An Interdisciplinary Pain Rehabilitation Programme: Description and Evaluation of Outcomes

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ABSTRACT

Purpose: The purpose of this archival report is to describe the essential elements of an intensive 8-week interdisciplinary pain rehabilitation programme (IPRP) with a cognitive-behavioural emphasis and the results that can be expected in treating patients with chronic pain conditions.

Method: This report describes a private outpatient program providing treatment services to patients with long-term disabling pain arising from work- or accident-related musculoskeletal injuries. The cohort consists of 338 consecutive patients who completed the program over a 3-year period (patients discharged between January 1, 2005, and December 31, 2007).

Results: Improvements in vocational status were noted in 75% of patients with chronic pain. Patients were also able to reduce their pain levels by approximately 16% and to reduce their levels of anxiety and depression by 13% and 17% respectively. At the same time, 61% of patients were able to reduce or eliminate their pain medications.

Conclusions: Outcomes are consistent with evidence-based clinical practice guidelines for the management of chronic pain conditions. The published literature supports the efficacy of this interdisciplinary approach in highly disabled patients for whom effective treatment has been delayed. Early intervention in the subacute phase is recommended for prevention of long-term disability in patients with chronic pain.

Key Words: chronic low back pain, chronic neck pain, chronic pain, interdisciplinary pain rehabilitation programme, rehabilitation, musculoskeletal injury, work-related injury

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RÉSUMÉ

Objectif : L'objectif de ce rapport archivistique est de décrire les éléments essentiels d'un programme intensif multidisciplinaire de réadaptation pour la douleur, d'une durée de huit semaines avec accent cognitif-comportemental, et les résultats auxquels s'attendre dans le cas du traitement de patients aux prises avec des problèmes de douleur chronique.

Méthode : Ce rapport décrit un programme privé pour patients externes qui assure des services aux patients souffrant de douleur incapacitante à long terme causée par une blessure musculosquelettique qui résulte d'un accident ou d'une lésion causée par le travail. La cohorte étudiée comprenait 338 patients consécutifs ayant suivi le programme durant trois ans (patients qui ont obtenu leur congé entre le 1^{er} janvier 2005 et le 31 décembre 2007).

Résultats : Des améliorations à l'état professionnel ont été observées chez 75 % des patients aux prises avec des douleurs chroniques. Les patients ont aussi été en mesure de réduire leur niveau de douleur d'environ 16 % et leur niveau d'anxiété et de dépression de 13 % et de 17 % respectivement. Simultanément, 61 % des patients ont été en mesure de réduire ou d'éliminer complètement la prise de leurs médicaments antidouleur.

Conclusions : Les résultats sont conformes aux directives de pratique fondées sur l'expérience clinique pour la gestion des problèmes de douleur chronique. La documentation déjà publiée confirme l'efficacité de cette approche multidisciplinaire chez les patients fortement invalidés et chez qui des traitements efficaces ont été retardés. Une intervention précoce en phase subaiguë est recommandée pour prévenir une incapacité à long terme chez les patients qui souffrent de douleurs chroniques.

Mots clés : blessure, douleur chronique, douleur chronique au cou, lésions professionnelles, lombalgie chronique, musculosquelettique, programme multidisciplinaire de réadaptation pour la douleur, réadaptation

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INTRODUCTION

Chronic pain disability is a major health problem and one of the most costly contributors to occupational disability in industrialized countries.¹ Statistics Canada's Community Health Survey found in 2005 that 15% of the population of Canada aged 20–64 had pain complaints;² pain prevented a few or some activities in 8% of this population and prevented most activities in 3%.² The treatment of chronic pain disability focuses on this latter, more disabled group. It has also been reported that pain is the most common presenting symptom in medical outpatients.³ In response, over the last 30 years a great deal of research has gone into finding more effective ways of treating and managing this challenging population, with a view to reducing both pain and disability.

One of the more innovative ways of tackling chronic pain problems has been the development of multidisciplinary and, more recently, interdisciplinary pain rehabilitation programmes (IPRPs). *Multidisciplinary* programmes involve clinicians from different professions who may see the same patient but do not work as an integrated team. In contrast, *interdisciplinary* teams work in the same facility and share the same patient file, and a clinical manager is responsible for coordinating ongoing treatment. Interdisciplinary programmes have evolved from multidisciplinary programmes, incorporating medical, psychological, functional, and physical treatment methods in an intensive, integrated format.

