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Simple pain relief score by observers (PRSO) for assessing chronic pain

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Abstract: In 56 patients with severe chronic pain, pain relief was evaluated by observation of changes in activities of daily life (ADL), drug intake, and patients' mood. The degree of pain relief was scored on the basis of these evaluations by a pain clinic physician, a nurse, and a member of the patient's family. The resulting score was termed "pain relief score by observers" (PRSO). Subjective pain relief was evaluated by the visual analogue scale (VAS). Although a significant correlation ($rS = 0.755$, $P < 0.001$) was demonstrated between the mean PRSO and VAS values, there was some dissociation between the two values in patients with underlying personal problems such as compensation lawsuits or job loss. The results suggest that an objective evaluation of pain relief is possible by PRSO alone without subjective assessment, and that PRSO can be used for patients with various types of pain. Combined assessment of pain relief by the VAS and PRSO methods may be useful to detect the influence of personal background factors in patients with chronic pain.

Key words: Pain relief score, Observer, ADL, Drug intake, Mood

Introduction

Various methods of pain assessment, including the McGill pain questionnaire [1–4], the visual analogue scale (VAS) [5–9], the Wisconsin pain questionnaire [10], the numerical rating scale score [9,11], the picture score [12], or the four-point scale [7,9], have been, used in clinical practice. However, assessment of the intensity of chronic pain and evaluation of pain relief following treatment are sometimes difficult [13–15], since the evaluation of pain relief tends to differ between the patient's subjective report and objective observation by the medical staff [13–15]. Severe chronic pain has been demonstrated to alter behavior [14,15] and mood [15–17]. Therefore, objective evaluation of pain relief may be possible by observing changes in behavior, activities of daily life (ADL), drug intake, and the patient's mood. Based on these observations, a preliminary pain relief score by observers (PRSO) was tested in patients with chronic pain in our previous study [18]. In the present study, this system was simplified and compared with the VAS in patients with chronic pain due to trauma, rheumatic diseases, and post herpetic neuralgia. The PRSO is probably the first pain assessment method relying on observers only, without patient input.

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Methods

This study was conducted with the approval of the Institutional Committee for Human Investigation of our university hospital. After obtaining their informed consent, 56 patients with chronic pain (longer than 6 months in duration and >70mm on the VAS) were included in the present study. The patients were divided into three groups: (1) a traumatic pain group suffering from chronic posttraumatic pain (7 with brachial plexus avulsion, 8 with spinal cord injury, and 2 with causalgia), (2) a rheumatic pain group consisting of 20 patients with rheumatoid arthritis and 2 with systemic lupus erythematosus, and (3) a group of 17 patients with postherpetic neuralgia. Trauma is a disorder due to external mechanical causes without intrinsic etiology. Rheumatic diseases are disorders due to internal physical causes accompanied by motor dysfunction. *Herpes zoster* is also disorder due to internal physical causes, but without motor dysfunction. Thus, we selected these three groups as representing chronic pain. The treatments performed at our clinic included lesions of the dorsal root entry zone (17 cases), stimulation of the epidural spinal cord (11 cases), nerve block (41 cases),

Table 1. Clinical profiles of the traumatic, rheumatic, and postherpetic pain groups

	Traumatic	Rheumatic	Postherpetic
Age	52.7 ± 10.8	52.1 ± 11.8	65.1 ± 11.8
Sex (male/female)	10/7	2/10*	11/6
Pain duration (years)	6.2 ± 1.5	6.3 ± 4.7	3.3 ± 2.1*

*$P < 0.05$ compared with the other two groups. Values are given as the mean ± standard deviation (SD). These factors did not seem to account for the differences in visual analogue scale (VAS) and pain relief score by observers (PRSO) values.

Table 2. Pain relief score by observers (PRSO)

I.	Activities of daily life (ADL)	Very much improved	+2
		Improved	+1
		No change	0
		Decreased	−1
II.	Drug intake[a]	Withdrawn	+2
		Reduced	+1
		No change	0
		Increased	−1
III.	Mood	Brightened	+1
		No change	0
		Depressed	+1
		Score	−3–+5

The PRSO was scored by the mean scores assigned by three observers: (1) a pain clinic physician, (2) a nurse, and (3) a member of the patient's family.
[a]Changes in the intake of drugs such as analgesics, tranquilizer, and local anesthetics were scored.

and immunotherapy (22 cases). Age, gender, and duration of pain are shown in Table 1.

