Description of Stable Pain in Rheumatoid Arthritis: A 6 Year Study

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ABSTRACT. ***Objective.*** To study pain quality and variability in patients with rheumatoid arthritis (RA).

Methods. Pain, disease activity, and functional status were assessed 3 times over 6 years in an initial cohort of 120 clinic patients with chronic pain from RA. A pain visual analog scale and the McGill Pain Questionnaire (MPQ) were used to record pain intensity and quality. RA disease activity and function were measured.

Results. There was no statistically significant difference in any measure over the 3 assessments. RA pain intensity was moderate. The MPQ showed that sensory components of the pain were described in terms of pressure and constriction. Pain related affect was described with adjectives suggesting positive psychological adaptation to pain.

Conclusion. The results indicate a general profile of no change in pain sensation, affect, and emotional quality in clinic monitored patients with ongoing RA and ongoing, moderate levels of disease activity and function. The MPQ provides qualitative detail to patient's report of pain severity that could be a useful addition to longterm documentation of RA outcome. Regular MPQ documentation of current pain in outpatients could indicate whether any significant change in pain levels is reflected in altered word selection that reflects physiological or psychological change, and could assist clinicians to select the most appropriate form of therapy for RA pain. (J Rheumatol 2003;30:1733–8)

Key Indexing Terms:
RHEUMATOID ARTHRITIS PAIN MEASUREMENT

People diagnosed with rheumatoid arthritis (RA) consider pain as their most troublesome symptom and the primary reason for seeking medical care[1]. Pain relief is frequently associated with the response to antiinflammatory medical therapy in RA; however, the need for analgesic drugs continues to characterize most patients with RA throughout their lives.

Despite the predominance and long duration of pain in RA, only 18% of rheumatologists systematically collect quantifiable data on pain from their patients[2]. Regular and detailed documentation of results from self-rated questionnaires on health status helps clinicians to evaluate the effects of their treatment on key outcomes of RA over months or years[3]. Similarly, documentation of patients' description of their pain, if sufficiently detailed, could benefit longterm RA care. Such documentation needs a more complex measure of pain than is available with simple pain scales such as a visual analog scale (VAS).

Pain comprises sensation, affect, and emotional perceptions of "harm" that are together reported as "pain." These dimensions can be qualitatively described with the pain vocabulary of the McGill Pain Questionnaire (MPQ)[4]. Modification of these dimensions, together or independently, alters the self-reported score of pain intensity[5]. Sensory and affective-emotional dimensions may be elevated, for example, with heightened disease activity and joint inflammation. However, psychological disabilities associated with chronic pain and RA[6,7] may accentuate the affective-emotional dimension with no accompanying change in disease activity. Both events would increase the individual's pain score. Linear pain scales such as the VAS record a score of self-reported pain intensity, but cannot help clinicians relate any change in the pain score to elevation or reduction in sensory and/or affective-evaluative dimensions of pain. Regular documentation of patients' description of the sensory and affective-emotional components of their pain could help clinicians monitor individual patterns, and changes in patterns, of pain. Such a monitoring procedure could be most useful if able to be compared against a "gold standard" description of RA pain and its variation over time with change in disease status.

People with RA have pain that is chronic[8] and may endure for decades. The course and quality of RA pain should be investigated during the years of chronic disease. Although RA symptoms are unpredictable over time, the

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progress of the disease generally slows and becomes more stable with increased disease duration[9-12], and pharmacological treatment[13] may modify disease severity over time. The longterm course of RA pain, however, remains unclear. Middle–longterm cohort studies of patients with RA report an increase in chronic RA pain[11], no change[12], or pain reduction[14]. Each of these studies used simple linear scales to measure pain. Linear scales are practical in the clinical setting when frequent pain ratings are required[15]. They do not, however, reflect qualitative change in pain experience that could account for change in pain intensity, and they do not describe pain in the complex and meaningful manner preferred by patients with chronic pain[16]. A longitudinal study employing a qualitative measure could improve understanding of chronic RA pain.