The first meta-analysis of research evaluating multidisciplinary programmes was published in 1992; Flor et al. concluded that a comprehensive treatment approach for chronic non-malignant pain was superior to no treatment, wait-list control, and single-discipline treatments (e.g., medical treatment, physical therapy, psychological interventions).⁴

Since that time, interdisciplinary programmes have been more extensively studied throughout North America and Europe, and several systematic reviews have yielded favourable results.^{5–9} Guzman et al.'s (2001) review concluded that IPRPs were more effective than single-discipline approaches in reducing low back pain (LBP) and improving function.⁵ In addition, more intensive programmes (i.e., those involving more than 100 hours of clinical contact time) were more effective.

A more recent systematic review concluded that in the long term, multidisciplinary back training has a positive effect on work participation in patients with non-specific chronic LBP.⁷ Moreover, Gatchel and Okifuji addressed cost-effectiveness by pointing out that, on average, comprehensive pain programmes returned 66% of graduates to work, compared with 27% in control groups, and resulted in a savings of more than US\$350,000 in disability and health care costs over the lifetime of the patient.⁸ Jensen et al. have also reported substantial cost

savings from a multidisciplinary programme for neck and back pain in Sweden.⁹

The American Pain Society released its evidence-based clinical practice guideline on the treatment of LBP in 2009, based on a review of 161 randomized trials.¹⁰ Recommendation 2 reads in part,

In patients with nonradicular low back pain who do not respond to usual, noninterdisciplinary interventions, it is recommended that clinicians consider intensive interdisciplinary rehabilitation with a cognitive/behavioral emphasis (strong recommendation, high-quality evidence).^{10(p.1070)}

The efficacy of intensive interdisciplinary approaches in the treatment of chronic pain disability is now indisputable. Some questions that remain include the following: What are the essential elements of an interdisciplinary programme? Who can best benefit from this type of programme? How can Canadians more readily access this type of care in a timely manner?

Two of the current authors (DE, DC) have previously reported the clinical outcomes of a limited functional-restoration programme compared to a randomized usual-care group.¹¹ Since then, the programme model has evolved into a more comprehensive, individualized approach. The purpose of this study is to describe the current IPRP, profile the patients, and describe symptomatic, functional, and vocational outcome results over three consecutive years. These results will be compared with the benchmarks reported in the literature. Based on this evidence, we will also discuss the appropriate management of the chronic pain population and suggest future directions.

METHODS

Setting

During the study period (2005–2007), the programme provided an integrated approach to treatment that includes interdisciplinary assessment, cognitive-behavioural and biofeedback therapy, and physical and occupational rehabilitation. Patients were referred by one of the following: motor vehicle or disability insurers, the Workplace Safety and Insurance Board of Ontario (WSIB), lawyers, or treating physicians. Funding was provided by WSIB or by insurance companies. The Ontario Health Insurance Plan (OHIP) does not fund programmes of this type. The programme was first accredited as an IPRP by the Commission on Accreditation of Rehabilitation Facilities (CARF) in 2006.¹²

Eligibility Criteria

The clinical director, physiotherapist, and psychologist conducted an initial screening interview and assessment and provided written recommendations to the

funding source and the treating physician. The assessment team also determined whether any further diagnostic investigations (e.g., radiographs, CT scans, MRI) or treatments (e.g., antidepressant medication) were required prior to the start of the treatment programme.

Inclusion criteria for treatment were chronic non-malignant pain, poor response to previous therapies, and ability to attend an outpatient programme. Patients consented to treatment and signed a programme participation agreement. Exclusion criteria included, but were not limited to, lack of patient consent and medical or psychological contraindications (including but not limited to untreated or unstable physical conditions, alcohol or drug addictions, active suicidal tendencies, violent behaviour, delusional disorders, severe depression, and cognitive difficulties that would interfere with retention). Patients who did not speak English fluently were provided with an interpreter (through the funding source) to facilitate communication.

Interdisciplinary Intervention

Following assessment, patients attended 7–8 weeks of outpatient treatment, which consisted of 3–4 clinical contact hours per day, usually 5 days per week. The total clinical contact time ranged from 130 to 150 hours per patient. Patients were also asked to perform additional exercises and related homework for approximately 1–2 hours per day, and their compliance was monitored. Programme cost ranged from \$8,000 to \$12,000 per patient.

