably longer episodes of increased pain. The median pain score of 3 for the participant presented in Figure 2c, while close to the sample mean, is distinguished by high daily variability and a lack of episodes as defined by the proposed definition. By contrast, the tracing in Figure 2d is characterized by a lower pain score (median, 2), but dominated by several

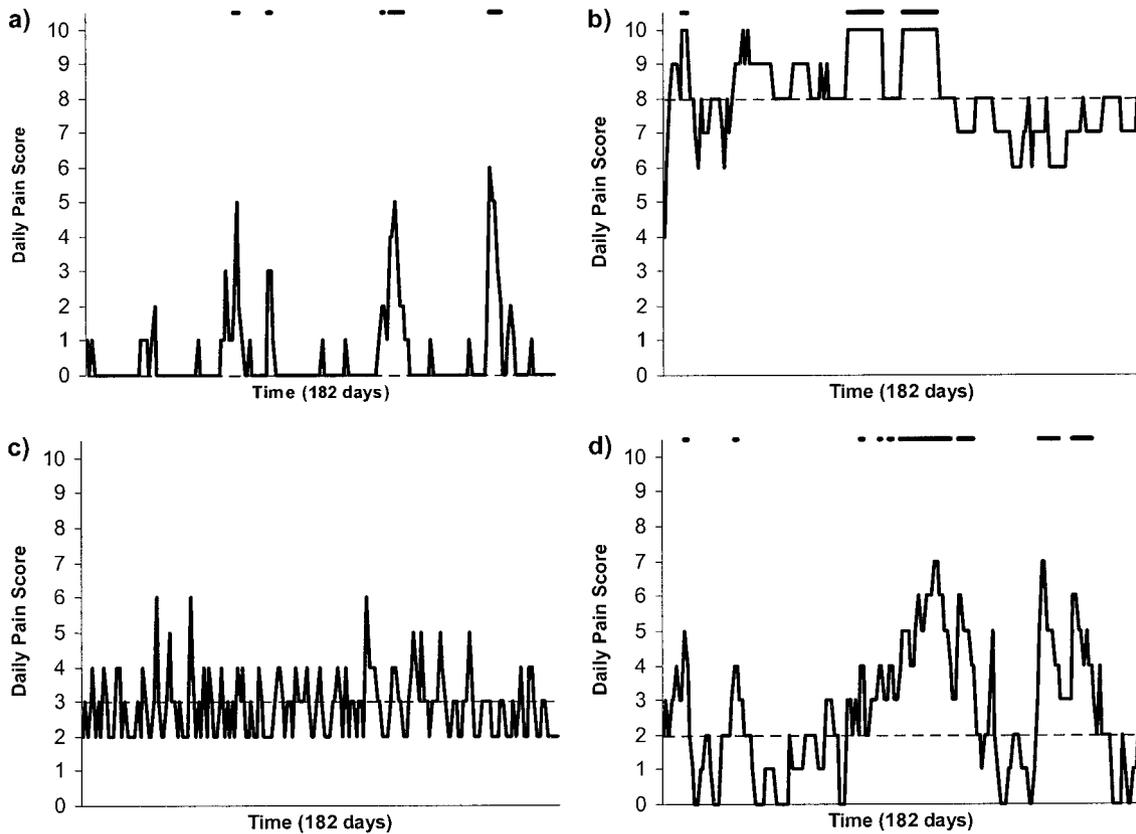


Figure 2. Examples of daily pain scores over a 6-month period for four participants. Note: Dashes of different lengths at the top of a figure designate an episode and its duration.

episodes of varying duration, creating an impression of a lower frequency modulation in the reported pain.

In conclusion, when viewed collectively, the results of this study support the perception that chronic and recurrent LBP are not static conditions. The relations between disability, medication use, and pain score were demonstrated in several analyses with a relatively large sample over a 6-month period. A metric of the episodic nature of LBP developed for this study proved to be a useful tool in describing the relation between LBP and disability. The findings suggest that whereas pain intensity can have a profound effect on disability, the episodic nature of LBP also affects the patient's ability to function in both work and personal life. According to ramifications of this finding, chronic LBP should not be treated as a static phenomenon. Intermittent increases in the pain state can markedly alter disability.