Pain relief following treatment was evaluated by two methods. One was the VAS, employing a 100-mm horizontal line [5,7,8,19], that was marked by the patients themselves. The percent change from the VAS value before treatment was determined (VAS evaluation of pain relief). The other method was the PRSO, which involved evaluation by three observers, a pain clinic physician, a nurse, and a member of the patient's family. The PRSO was determined by scoring the changes in ADL, the patient's mood, and drug intake (analgesics, tranquilizers, and local anesthetics) after treatment (Table 2). PRSO criteria were simplified to facilitate use by members of the patient's family. Therefore, ADL and the patient's mood were scored only on the basis of the observers' impressions without establishing specific criteria.

Using these two methods, pain relief in each patient was evaluated by comparing scores at the start of treatment with those at the end of treatment or 12 months after the start of treatment if the patient received continuous treatment. The relationships between VAS evaluation of pain relief and the PRSO value of each observer (pain clinic physician, nurse, or member of the patient's family) as well as the mean PRSO of all three observers were examined in the present study.

When complete pain relief was obtained, the VAS evaluation of pain relief and PRSO were 100% and 5, respectively. When there was no pain relief, these values were 0% and 0, respectively (Table 2). For analysis of disagreements between the two evaluations, the differences between the VAS evaluation of pain relief and 20 × (times) PRSO (VAS-PRSO gap) were calculated. Therefore, the VAS evaluation of pain relief and PRSO were considered to be almost similar if no differences in VAS-PRSO were found, and the dissociation between the two evaluations became more distinct as the differences increased.

In addition to pain relief, certain situations which were disturbing to the patient (e.g., social and financial problems), were monitored by daily consultation.

Numerical data were compared by the chi-squared test, Spearman's rank correlation (rS), or Student's t-test, and $P < 0.05$ was considered significant.

Results

The PRSO values of each observer—the physician ($rS = 0.642$, $P < 0.01$), nurse ($rS = 0.710$, $P < 0.01$), or member of the patient's family ($rS = 0.816$, $P < 0.01$)—significantly correlated with the VAS evaluation of pain relief in the patients (Fig. 1). The mean PRSO values of

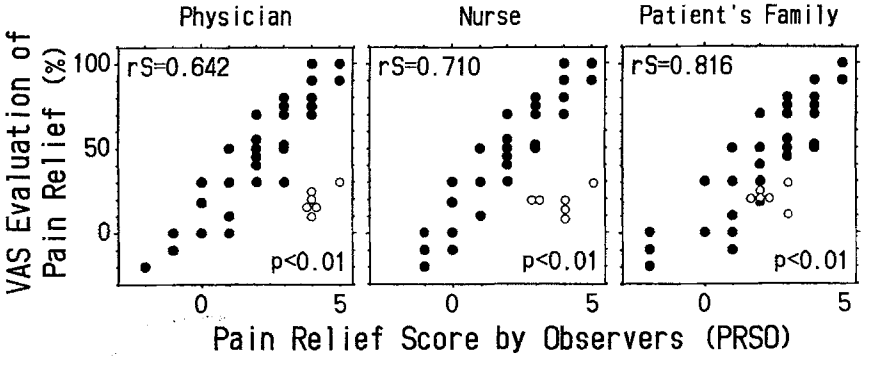

Fig. 1. Relationship between the pain relief score by observers (*PRSO*) determined by each observer group and the visual analogue scale (*VAS*) evaluation of pain relief in the patients. *Open circles* represent cases showing dissociation between the VAS and PRSO values (see Fig. 4)