The treatment team consisted of cognitive-behavioural therapists, kinesiologists, occupational therapists, physiotherapists, physicians, psychologists, biofeedback therapists, and massage therapists. Supplemental team members included chiropractors, dieticians, physiatrists, and psychiatrists. The team delivered treatment in an individualized format, all in the same treatment facility, using the best available evidence from the literature and our own clinical experience in accordance with the principles of evidence-based practice.^{5,6}

The medical consultant, a physician experienced and trained in the area of chronic pain and musculoskeletal rehabilitation, provided medical advice to the team, reassured patients with respect to their medical status, and made suggestions about patient management, with a primary focus on medication rationalization. The medical consultant also contacted family physicians to provide them with education on the programme, answer their questions, and obtain their support for the patient's rehabilitation plan and medication changes.

The psychologist directly supervised the cognitive-behavioural therapist and advised the treatment team on how best to manage the emotional, cognitive, and personality issues that might affect the patient's presentation and progress. The psychologist also provided indi-

vidual therapy, focusing on the patient's identified psychological and emotional problems related to the pain disorder. This treatment addressed social, occupational, and emotional adjustment issues impeding the patients' optimal functioning, including the use of pain-management strategies.¹³

The cognitive-behavioural therapist (CBT) undertook the primary counselling role, helping the patient to recognize how thoughts and behaviours affect mood and pain levels. Treatment objectives included but were not limited to the identification and correction of distorted cognitive patterns, such as confusion over hurt versus harm and fear-avoidance. Patients were trained to use a variety of strategies to overcome the obstacles associated with their condition. Psycho-educational components included but were not limited to the pain system, the hurt/harm distinction, sleep hygiene, medication scheduling/reduction, emotional response to pain, anger management, mind/body connection, self-talk, assertiveness, stress management, goal setting, and relaxation therapy. Key family members were invited to the clinic, informed about the programme objectives, and educated in CBT principles and goals. The CBT acted as the team leader or case manager, both within the clinic and when contacting outside stakeholders (e.g., funding sources, family members).¹⁴

The physiotherapist employed manual and manipulative therapy techniques appropriate for each patient's specific findings.^{15–18} The physiotherapist also prescribed and monitored compliance and outcomes of a specially designed exercise programme.^{19,20} Elements of this programme included education on the patient's condition, hurt versus harm, posture, core stability and motor-control retraining, scapular stabilization, stretches, and strengthening.^{18,21–29} The exercise programme was supervised by a kinesiologist working under the direction of the physiotherapist. The kinesiologist was responsible for helping to encourage patients to use their pain-management strategies during functional activities while at the clinic and for encouraging regular relaxation practice, which was a regular part of the treatment schedule. The physiotherapist and the medical consultant made recommendations for permanent restrictions and temporary limitations of function for each patient.

Biofeedback was provided by a certified biofeedback therapist working under the close supervision of the physiotherapist. This therapist reported to the rest of the team on stress triggers and successful strategies specific to the individual patient. The aim of this therapy was to identify and correct dysfunctional muscular activation patterns and stress responses that might be contributing to the patient's pain.^{30–32}

Massage therapists focused on normalizing the soft tissues affected by injury and stress. Massage therapy was used selectively with conditions such as myofascial trigger points, hypertonicity, muscle spasm, fibrosis, and

contracture. The appropriate therapeutic massage techniques, such as effleurage, petrissage, friction, tapotement, vibration, myofascial trigger points, and fascial release techniques, were used in response to the unique clinical presentation of each of these conditions.^{33–38}

The skills acquired by the patient were reinforced outside the clinic by the occupational therapist, who provided in-home visits, job site analyses, and return-to-work programme design and implementation. The education component of the occupational therapy services included graded activity, energy conservation, work-simplification techniques, joint-sparing techniques, pacing, training in body mechanics, and proper posture and positioning.^{39–41} In addition, the occupational therapist made recommendations for the provision of assistive devices and ergonomic equipment, as well as environmental modifications.⁴¹ When appropriate, a graded return-to-work plan was developed jointly with the patient and the employer and was carried out under the close supervision of the occupational therapist.⁴¹ Often, patients began the return-to-work process while still attending the final few sessions at the clinic.