The evidence indicates the need for specific study of the course and quality of chronic pain in RA that includes sensory and affective-evaluative detail. We monitored the intensity and quality of self-reported pain longitudinally in a cohort of consecutive clinic patients with RA, and correlated this with measures of RA disease activity and physical function.

MATERIALS AND METHODS

Study group. Initial assessment consisted of 120 consecutive patients with RA attending an outpatient clinic for review by a rheumatologist. Patients were required to fulfil American College of Rheumatology criteria for the diagnosis of RA[17], to be aged 18 years or over, to be fluent in English, and to have experienced RA joint pain for 6 months or longer[8]. Patients with a psychiatric illness were excluded.

Procedure. Patients were informed of the purpose and duration of the study. One collaborating rheumatologist obtained clinical data first. Data on pain was next obtained in a separate interview by a research assistant employed throughout the study. Followup was monitored by an appointment diary and the outpatient system. Three evaluations were conducted: at the initial assessment for this study, at 63 months, and at 77 months later. The followup reviews were timed to record the slow rate of measureable deterioration in functional status reported in 1992[9] and in a recent study of 1800 patients with RA[10]. Subjects' written consent was obtained at each stage. The Medical Research Ethics Committees of the University of Queensland and the Royal Brisbane Hospital approved the study.

Evaluation measures. Rheumatology clinical data included (1) disease duration. At each of the 3 visits, the following were also recorded: (2) medications taken, categorized as 0 = no drugs, 1 = simple analgesics, 2 = nonsteroidal antiinflammatory drug (NSAID), 3 = steroids, 4 = disease modifying antirheumatic drugs (DMARD), 5 = immunosuppressants; only the highest category of medication prescribed was recorded. (3) The Steinbrocker classification[18,19] was used as an expedient measure of functional capacity — the more commonly used Health Assessment Questionnaire would have added at least another 5 minutes to patient's evaluation[20,21]. (4) Disease activity was measured with the Index of Disease Activity (IDA)[22], a global measure of disease activity that is valid and sensitive to change in longitudinal studies of RA[23,24]. Since VAS pain was a dependent variable of study, the IDA was modified to exclude the VAS pain score. The remaining 5 IDA variables were erythrocyte sedimentation rate (Westergren), hemoglobin (Coulter method), grip strength, morning stiffness, and the Ritchie Articular Index[25]. Four categories were derived representing mild, moderate, severe, and very severe grades of disease activity[22].

The research assistant recorded pain intensity with the VAS[26]. Pain intensity and quality were also recorded with the MPQ vocabulary[4]. The vocabulary comprises 78 adjectives grouped into 20 subclasses describing sensory and affective-evaluative qualities associated with pain. Words within each subclass are intensity ranked. Subclasses 1–15 plus 17–19 convey sensory qualities; subclasses 11–16 plus 20 convey affective-evaluative meaning (comprising affective-motivational and cognitive-evaluative subclasses)[27]. Patients were instructed to select a single word from any of the 20 subclasses that described some quality about their present joint pain. Three measures were derived: (1) the Pain Rating Index (PRI) and (2) the Rank of Word (RW) measured the total score of pain intensity and the rank intensity of word selected from each subclass, respectively[4,28,29]; (3) the frequency of Subclass Use (percentage SU) was also recorded[28]. The MPQ-PRI is sensitive to change in clinical and laboratory pain[15,30-34]. Studies have confirmed that patient's pattern of words and subclass choice discriminate between pains associated with unique diagnosis[35,36]. Although separate analysis of sensory and affective-evaluative data is no longer recommended[5], simple charts of average RW and percentage SU are informative in determining the relative balance of sensory and affective-evaluative components in a group's description of their pain. Previously used in cross-sectional studies of RA[28,29], the MPQ has not been employed in a followup analysis of RA pain.

