

# Psychosocial Treatment Techniques to Augment the Impact of Physiotherapy Interventions for Low Back Pain

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## ABSTRACT

*Purpose:* The present study examined the profile of physical and psychosocial changes that occur in physiotherapy intervention when patients also participate in a psychosocial intervention. The psychosocial intervention, delivered by physiotherapists, was designed to target catastrophic thinking, fear of pain, perceived disability, and depression.

*Methods:* The study sample consisted of 48 individuals referred for the rehabilitation treatment of disabling back pain. Half the sample was enrolled in a physiotherapy intervention only; the other half was enrolled in a psychosocial intervention in addition to receiving a physiotherapy intervention.

*Results:* At post-treatment, the two treatment groups did not differ significantly on measures of pain severity, physical function, or self-reported disability. Patients who participated in the psychosocial intervention in addition to physiotherapy showed significantly greater reductions in pain catastrophizing, fear of movement, and depression than patients who received only the physiotherapy intervention. Reductions in psychosocial risk factors contributed to reduced use of the health care system, reduced use of pain medication, and improved return-to-work outcomes.

*Conclusions:* The findings of the present study suggest that a psychosocial intervention provided by physiotherapists can lead to meaningful reductions in psychosocial risk factors for pain and disability and may contribute to more positive rehabilitation outcomes.

**Key Words:** catastrophizing, fear of pain, musculoskeletal pain, psychosocial factors, rehabilitation, return to work

**Sullivan MJL, Adams H. Psychosocial treatment techniques to augment the impact of physiotherapy interventions for low back pain. *Physiother Can.* 2010;62:180–189.**

## RÉSUMÉ

*Objectif :* La présente étude examine le profil des changements physiques et psychologiques qui surviennent lors d'interventions en physiothérapie chez les patients qui participent également à une intervention psychosociale. L'intervention psychosociale, assurée par des physiothérapeutes, a comme objectif de cibler la pensée catastrophique, la peur de la douleur, l'incapacité perçue et la dépression.

*Méthode :* L'échantillon étudié se composait de 48 personnes envoyées pour des traitements de réadaptation pour des maux de dos incapacitants. La moitié des personnes participaient aussi à une intervention psychosociale en plus de recevoir des soins en physiothérapie.

*Résultats :* En post-traitement, les deux groupes traités n'affichaient pas de grandes différences en ce qui a trait aux mesures d'intensité de la douleur, à la fonction physique ou à l'incapacité signalée par le sujet. La tendance à ne voir que la douleur, la peur de bouger et la dépression ont toutefois été grandement réduites chez les patients qui prenaient part à une intervention psychosociale en plus de recevoir leurs soins en physiothérapie. Ces réductions des facteurs de risque psychosociaux ont contribué à réduire l'utilisation des soins de santé et des médicaments contre la douleur et à améliorer les résultats de retour à la vie active.

*Conclusions :* Les constatations de la présente étude semblent indiquer que l'intervention psychosociale par des physiothérapeutes permet des réductions appréciables des facteurs de risques psychosociaux de la douleur et de l'incapacité, et pourrait contribuer à de meilleurs résultats en matière de réadaptation.

**Mots clés :** catastropher, douleur musculosquelettique, facteurs psychosociaux, peur de la douleur, réadaptation, retour au travail

## INTRODUCTION

Research over the past two decades has revealed that psychosocial variables can present significant obstacles

to recovery following musculoskeletal injury.<sup>1,2</sup> Factors such as fear-avoidance beliefs, catastrophic thinking, perceived disability, and depression have been identified as contributing to poor rehabilitation outcomes in indi-

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This research was supported by grants from the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST) and the Canadian Institutes of Health Research (CIHR).

The authors thank Nicole Davidson and Pascal Thibault for their assistance in coordinating data collection from collaborating treatment centres. The authors also thank all collaborating treatment centres that contributed data that were used in the preparation of this paper.

Conflict of interest statement: The authors receives royalties from the sale of the *PGAP Treatment Manual*.