Together, these components were designed to enhance each patient's understanding of chronic pain and to promote effective use of pain-management skills. Patients were taught effective physical and mental pain-coping techniques within a supportive, goal-oriented atmosphere to increase self-efficacy in pain management. Individualized goals were negotiated with the patient, employer, and funding source and often included improving the patient's functional abilities and work status. In support of these goals, treatment was also directed at lifestyle changes that allowed patients to use their pain-management strategies throughout the day, to improve sleeping patterns, to rationalize and reduce unnecessary pain medications, and to improve their emotional state and their ability to cope with future pain flare-ups.

Patient reviews were held on a weekly basis, with active participation from each team member. The team members also communicated regularly between reviews to discuss problems and improve programming. When necessary, a sub-group of team members would meet with a patient to discuss problems and solutions. The team members all worked from one clinical file, and reports were prepared jointly.

Data Collection and Analysis

Information on each patient's functional and psychological status was collected during the initial assessment, and again at the end of treatment, through a battery of psychometric tests containing standard measures of patient demographics, pain areas, pain severity, mood disturbance, and use of pain medications. At intake, patients were asked to fill out a digital pain diagram (see Figure 1) and to identify specific painful areas. They

Figure 1 The digital pain diagram completed by patients at both intake and discharge

were then asked to rank these areas in terms of pain severity. Pain was rated on a 0–10 numerical pain rating scale (NPRS), chosen for ease of administration.⁴² Patients were asked to choose a number indicating the *average* amount of pain they had experienced in each area over the preceding week. To simplify data collection and analysis, only the three main pain areas were recorded. Pain areas were designated as *primary*, *secondary*, and *tertiary* according to the patient's ranking of severity. Table 1 illustrates the areas of pain identified by patients.

Each patient completed the Hospital Anxiety and Depression Scale (HADS) questionnaire and reported his or her intake of pain medication. The HADS consists of 14 items addressing a patient's emotions, each rated from 0 to 3. There are seven items each for anxiety and depression, giving a range of scores from 0 to 21. Total scores are rated as *normal* (0–7), *mild* (8–10), *moderate* (11–14), or *severe* (15–21). In addition, patients' work status was determined; patients who were not working or who were unable to proceed with retraining were considered disabled. Patients documented their medication use at intake and discharge, and the team evaluated whether their pain medication use had changed, based on the strength and quantity of opioid and non-opioid pain medication reported. This evaluation was recorded in our database as *more medication*, *less medication*, *same medication*, or *no medication*. At discharge, the eight-item Client Satisfaction Survey (CSQ-8) was administered and collected anonymously.⁴³

Table 1 Location of Pain Complaints

Area of Pain	Primary (454)		Secondary (380)		Tertiary (257)		Totals (454)	
	n	%	n	%	n	%	n	%
Back	201	44.3	61	16.1	40	15.6	302	66.5
Neck	109	24.0	97	25.5	58	22.6	264	58.1
Lower extremities	36	7.9	96	25.3	55	21.4	187	41.2
Upper extremities	78	17.2	83	21.8	76	29.6	237	52.2
Upper back	25	5.5	35	9.2	24	9.3	84	18.5
Chest	4	0.9	6	1.6	2	0.8	12	2.6
Other	1	0.2	2	0.5	2	0.8	5	1.1

Where appropriate, data were analyzed using Student's *t*-tests, *t*-tests for unequal variances, and analyses of variance (ANOVAs). ANOVAs used difference scores as the dependent variable, with the presence/absence of a particular group (e.g., interpreter) as the fixed factor and initial scores as a covariate. Effect size was determined using Cohen's *d*.⁴⁴

Follow-Up

At 6 months post discharge, patients were mailed a short questionnaire asking for their current pain ratings, their pain-medication intake, and their current work/retraining status. Fewer than 10% of these questionnaires were returned, so follow-up results have not been included in our analysis.