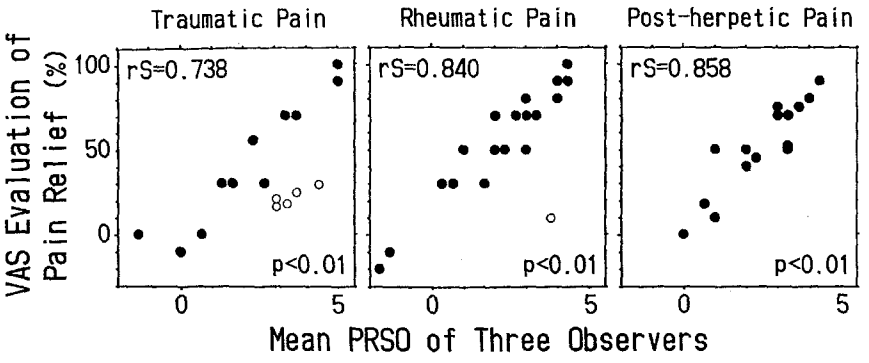

Fig. 2. Relationships between the mean PRSO of three observers and VAS evaluation of pain relief in each patient group. Symbols are the same as in Fig. 1

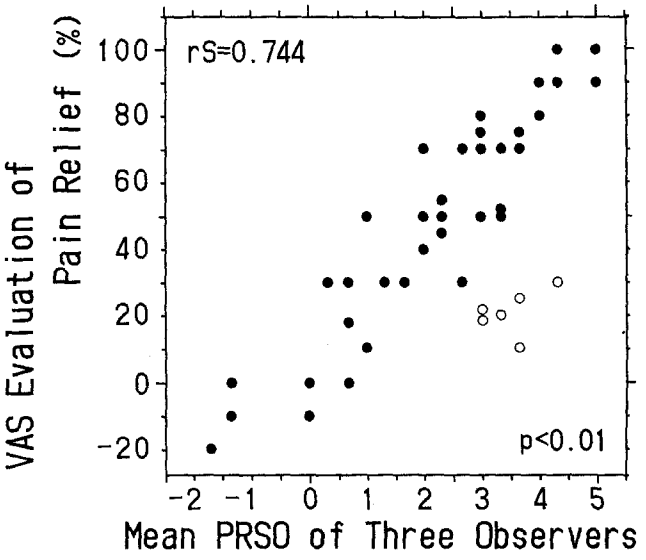

Fig. 3. Relationship between the mean PRSO of three observers and VAS evaluation of pain relief in all patients. Symbols are the same as in Fig. 1

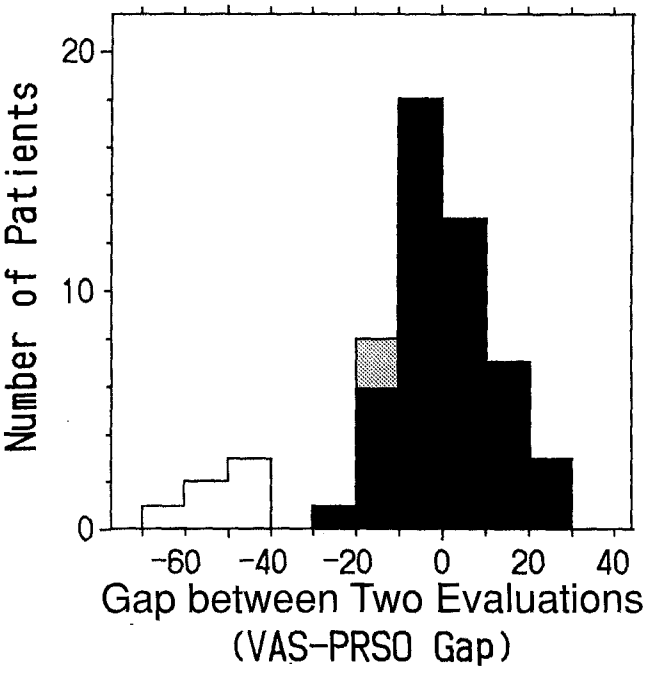

Fig. 4. Analysis of the VAS-PRSO gap. The VAS evaluation of pain relief and PRSO score were thought to coincide when the gap between VAS evaluation of pain relief and 20 × PRSO (the VAS-PRSO gap) was nil. Dissociation between the two evaluations became more apparent as the gap increased (see text). Eight patients (6 *open* and 2 *shaded bars*) had impending problems including lawsuits or unemployment. The gap between these 8 and the other patients without impending problems (*solid bars*) was significant ($P < 0.01$)

the three observers significantly correlated with the VAS evaluation of pain relief in each patient group, the traumatic pain ($rS = 0.738$, $P < 0.01$), rheumatic pain ($rS = 0.840$, $P < 0.01$), or postherpetic pain ($rS = 0.858$, $P < 0.01$) group (Fig. 2). A significant relationship ($rS = 0.744$, $P < 0.01$) was also demonstrated between the VAS evaluation of pain relief and mean PRSO values of the three observers (Fig. 3).