Statistical analysis. PRI scores were subdivided into categories representing mild–moderate or severe pain[37]. Analysis of variance (ANOVA) for independent samples or chi-square (for categorical data) tested for differences between reassessed subjects and those lost to followup. Chi-square tests were used to compare the sex composition of the sample at each assessment. One-way repeated measures ANOVA tested for differences across the 3 assessments in continuous data. Friedman's test for several related samples was used to test for differences in the categorical measures of medication, disease activity, and functional capacity. Chi-square and ANOVA were used to test for differences in the average SU and RW.

RESULTS

At the initial assessment, the mean age of the study population was 58.75 ± 12.58 years, mean duration of disease 15.27 ± 10.09 years, and 82% were seropositive for rheumatoid factor. The population was 72% female. One hundred fifteen subjects (96%) had joint pain when first interviewed. Table 1 shows categories of PRI pain intensity, IDA disease activity, Steinbrocker functional capacity, and medications prescribed.

Attrition analysis. Sixty-one of the original subjects (50.83%) participated in assessment 2, and 52 (43.3%) in assessment 3. By the final assessment, 26 patients were unavailable because of transfer to other facilities, 22 could not be traced, 17 had died, and 3 could not be assessed due to other constraints. Analysis of the pattern of attrition revealed no differences between the dropout and the studied groups except that 9 patients from assessment 2 who were not available for assessment 3 had a higher mean VAS score than the rest of assessment 2 patients ($p < 0.03$).

Repeated measures analysis. There was no significant difference in the number of men and women in the studied groups ($p > 0.05$). Table 2 shows the mean scores at each of the 3 assessments. At baseline the average VAS and PRI scores were moderate and remained essentially unchanged over time. The remaining variables showed a similar pattern. Scores of functional capacity, medication profile, and disease activity (including the variables making up the IDA) were also at moderate levels on average and did not show any significant change at followup. Post-hoc analyses

Table 1. The distribution of categories of pain severity, disease activity, functional capacity, and medications prescribed.

Variable and Category	%
Pain Rating Index	
Mild	55.8
Moderate	33.3
Severe	10.8
Index of Disease Activity	
Grade 1, mild	8.5
Grade 2, moderate	54.7
Grade 3, severe	35.8
Grade 4, very severe	0.9
Steinbrocker functional capacity	
1, complete function	10.8
2, mild incapacity	60.8
3, moderate incapacity	25.0
4, wholly incapacitated	3.3
Medications	
0, no medication	5.8
1, simple analgesics	2.5
2, NSAID	13.3
3, steroids	16.7
4, DMARD	42.5
5, immunosuppressants	19.2

of data from the 52 subjects who completed all 3 assessments showed the same pattern of results.

Pain quality: 3 assessments. Table 3 shows the patterns of use of the 20 MPQ-PRI subclasses describing pain quality.

Table 3 shows a consistent pattern of subclass and word choice across assessments. More than 40% of patients chose 4 sensory and 3 affective-evaluative subclasses. Two of these — the sensory subclass 9 describing "dullness" and the evaluative subclass 16 describing the negative emotional impact of pain — were used by two-thirds or more of the sample at each evaluation. In general, there was no statistical significance in the percentage SU or average RW across the 3 assessments ($p > 0.05$). The exception was subclass 13, describing "fear"; subclass 13 was selected by over 30% at assessment 1, which was twice as often as the followup assessments (chi-square 7.238, df 2, $p < 0.02$). Identical words were chosen from 13 subclasses at each evaluation. Differences in word choice that did occur were only one rank more or less than the comparison word. The sensory words chosen were of relatively higher rank value than the affective-evaluative words.

Figure 1 illustrates the SU profile from assessment 1; it clearly shows the generally frequent use of sensory subclasses, particularly those depicting pressure and dullness, and the high percentage use of subclasses 16 and 20 depicting the emotional impact of pain. It also shows a distinctive reduction in subclass use in the affective subclasses 12–15 reflecting pain in terms of fear, punishment, unhappiness, and emotional intrusion.