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DOI:10.3138/physio.62.3.180

viduals who have sustained musculoskeletal injuries.<sup>3–5</sup> There has been increasing interest in the development of intervention approaches that would permit early detection and treatment of psychosocial risk factors for poor recovery from musculoskeletal injury.<sup>3,6,7</sup>

Psychosocial treatment for pain-related conditions has typically taken the form of cognitive-behavioural pain-management programmes.<sup>8,9</sup> The term “cognitive-behavioural” refers not to a specific intervention but, rather, to a class of intervention strategies that may include self-instruction (e.g., motivational self-talk), relaxation or biofeedback, exposure, developing coping strategies (e.g., distraction, imagery), increasing assertiveness, minimizing negative or self-defeating thoughts, changing maladaptive beliefs about pain, and setting goals.<sup>7,10</sup> As a function of the profile of presenting problems, a client participating in a cognitive-behavioural intervention may be exposed to varying selections or combinations of these strategies. Traditionally, cognitive-behavioural pain-management programmes have been delivered by psychologists or other rehabilitation professionals with a background in mental health.<sup>11</sup>

Given the strategic position of the physiotherapist as a first-line health care professional for problems associated with musculoskeletal injury, it has been suggested that physiotherapists might be ideally suited to intervene on psychosocial barriers to rehabilitation progress.<sup>7</sup> A few recent studies have examined the effectiveness of psychosocial interventions delivered by physiotherapists. In each of the studies described below, the effectiveness of a pain-related psychosocial intervention, administered by a physiotherapist, was compared to traditional physiotherapy. Of interest in all these studies was whether the impact of physiotherapy treatment could be increased by an intervention specifically targeting psychosocial barriers to rehabilitation progress.

The effects of a cognitive-behavioural pain-management programme delivered by physiotherapists was reported by Hay et al.<sup>12</sup> Physiotherapists attended a 2-day training workshop (with follow-up supervision) to develop the skill set needed to deliver a group cognitive-behavioural pain-management programme. The effects of the pain-management programme were compared to those of physiotherapy alone. The results of the study revealed that the two treatment groups did not differ significantly at post-treatment on measures of pain severity, emotional distress, or self-reported disability; however, patients in the pain-management group showed a decrease in use of health care services compared to patients in the physiotherapy group.<sup>12</sup>

George et al.<sup>13</sup> reported the results of a study comparing treatment outcomes of patients with back pain who received physiotherapy, graded activity, or graded exposure. The graded exposure intervention was intended to target pain-related fears, while the graded activity was intended to increase involvement in activity.

The study report provides no information on the duration of training for physiotherapists who provided the graded exposure or graded activity interventions. Group comparisons conducted at 6-month follow-up revealed no significant differences among groups on measures of pain intensity, physical impairment, or disability.

The findings of studies conducted to date have not provided convincing support for the idea that psychosocial interventions provided by physiotherapists during the subacute period of recovery yield additional benefits over physiotherapy alone. On the basis of these equivocal results, some authors have questioned the utility of targeting psychosocial risk factors early in the recovery process.<sup>13,14</sup> While there is considerable evidence for the utility of psychosocial interventions for individuals with chronic musculoskeletal conditions, the utility of such interventions for individuals in the acute or subacute phase of recovery remains to be established.<sup>15</sup>

Research from our laboratory has been exploring how “activity” might be used strategically to target psychosocial risk factors for prolonged pain and disability. As noted earlier, psychosocial factors such as catastrophic thinking, fear of movement, and disability beliefs have been shown to impede progress in rehabilitation. It is possible that activity, movement, or exercise could be used strategically to change these psychosocial risk factors. For example, since involvement in complex activity demands attention, activity participation might limit the attention that can be invested in catastrophic thinking. Repeated exposure to activities that have been avoided as a result of fear might be an effective approach to reducing fear of movement. Finally, the improvement in function that occurs as a result of repeated activity involvement might challenge a patient’s disability beliefs.

Several years ago we began investigating whether an activity-based intervention programme could be developed in which activity would be used to target psychosocial barriers to rehabilitation progress. We considered that an activity-based psychosocial intervention might be more relevant than typical pain-management interventions to the philosophy of physiotherapy treatment, thus promoting greater skill uptake and potentially contributing to more positive treatment outcomes. The Progressive Goal Attainment Program (PGAP) was the intervention that emerged from these efforts. PGAP differs from traditional cognitive-behavioural interventions not only in its focus (behaviour rather than cognition) but also in its objectives (return to work versus pain management).

In one study of patients with chronic cervical pain, individuals participating in a functional restoration physiotherapy programme were compared to a sample of individuals who received PGAP in addition to the same physiotherapy intervention.<sup>16</sup> The results showed that at treatment termination, there were no significant differences in pain severity or pain-related fear; how-

ever, the individuals who received PGAP showed greater reductions in catastrophizing and were more likely to return to work.<sup>16</sup>

Although research suggests that PGAP may improve rehabilitation outcomes for individuals with chronic pain, PGAP has yet to be evaluated in individuals in the subacute period of recovery. Data suggesting that PGAP improves clinical outcomes for individuals in the subacute period of recovery would point to PGAP as a potential intervention to prevent the transition to chronicity. A key question in the development of psychosocial interventions to complement physiotherapy is not only whether outcomes can be improved but, specifically, what domains of functioning are most likely to be improved with the addition of a psychosocial intervention.