RESULTS

Patient Characteristics

Patients referred to the programme were typically diagnosed with a pain disorder as defined by the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. (DSM-IV).⁴⁵ There are five main criteria for diagnosing a pain disorder:

- Pain in one or more anatomical sites is the predominant focus of the clinical presentation and is of sufficient severity to warrant clinical attention.
- The pain causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- Psychological factors are judged to have an important role in the onset, severity, exacerbation, or maintenance of the pain.
- The symptom or deficit is not intentionally produced or feigned (as in Factitious Disorder or Malingering).
- The pain is not better accounted for by a Mood, Anxiety, or Psychotic Disorder and does not meet criteria for Dyspareunia.^{45(p.461)}

Often the pain disorder is diagnosed with psychological factors (e.g., depression, anxiety disorders, panic attacks) and/or accompanying medical condition(s) (e.g., neuropathy, post-surgical complications, myofascial pain syndromes, joint dysfunctions).⁴⁵ The pain disorder is considered chronic if its duration is 6 months or more.⁴⁵

A total of 454 patients were initially enrolled in the programme from 2005 to 2007 (see Table 2). The patient population tended to be equally distributed between men and women, and ages ranged from 21 to 64, with the average age in the mid-40s. LBP was the most common primary pain complaint, followed by neck pain, upper-extremity pain, and lower-extremity pain. Pain was usually widespread: more than half the patients had at least three areas of pain. On intake, the mean anxiety and depression scores of the 454 patients were in the "moderately" elevated range (HADS score 11–14). Detailed medication information is not available in the database, although typically the majority of patients were heavily medicated with opioids for pain and with antidepressants and sedatives for anxiety and insomnia.

Eighty percent of patients had been injured at work; the other 20% were injured in motor vehicle accidents. The average chronicity of pain complaints, calculated from the date of injury to the date of intake, was 800 days (2.2 years); the median was 542 days (1.5 years), and the range from 56 days to 6,677 days (18 years; see Table 2). The vast majority (88%) were not working at the time of their intake assessment. Typically these patients worked in unskilled labour positions or in skilled positions requiring a substantial amount of lifting, which would put their job demands into at least the Medium Strength category as classified by the *Dictionary of Occupational Titles*.⁴⁶

One-quarter of patients (116, or 26%) did not complete the full programme. These patients were discharged either because of poor compliance or at their own request, usually because of lack of progress. Those patients who were discharged early did not differ signifi-

Table 2 Demographics

	Total	Completions	Discharged Early
Total patients	454	338 (74.4%)	116 (25.6%)
Gender			
Male	236	172	65
Female	218	166	52
Female:male ratio	92:100	97:100	80:100
Age (years)			
Mean (SD)	44.0 (9.6)	44.4 (9.5)	43.5 (9.7)
Median	44.0	44.1	42.5
18–40	147	107	40
40–64	307	231	76
65 +	0	0	0
Translator required	77 (17.0%)	56 (16.6%)	21 (27.3%)

cantly from programme completers with respect to age, duration of disability, gender, work status, translation requirements, pain ratings, or anxiety scores. However, initial depression scores were significantly higher among patients who were discharged early (13.1, vs. 11.9 for patients who completed the programme; $t(444) = 2.45$, $p = 0.015$). In addition, 64% of patients who were discharged early reported at least three pain complaints, compared with only 52% of patients who completed treatment, a difference that was also statistically significant ($t(453) = 2.152$, $p = 0.032$).

All subsequent analyses were carried out only for the 338 patients who completed the programme.

Outcomes

Work Status

Overall, 253 (75%) of the 338 patients who completed the programme made improvements in their work status; 247 (82%) of patients who were disabled at the time of intake were able to improve their work status, and six (2%) who were working at part-time or modified duties were able to resume full-time work by the end of their treatment (see Figure 2). For the remaining 85 patients (25%), work status did not improve. In 2 cases (1%), patients who were working at the time of intake became disabled, both for psychological reasons.

Pain Ratings

The mean pain rating for the primary pain complaint was 7.3 at intake and 6.1 at discharge, an average improvement of 16% (see Table 3). This improvement was statistically significant, as were improvements for the secondary and tertiary pain complaints. There were 226 patients (67%) who reported an improvement in their primary pain complaint, and their mean pain ratings improved by 27% (2.0/10 on the NPRS). Individually, an

Figure 2 Work status at intake and discharge

improvement of 2/10 or more on the NPRS was reported by 118 (35%) patients, corresponding to a clinically meaningful change.⁴⁷ Another 93 patients (28%) reported an improvement of between 1.0/10 and 1.5/10 on the NPRS, which may be interpreted as a minimally important improvement.⁴⁷