DISCUSSION

This study aimed to record the intensity and quality of patients' descriptions of RA pain and to describe the course of pain in relation to disease progress. The sample was typical of RA outpatient populations in age, sex distribution, disease activity, and functional capacity, and the rate and reasons for attrition were comparable to previous studies[12,38]. The VAS and PRI ratings of pain intensity were in agreement. The majority of patients in our sample had moderate level pain at their first assessment in this study when RA had lasted for roughly 15 years. These findings agree with previous cross-sectional MPQ[28,29] and VAS studies in RA samples with similarly long disease duration. The results show that moderately severe joint pain is common in the second decade of RA despite antirheumatic drug therapy. Chronic pain in RA is associated with mental health problems, poor psychological adjustment to illness, and physical disability[6]. The results reinforce the need for clinicians to maintain a focus on the problem of pain and to endeavor to provide effective evaluation and treatment of chronic pain throughout RA.

RA typically fluctuates over weeks and months, but our 6 year results taken over 3 data points showed that the level of disease activity and pain were essentially unchanged. There was no significant deterioration or improvement across time. The results indicate a general profile of no longitudinal change in outcome, in the measures of study, in medically managed outpatients. These results may testify to

Table 2. Mean scores (standard deviation) of pain intensity, disease activity, functional status, and medications at the 3 assessments.

Variable	Assessment 1	Assessment 2	Assessment 3	p
Pain Rating Index	18.10 (12.10)	16.54 (13.59)	16.56 (12.24)	0.607
Visual analog scale	3.92 (2.82)	3.47 (2.72)	3.75 (2.78)	0.147
Index of Disease Activity*	2.16 (0.67)	2.14 (0.57)	2.26 (0.57)	0.110
Functional capacity**	2.20 (0.67)	2.26 (0.67)	2.14 (0.54)	0.589
Medication***	3.45 (1.33)	3.96 (1.29)	3.81 (1.48)	0.682

* IDA classification 2 = morning stiffness 10–30 min, grip strength 50–200 mm, hemoglobin 13–14 g/dl, ESR 21–45 mm/h. ** Functional capacity classification 2 = adequate to conduct normal activities. *** Medications classification 3 = steroids.

Table 3. Pain quality in the studied groups. Assessment 1 shows the mean rank work (RW), the word represented by the mean RW, and the percentage of subclass utilization (% SU). Only the mean RW and % SU are shown for each of the 2 followup assessments. Pain qualities printed in bold identify subclasses with high use (40% or higher SU across all 3 assessments). Italics identify affective-evaluative subclasses.

Subclass	Subclass Quality	Mean Rank (RW) and % SU						
		Assessment 1			Assessment 2		Assessment 3	
		Mean RW	Word	% SU	Mean RW	% SU	Mean RW	% SU
1	Temporal	4	Throbbing	44	4	36	3	47
2	Spatial	2	Flashing	33	2	25	3	25
3	**Punctuate pressure**	3	Drilling	48	3	43	3	45
4	Incisive pressure	1	Sharp	45	1	34	1	40
5	**Constrictive pressure**	3	Gnawing	59	3	54	3	50
6	Traction pressure	2	Pulling	26	2	21	2	22
7	Thermal—hot	1	Hot	41	2	37	1	35
8	Brightness	2	Itchy	24	2	24	2	30
9	**Dullness**	3	Hurting	89	3	82	3	81
10	**Sensory miscellaneous**	1	Tender	55	2	41	1	51
11	*Tension*	2	Tiring	63	2	54	1	53
12	*Autonomic*	1	Sickening	26	2	23	1	17
13	*Fear*	2	Frightful	31	1	15	1	17
14	*Punishment*	2	Gruelling	40	2	33	2	32
15	*Affective/evaluative-sensory*	1	Wretched	16	1	21	1	15
16	***Evaluative***	2	Troublesome	86	2	75	2	81
17	Spatial distribution	3	Penetrating	37	3	38	2	42
18	Constriction	2	Numb	44	2	34	2	38
19	Thermal—cold	1	Cool	12	1	10	2	10
20	***Evaluative/miscellaneous***	2	Nauseating	61	2	61	1	54