Based on daily consultation, it became clear that 7 patients in the traumatic pain group had impending problems related to compensation lawsuits or insurance money, and 1 patient in the rheumatic pain group was distressed because of unemployment due to rheumatoid arthritis. The VAS-PRSO differences in these patients differed significantly ($P < 0.01$) from those in the other patients. Furthermore, the VAS evaluation of pain relief and PRSO in 5 of 7 traumatic pain patients as well as 1 rheumatic pain patient were apparently dissociated: the VAS-PRSO differences in these patients were less than −40, while the differences in the other patients with association between the two evaluations were within ±40 (Fig. 4).

Discussion

The present study demonstrated a significant correlation between evaluation of pain relief by the PRSO and

VAS methods. This may indicate that objective assessment of pain relief can be obtained by PRSO alone without subjective assessment, since behavioral and personality changes have been demonstrated to reflect the intensity of pain [14–17]. Although there were significant differences in the gender ratio and pain duration among the groups, these factors did not seem to account for the differences in VAS and PRSO values: prevalence rates in rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE) are higher among females than among males (about 4:1 and 20:1, respectively), and the demographic difference was thought to be natural; pain duration was incomparably longer than the observation period in the present study.

An advantage of PRSO might be that pain relief can be assessed by observers only without patient input. Although there are several scoring methods for pain, these consist of evaluations by the patients themselves [1–12]. Postoperative pain may also be assessed by nurse [20]. However, this assessment is scored by a single observer for specific acute pain. The mean PRSO value of the three observers was quite close to the VAS evaluation of pain relief compared with those of the individual observer group. For more accurate assessment of pain relief (elimination of bias), it might therefore be advantageous to employ the values determined by multiple observers (≥ 3) rather than a single observer [20].

Another advantage of PRSO might be that pain relief can be scored easily. The evaluation method was simplified as much as possible, so that observers could easily use the PRSO in daily practice within a few minutes when necessary. Such assessment by impression, however, may involve some bias and error. Therefore, PRSO should be assessed by multiple observers to minimize those influences. To maintain the simplification of PRSO, there was no special training or education given to the observers.

Although PRSO was observed in three patient groups with different types of pain—traumatic, rheumatic, and postherpetic pain—the results from these groups were similar. Therefore, using the PRSO, we consider it possible to evaluate relief from various types of chronic pain.

Eight patients had impending problems related to lawsuits or unemployment. The VAS-PRSO differences in patients with such problems were significantly less than −30. These patients seemed to assess pain relief as being less effective compared to the observers' impressions of its effectiveness. Overall, an apparent dissociation between PRSO and VAS evaluation of pain relief was noted in 6 patients (10.7%) with impending lawsuits or unemployment. However, most scores in the other 50 patients (89.3%) showed a correlation.

Thus, the dissociation could have been attributable to social or financial factors. When PRSO and VAS do not correlate, the existence of nonmedical factors might be considered. Psychologists, social workers, or lawyers should be consulted as necessary. However, independence among the three observers should be maintained in evaluating PRSO.

To investigate the features of pain and the relationship between disease and pain, or to make a detailed assessment of pain, the McGill pain questionnaire [2–4,21] or the Wisconsin pain questionnaire [10] might be of value. Applying these questionnaires to the effects of treatment, however, is sometimes confusing and irritating to the patient. In everyday clinical practice, a simpler method of evaluating the effect of treatment like our PRSO combined with VAS might thus be of value.

On the basis of these results, we consider objective evaluation of pain relief to be possible by PRSO alone without subjective patient assessment, and we have found that PRSO can be used for patients experiencing various types of pain. Combined assessment of pain relief by the VAS and PRSO methods may therefore be useful to detect the influence of personal background factors in patients with chronic pain.

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