The purpose of the present study was to undertake a preliminary examination of the profile of physical and psychosocial changes that occur in physiotherapy intervention when patients also participate in PGAP. In order to provide a reference point for observed changes, treatment results were compared to a matched sample of individuals who received only a physiotherapy intervention. The study was constructed as a retrospective two-cohort design, with the two cohorts matched on a variety of variables known to influence rehabilitation outcomes.

The participants in each sample were drawn from a large database of individuals who received treatment for disabling musculoskeletal conditions. Our centre is involved in collaborative research with numerous treatment centres on various projects examining trajectories of recovery following injury. Data accumulated through these various projects form the pool from which the sample was drawn. It is important to note that the primary intent of the analyses described in this paper was not to compare the efficacy or clinical outcomes of these two different treatment approaches but, rather, to examine whether providing a psychosocial intervention in addition to physiotherapy influenced the pattern of change in psychosocial variables through the course of rehabilitation. A secondary objective was to explore whether differential change in psychosocial variables had an impact on clinical outcomes such as the need for additional treatment, medication use, and return to work.

## METHODS

### Participants

The study sample consisted of 48 individuals referred for the rehabilitation treatment of disabling back pain. Half the sample (15 women, 9 men) was enrolled in a physiotherapy intervention characterized by a functional restoration orientation (e.g., mobility, strengthen-

ing exercises). Half the sample (15 women, 9 men) was enrolled in PGAP in addition to receiving a physiotherapy intervention. Participants in the two groups were matched on sex, age ( $\pm 3$  years), education ( $\pm 1$  year), duration of sick leave ( $\pm 1$  week), and initial pain severity ( $\pm 1$  on a 0–10 severity scale). All participants were in the subacute phase of recovery (4–12 weeks post-injury) when they were first enrolled in one of the treatment groups. All participants had sustained a low back injury in the workplace and were receiving workers' compensation benefits. Participants received treatment in one of five rehabilitation clinics in the Montreal (Quebec) region.

### Measures

#### Severity of Pain

Participants were asked to complete the McGill Pain Questionnaire (MPQ)<sup>17</sup> to assess the current severity of their pain. The Pain Rating Index (PRI) of the MPQ, a weighted sum of all adjectives endorsed, is considered a reliable and valid index of an individual's pain experience associated with musculoskeletal injury.<sup>18,19</sup> Participants were also asked to rate the severity of their pain on an 11-point numerical rating scale (0 = no pain, 10 = excruciating pain). Participants were asked to indicate the location of their pain on the body drawing of the MPQ; the total number of pain sites (range: 0–4) was computed from the body drawing (neck, back, upper extremity, lower extremity).

#### Physical Function

Two functional performance tests were used to assess functional limitations: a 5-minute walk and a finger-to-floor test. These measures are part of a battery that has been tested in different patient groups.<sup>20</sup> The tests complement self-reports of function and help to quantify the impact of symptom burden on function; they have been shown to have high interrater reliability and high test-retest reliability and to correlate significantly with other indices of disability.<sup>21,22</sup>

For the 5-minute walk, participants were asked to walk as quickly as possible, but at a comfortable speed, between two markers set 20 m apart. The distance walked in 5 minutes was recorded in metres.

For the finger-to-floor test, the participant stood erect with shoes removed and feet together. The participant was asked to bend forward as far as possible while keeping the knees, arms, and fingers fully extended. The vertical distance between the tip of the middle finger and the floor was measured in centimetres.

#### Self-Rated Disability

The Pain Disability Index (PDI)<sup>23</sup> assesses the degree to which respondents perceive themselves to be disabled

in seven different areas of daily living (home, social, recreational, occupational, sexual, self-care, and life support). For each life domain, respondents are asked to provide a perceived disability rating on an 11-point scale (0 = no disability, 10 = total disability). The PDI has been shown to be internally reliable and significantly correlated with objective indices of disability.<sup>24</sup>

### **Catastrophizing**

The Pain Catastrophizing Scale (PCS)<sup>25</sup> was used as a measure of catastrophic thinking related to pain. The PCS has been shown to have high internal consistency and to be correlated with interview-based methods of assessing catastrophic thinking.<sup>25</sup> High scores on the PCS have been associated with heightened pain, emotional distress, and occupational disability.<sup>26,27</sup>