Mood

Mean anxiety and depression scores improved by 12.6% and 16.8% respectively; both anxiety and depression change scores were statistically significant (see Table 3). At discharge, mood levels had improved significantly, with depression scores at the high end of *mild* and anxiety scores at the lower end of *moderate*. For the 193 patients (59%) who reported improvement in anxiety, the mean improvement from intake to discharge was 30%. Individually, 80 patients (24%) improved one full category (i.e., from *severe* to *moderate*, *moderate* to *mild*, or *mild* to *normal*), 44 (13%) improved two categories, and 10 (3%) improved from *severe* to *normal* (three categories). For the 214 patients (65%) who reported improvement in depression, the mean improvement from intake to discharge was 32%; 98 patients (29%) improved one full category, 42 (12%) improved two categories, and 8 (2%) improved three categories.

Pain Medication Change

A substantial number of patients (170, or 49%) reported taking less pain medication at discharge, and 40 patients (12%) eliminated all pain medications; 134 (32%) reported no change in pain medication. The remaining 30 (7%) reported an increase in pain medication as recommended by the medical consultants.

Patient Satisfaction

Over the 3-year study period, 412 anonymous CSQ-8s were collected in total. The programme was rated *good*

Table 3 Pain and Mood Ratings at Intake and Discharge

	<i>Intake</i>	<i>Discharge</i>	<i>Mean Improvement</i>	<i>Statistical Significance</i>	<i>Effect Size (95% CI)</i>
Primary pain complaint	7.3	6.1	16.4%	$t(338) = 13.85$ $p < 0.001$	0.74 (0.58–0.90)
Secondary pain complaint	6.5	5.6	14.2%	$t(279) = 8.55$ $p < 0.001$	0.46 (0.29–0.63)
Tertiary pain complaint	6.2	5.2	16.9%	$t(177) = 6.63$ $p < 0.001$	0.47 (0.26–0.68)
Anxiety (HADS)*	12.6**	11.0**	12.6%	$t(328) = 7.21$ $p < 0.001$	0.38 (0.23–0.54)
Depression (HADS)*	11.9**	9.9**	16.8%	$t(328) = 8.86$ $p < 0.001$	0.41 (0.27–0.58)

CI = Confidence Interval; HADS = Hospital Anxiety and Depression Scale

* Based on 328 patients completing the HADS at both intake and discharge

** 0–7 = normal, 8–10 = mild anxiety/depression, 11–14 = moderate anxiety/depression, 15–21 = severe anxiety/depression

to *excellent* by 91% of respondents, while 9% rated the services *fair*. No one rated the services *poor*.

Comparison of Sub-groups

The 16% of patients for whom an interpreter was required were compared to those who spoke sufficient English not to need an interpreter. Table 4 displays the primary pain complaint, anxiety scores, and depression scores for English and non-English speaking patients. The improvement in primary pain complaint was significant for both groups. An ANOVA comparing these two groups was conducted with difference scores as the dependent variable, the presence/absence of an interpreter as the fixed factor, and initial scores as a covariate,

in order to control for differences in initial pain ratings between groups. The difference between groups was not statistically significant. The ANOVA for anxiety difference scores was statistically significant, however, indicating that patients who did not speak English did not experience as substantial an improvement in anxiety. The ANOVA for depression difference scores was also statistically significant, indicating that patients who did not speak English did not experience a significant improvement in depression relative to those who did speak English (see Table 4). Work status improved for 75% of patients who did not speak English, compared with 72% of those who did speak English ($t(337) = 1.59$, ns).

Further comparisons of sub-groups were performed for gender, head and neck pain patients, and LBP patients.

Table 4 Non-English-speaking Patients Compared with English-Speaking Patients

	<i>Primary Pain Complaint (NPRS)</i>	<i>Anxiety (HADS)</i>	<i>Depression (HADS)</i>
Non-English-speaking ($n = 56$)			
Initial	7.4	13.9**	12.9**
Discharge	6.5	12.7**	12.5**
Mean improvement	12.3%	9.0%	3.0%
Statistical significance	$t(55) = 4.13$ $p < 0.001$	$t(54) = 2.195$ $p < 0.05$	$t(54) = 0.726$ $p = 0.47$
English-Speaking ($n = 282$)			
Initial	7.2	12.3***	11.2***
Discharge	6.0	10.6***	8.8***
Mean improvement	17.0%	13.3%	21.2%
Statistical significance	$t(281) = 13.56$ $p < 0.001$	$t(272) = 6.867$ $p < 0.001$	$t(272) = 9.518$ $p < 0.001$
ANOVA*			
Marginal mean at intake	7.27	12.54	11.84
Marginal mean improvement	–0.86 NES	–0.610 NES	–0.008 NES
Statistical significance	$F(1,335) = 3.11$ $p = 0.078$	$F(1,325) = 4.68$ $p < 0.02$	$F(1,325) = 18.846$ $p < 0.001$