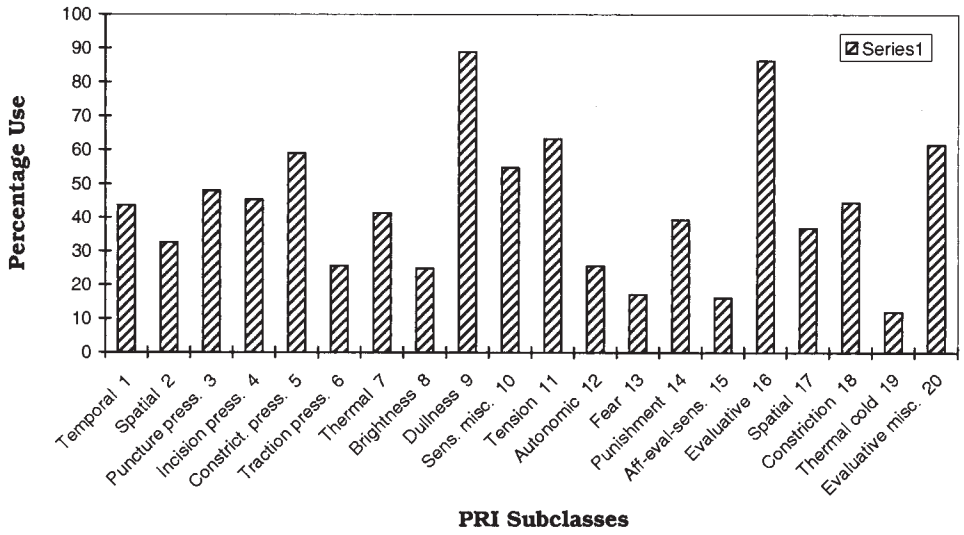

Figure 1. The subclass utilization profile in 120 patients with RA.

the success of rheumatology review and pharmaceutical management in preventing significant deterioration in key outcomes over time. Nevertheless, the similarity of VAS and PRI scores across the 3 assessments emphasizes the continued presence of pain across time, despite medical treatment, and indicates that planning for longterm pain management is advisable in RA. Such a plan could include identification of pain therapy, or therapies, shown to have good effect on moderate level joint pain, and the recommendation of those therapies to patients at an early stage in the chronic course of RA pain.

The use of the the MPQ vocabulary in our study gave depth and meaning to the PRI score of pain intensity that is not available from any other source. The vocabulary results illustrate that pain in RA is multidimensional as well as persistent. As well, they showed that the mean PRI scores obtained across 6 years were similar, and were due to a distinct absence of qualitative change in the pattern of subclass use and ranked word chosen at each of the 3 points of assessment. This result points to qualitative similarity in joint pain when disease activity is moderate in the late and chronic stages of RA. The utility of the MPQ lies in its capa-

bility to explain a single score of pain intensity. In our study, the same average PRI score could have been obtained at each assessment, but with different qualitative composition, for example, reduced sensory input but heightened affective distress. Such an MPQ result could prompt the rheumatologist to recommend adjunctive psychological therapy to assist in coping with pain. The capability of the MPQ vocabulary to expand clinicians' understanding about self-reported pain severity, in addition to the evidence that the vocabulary provides diagnosis–specific descriptions of pain[34], indicates a role for the MPQ in comparative studies in other forms of rheumatic disease. MPQ description of pain in scleroderma, fibromyalgia, and systemic lupus erythematosus, for example, could yield a databank of pain profiles that add to laboratory and clinical information in the diagnosis and management of these conditions over time.