Higher resolution analysis techniques have proved to be useful in bringing to light the dynamic nature of pain and disability as reported by individuals with "subclinical" levels of chronic LBP. A similar method applied to a population of patients with acute LBP, neck pain, or other disorders could likewise improve understanding of the relation between pain and disability. Considering the generally moderate pain intensity, the protracted history, and the high functionality reported by the test population, an even stronger relation between disability and the

intensity and episodic nature of LBP might be expected for individuals with more symptoms of greater acuity.

■ Key Points

- Chronic low back pain should not be treated as a static phenomenon.
- Both pain intensity and the episodic nature of low back pain can influence function in work and social life.
- Disability and medication use was greatest during episodes and increases in the latter half of an episode.

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Point of View

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Many forms of illness run an episodic course. Some of these, such as rheumatoid arthritis, schizophrenia, multiple sclerosis, and asthma, are viewed as chronic conditions. Other illnesses that run an episodic course, such as depression, headache, and back pain, are often viewed as acute conditions that occasionally become chronic. It would be simpler if health problems could be easily classified as either acute or chronic. However, human illness is characterized by variability and change—variability that is both important and difficult to study. In the case of back pain, a better understanding of how to characterize its episodic course could advance understanding of pathophysiologic and psychophysiologic mechanisms, effective management, and disability prevention.

Back pain has characteristics of an acute, an episodic, and a chronic condition. It is common for a severe episode of back pain to improve in a matter of days to lower levels of pain, followed by more gradual improvement over 1–2 months, and then by intermittent or persistent back pain that continues over long periods of time at varying levels of severity. Is it most accurate to call this course acute, episodic, or chronic? None of these labels seems particularly apt.

Because episodic expression of back pain is both common and complex, identifying the most valid and useful

summary measures of the clinical course is important. If one were able to continuously monitor back pain intensity and the extent of activity limitation over time, what summary measures would best describe patient outcomes? Possibilities include percent of time with back pain (or number of days with back pain), the number of days when back pain exceeded a defined severity level, the average pain intensity level when back pain was present, the number of days (or episodes) of severe back pain, the average level of activity limitation, and the number of days when the patient was unable to carry out major life activities.¹ At present, consensus is lacking on the most useful summary measures of back pain course and on the most valid and practical ways of estimating those summary measures. The lack of clarity and agreement on how back pain course should be assessed contributes to confusion over seemingly simple questions, such as the definition of chronic back pain.

The report by McGorry et al in this issue provides useful information regarding the episodic course of back pain. Using daily diary data, the authors found that severe flare-ups of back pain were usually resolved within 9 days or less—confirming the view that back pain flare-ups are acute phenomena. Although severe flare-ups were typically brief, most subjects experienced persistent

back pain at lower levels of severity—consistent with the view that back pain often runs a chronic course. (Note: Their sample was identified through newspaper advertisements seeking persons with recurrent or persistent back pain, which means it is not representative of all patients with back pain in terms of chronicity.) Their examples of daily pain scores over a 6-month period are intriguing. In addition to marked variation in mean pain intensity level across patients, some appeared to experience back pain that fluctuated randomly around the mean level with little apparent correlation from 1 day to the next. Others showed a clearly apparent day-to-day correlation in pain intensity—suggesting a wind-up period of increasing pain intensity followed by a wind-down period of decreasing pain intensity. It would be interesting to know more about differences between patients whose back pain fluctuates at random around an average level *versus* patients who evidence well-defined episodes that build up and dissipate over days or weeks.

The authors' analyses of disability and medication use showed, as might be expected, that persons report more disability and medication use when in a severe episode of back pain than when not. Using daily diary data, it would be possible to estimate the response curve for disability and medication use as a function of contemporaneous pain intensity ratings. Such an analysis would shed light on the pain intensity levels necessary for high rates of behavioral response in the form of activity limitation

and use of pain medications. Such information could shed light on whether there is a pain intensity threshold for significant behavioral effects of back pain. Identifying a pain intensity threshold for behavioral response would have obvious implications for back pain management (*e.g.*, setting pain control targets below the threshold level when complete pain relief is not possible).

The results of this study, in combination with those of other studies of the episodic course of back pain,²⁻⁴ provide a more complete picture of long-term course. However, major gaps remain in the understanding of the course of back pain across time. Although daily diary data have great potential to clarify the clinical course of back pain, the complexities and difficulties in analyzing such data call for clarity in research questions and in data analysis.

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