NPRS = numeric pain rating scale; HADS = Hospital Anxiety and Depression Scale; NES = Non-English-speaking patient; ES = English-speaking patient

* ES vs. NES

** Based on 55 patients completing the HADS at both intake and discharge

*** Based on 273 patients completing the HADS at both intake and discharge

There were no statistical differences in any of these subgroups for pain, anxiety, depression, or work status at intake or discharge.

DISCUSSION

We have described in some detail an integrated interdisciplinary programme for treatment of chronic non-malignant pain and have reported the outcomes of 338 patients who completed the programme. We have demonstrated that following an intensive IPRP, nearly three-quarters of patients were able to improve their work status; this result compares favourably with the 66% return-to-work rates reported by Gatchel et al.⁸ In contrast to the 89% who were not working at the time of intake, only 17% were disabled at the end of treatment. The majority of patients (60%) advanced into vocational retraining, but only a small percentage (7%) were able to return to their original full-time jobs.

The literature suggests that the range of expected pain improvement as a result of comprehensive pain programmes ranges from 14% to 60%.⁸ In most interdisciplinary programmes, however, pain reduction is not the focal goal of therapy; rather, the ability to cope with and manage pain while restoring function is the principal aim. The average pain improvement in this study was within the expected range. For those patients who reported improvement in pain ratings, the results were consistent with what has been considered a clinically meaningful change on the NPRS (i.e., a two-point improvement in pain ratings).⁴⁸ This result compares well with the reported (30%) efficacy of opioid medication in a similar population, without the added potential complications of such medication.⁴⁹ Moreover, the reduction in pain complaints occurred at the same time that patients were reducing their pain medication.

Interdisciplinary treatment had been demonstrated to be effective mainly for patients with chronic LBP. In 2006, Buchner et al. studied 365 patients with chronic LBP or chronic neck pain (NP) in a multidisciplinary treatment programme. Their study revealed that both groups improved significantly in all outcome criteria, with a return-to-work rate of 67%.⁵⁰ The results presented here also show that LBP and NP patients improved equally well with interdisciplinary treatment.

Regardless of whether they reported improvement in any of the parameters, over 91% of patients rated their treatment programme *good* or *excellent*, despite the fact that only 67% of patients reported improvement in their primary pain. This suggests that the overwhelming majority of patients were satisfied with the approach, regardless of the degree of pain improvement they experienced. It may be just as important to learn to cope with pain as it is to reduce the level of pain.

It is not surprising that the 16% of patients who required English interpreters had substantially poorer

outcomes with respect to mood management. There are several possible explanations for these results. First, the testing may be biased toward English-speaking patients and may not take into account cultural differences that are present among non-English-speaking patients. Second, issues with communication may hamper the acquisition and adoption of cognitive-behavioural strategies. Despite the outcomes of mood testing, however, non-English-speaking patients did just as well as their English-speaking counterparts in terms of improving their work status and pain complaints.

Carosella et al. reported that patients were more likely to be discharged early if they had higher somatization, higher pain intensity, higher perceived disability, and lower expectations of returning to work.⁵¹ Patients who tended to be discharged earlier also had longer durations of disability and were significantly younger.⁵¹ In the present study, patients discharged early tended to be more depressed and to have more widespread pain complaints; however, they did not differ from those who completed the programme in terms of age, duration of disability, or pain intensity. Workers' perceptions of disability and their expectations with respect to return to work, both important prognostic factors, were not captured in the database and therefore could not be examined.⁵² This study's results indicate that the patients who do best in IPRPs tend to be less emotionally distressed and to have more localized pain.