Table 3 and Figure 1 show a unique visual representation of RA joint pain. The "sensory" components are typically perceived in terms of "punctuating pressure" and "constrictive pressure," as well as "dullness" and "tenderness." These sensory features could be targeted in RA pain therapy. Reduced selection of these subclasses and/or the choice of lesser rank words within each subclass could identify the qualitative components of RA pain that are modified by medications and other analgesic techniques. Despite high-ranking sensory words "throbbing," "gnawing," and "hurting" being selected from the sensory subclasses, the rank value of words describing pain affect (in subclasses 11–15) was relatively low. We are puzzled about the higher use of the subclass 13 describing "fear" in assessment 1. Nevertheless, almost 70% of the sample did not use subclass 13. We conclude that affective distress was low, on the whole. The generally low rank of words selected from affective subclasses indicated that affective distress was an integral part of self-reported joint pain but contributed relatively little to the PRI score. Subclasses 16 and 20, reflecting the emotional impact of pain, received high percentage use, which is typical of MPQ profiles of clinical pain. However, the evaluative word "troublesome" from subclass 16, for example, is moderate in rank, and did not have a strong influence on the PRI score. The result showing low-level affect indicates that the sample had generally positive psychological adjustment to RA pain, perhaps due to supportive medical management, the long duration of RA, and patients' psychological acceptance of RA[39].

The results of this study offer a blueprint of pain quality and pain level across 6 years in clinic managed RA populations with moderate disease activity. The blueprint could be used to compare with individual or group report of pain across time, and may be useful as a comparison with pain outcome following treatment for pain. Wolfe and Pincus[3] note that chronic diseases are characterized by longterm pain and that rheumatologists must try to distinguish between patients who are at high risk or low risk for adverse outcomes. Figure 1 and Table 3 describe joint pain in a sample not at high risk of severe pain across 6 years of chronic disease. If, however, physiological and/or psychological changes occurred that had an influence on pain, the MPQ pattern of word and subclass choice is likely to register the effect in a manner that is not possible with linear or categorical pain scales. Changes in MPQ pain description could be associated with heightened disease activity or with negative coping strategies such as catastrophizing that are associated with negative mood and poor adjustment to RA pain[7].

The MPQ is also a potentially important tool of communication with patients in pain. The vocabulary takes a few minutes to complete and could be less useful than a VAS if clinical trials require frequent daily assessment of pain. It is untrue, however, that patients find the MPQ difficult to use. Clinical and research experience shows that patients can be quickly and easily taught to self-rate their pain with the MPQ. Many patients regard the MPQ as an important vehicle of communication between themselves and their care team. The instrument could be most useful in a rheumatology outpatient waiting area. Patients could complete the questionnaire prior to rheumatology review and thus provide their health team with individualized, current, and multidimensional data about their pain. The capability for the MPQ vocabulary to illustrate heightened emotional as well as sensory responses to pain could help the rheumatologist discuss the choice of pharmacological or psychological therapy with a patient and would support the importance of using self-report questionnaires and regular documentation of health status outcomes in the management of RA[3].

Limitations of this study that may influence the interpretation of the results include the low followup numbers and the quality of the medication data. Patients dropped out of the study for reasons similar to those reported in other RA populations[12]. Although there was no substantial difference in outcome across the 3 assessments, or between the dropout and the studied groups, additional objective measures of functional damage may have shown deterioration over time[12] or shown worse disease in nonreturning patients. Our measure of medications was a 6 point scale that did not correlate with the key measures of outcome in this study, possibly due to lack of sensitivity of the categories. Further study of the association between first and second-line antirheumatic drug use and MPQ pain should use a more sensitive measure of analgesic medication in RA. We did not observe deteriorating disease status across the 3 time periods selected for study, but more frequent MPQ assessment across shorter time frames could be useful to compile a more complete understanding of possible fluctuations in pain behavior as well as overall patterns of stability.

Our results reveal stable levels of pain over 6 years in patients with chronic RA that correspond with lack of significant change in measures of disease activity and function. The results provide a blueprint of pain intensity and quality

in clinic monitored patients with RA that could be compared against documented MPQ descriptions in other populations with RA. Group or individual monitoring of pain quality in RA could give the rheumatologist insight into pain and the efficacy of treatment for pain. Regular monitoring could identify whether change in self-reported levels of RA pain was due to change in sensory and/or affective-evaluative components of pain, and could indicate the most appropriate form of pain therapy to prescribe.

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