In this study, the average chronicity of pain complaints, calculated from the date of injury to the date of intake, was 2.2 years. It is known that in workers' compensation cases in particular, over the first year, the likelihood of return to work decreases rapidly with increased duration of disability, such that by the end of the second year, virtually no workers spontaneously return to work.⁵³ This small minority of longer-duration cases accounts for a large majority of direct compensation costs. The literature is now endorsing a more timely return to work following soft-tissue injury, with the support of all stakeholders and a multidisciplinary team as needed.⁵⁴ Investigators at the Institute for Work and Health have promoted a strategy of timely subacute intervention (within 4–12 weeks post injury) as a means of minimizing injured workers' suffering and reducing insurers' costs.⁵⁵ Timely referral is critical to effective prevention of disability resulting from a chronic pain disorder.^{56,57}

In 2009, the American Pain Society released an evidence-based clinical practice guideline for interventional therapies, surgery, and interdisciplinary rehabilitation for LBP.¹⁰ The panel did not base its recommendations on observational studies, since such studies can be very misleading for evaluating the benefits of therapy for chronic pain as a result of placebo effects. Their recommendations reflect the consensus opinion of a panel of experts based on a review of 161 random-

ized trials. The authors concluded that while the use of interventional therapies is rising, there continues to be insufficient evidence to evaluate the validity or utility of most of these procedures, which include diagnostic selective nerve root blocks, local injections, and intra-articular facet joint blocks. They recommended interdisciplinary rehabilitation with a cognitive-behavioural emphasis for non-responsive LBP on the basis of high-quality evidence.¹⁰ The efficacy of IPRPs in improving patients' work status—75% in the present study—challenges the wisdom of the present practice of funding risky and unproven interventional therapies while IPRPs remain widely unavailable due to lack of funding.⁵⁸

In our experience, to be successful in assisting these patients, clinicians must be prepared to go beyond traditional medical and functional approaches. Key approaches include addressing attitudinal and psychosocial issues as they arise and coordinating communication among all stakeholders: family doctor, employer, funder, family, and patient. The team needs to be prepared to go into the workplace and negotiate return-to-work plans and modifications in duties to accommodate permanent restrictions or temporary limitations in a graduated manner. Finally, our experience has been that patients who adopt lifestyle changes and pain-coping strategies are able to maintain family and work commitments and use fewer health care services over the long term.

Patients with chronic pain conditions can improve their symptoms and their work status if they are offered an appropriate treatment approach, such as an interdisciplinary pain rehabilitation programme.

LIMITATIONS

The fact that this is an observational study without a randomized control group, conducted in isolation, limits the conclusions that can be drawn from the results. Nevertheless, these results align with what has been consistently reported in the literature.

Our attempts to follow up with patients by mail were largely unsuccessful: fewer than 10% of the questionnaires were returned. As a consequence, we have committed to modifying our follow-up procedure by using an independent agency to make telephone contacts. Other studies in this field, however, have shown a long-lasting treatment effect of up to 7 years post discharge.¹³

A high percentage of patients in our study were considered work ready, or ready for retraining or for a labour-market re-entry programme. The vast majority of these patients had been referred with a recommendation for a pain-management programme before progressing further in their work status. As a result, they were not working at the time of entry into the programme; when they completed the programme, they were considered

ready for the next step in returning to the labour force. Without following these patients, however, we cannot know how many were deemed vocationally successful and how many were actually able to sustain their occupational, as well as symptomatic and functional, gains.

CONCLUSION

We have described the essential elements of an interdisciplinary pain rehabilitation programme and the characteristics and outcomes of the 338 consecutive patients who completed our programme over a 3-year period. The outcomes are consistent with previously published randomized trials from which evidence-based clinical guidelines were derived. This study's findings support the efficacy of this approach in these highly disabled patients for whom effective treatment has been delayed.

Prevention with appropriate strategies is best. However, for highly disabled patients with chronic pain, an intensive, interdisciplinary pain rehabilitation programme is the "gold standard."

KEY MESSAGES

What Is Already Known on This Topic

IPRPs improve symptoms, function, and occupational outcomes in a cost-effective manner in patients with chronic pain disorders. Early intervention is known to be effective in preventing the development of chronic pain disabilities, and long-term improvements in vocational outcomes have also been demonstrated. IPRPs are the "gold standard" in treating chronic low back and neck pain.

What This Study Adds

This article describes the staffing, essential elements of treatment, and conceptual approaches of an IPRP. The symptomatic and functional improvements, as well as the vocational outcomes, of this programme are very similar to those reported in the literature. IPRPs can thus be very successful, and such programmes need to be made more widely available within the Canadian health care system.

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