### **Fear of Movement/Re-Injury**

The Tampa Scale for Kinesiophobia (TSK)<sup>28</sup> is a 17-item questionnaire that assesses fear of (re-)injury as a result of movement. The TSK has been shown to be internally reliable ( $\alpha = 0.77$ ).<sup>29</sup> The TSK has also been shown to be associated with various indices of behavioural avoidance and self-reported disability.<sup>30,31</sup>

### **Depression**

The Beck Depression Inventory-II (BDI-II)<sup>32</sup> was used as a self-report measure of depressive symptom severity. The BDI-II has been shown to be a reliable and valid index of depressive symptoms in chronic pain patients and primary-care medical patients.<sup>33</sup>

### **Procedure**

This programme of research received ethical approval from the Institutional Review Board of the Centre de recherche interdisciplinaire en réadaptation du Montréal métropolitain (CRIR).

### **Treatment Conditions**

As noted earlier, participants were not assigned randomly to treatment groups; rather, cases were drawn from a larger data set containing the results of assessments conducted with individuals who were treated only with physiotherapy and with individuals who received physiotherapy and PGAP. The *Physio + PGAP* group was drawn from a data set comprising consecutive referrals ( $n = 160$ ) to one of two rehabilitation clinics where physiotherapists had received training in PGAP. The *Physio* group was drawn from a data set comprising consecutive referrals ( $n = 270$ ) to one of three rehabilitation clinics where no physiotherapists had been trained as PGAP providers. Cases were selected by a computer algorithm designed to extract a sample of the *Physio* cases most closely matching the *Physio + PGAP* cases.

On the first search pass, the algorithm selected for the following matching criteria: date of injury  $\geq 4$  weeks and  $\leq 12$  weeks; at least one psychosocial risk factor score above the 50th percentile; sex; age; education; and initial pain severity. Exact matching criteria yielded a sample of only 12 cases per group. When matching criteria were changed to age ( $\pm 3$  years), education ( $\pm 1$  year), duration of sick leave ( $\pm 1$  week), and initial pain severity ( $\pm 1$  on a 0–10 severity scale), sample size increased to 24 cases per group.

Actual techniques used in the physiotherapy interventions cannot be specified, as interventions were provided based on clinicians' determination of their clients' needs. The techniques used in PGAP were similar across clients, however, since PGAP is a standardized intervention. In both groups, treatment was provided until the client was ready to transition to work or until the insurer or the referring physician chose to alter the direction of treatment.

All participants were contacted by telephone 12 months after their treatment termination evaluation. During this follow-up interview, participants were asked questions about their employment status, the current severity of their pain, and the type of treatment they received over the past year (since the treatment termination evaluation).

### **The Psychosocial Intervention**

The primary goals of PGAP are to reduce psychosocial barriers to rehabilitation progress, promote re-integration into life-role activities, improve quality of life, and facilitate return to work. PGAP was delivered by one of five physiotherapists who completed a 2-day training workshop on the assessment and treatment techniques of PGAP. In addition to the training workshop, the physiotherapists were required to become familiar with the contents of the *PGAP Treatment Manual*, which describes all the assessment and intervention techniques of the programme.

The goals of PGAP are achieved through targeted treatment of psychosocial risk factors, structured activity scheduling, involvement in graded activity, exposure to feared activities, goal setting, problem solving, and motivational enhancement. Sessions are scheduled weekly and are approximately 1 hour in duration. The programme consists of a maximum of 10 weekly contacts between a trained PGAP provider and a client. PGAP is terminated when the client is ready to transition back to the workplace. PGAP never extends beyond 10 weeks, since development data suggested that if the techniques of PGAP are effective in promoting rehabilitation progress, their impact will be observed within 10 weeks. A workbook provided to the client serves as the platform for the intervention techniques used in the programme. An information video is used to provide standardized

education and reassurance information, emphasizing the importance of resuming activity to promote recovery. The video also orients participants to the objectives of the programme and describes the main procedures involved. It is made clear in the information video that return to work is the goal of PGAP.

Since PGAP is a risk-factor-targeted intervention, clients are considered as potential candidates for the intervention only if they score within the risk range (defined as a score above the 50th percentile) on at least one of the following measures: MPQ-PRI, PCS, TSK, or PDI.

In the initial weeks of the programme, the focus is on establishing a strong therapeutic relationship and developing a structured activity schedule in order to facilitate resumption of pre-injury activities. The client is given a copy of the PGAP Client Workbook, which he or she is asked to bring to each session. Each session begins with a review of the previous week's activities and ends with planning activities for the upcoming week. Activity goals are established in order to promote resumption of family, social, and occupational roles. Intervention techniques are invoked to target specific obstacles to rehabilitation progress (e.g., fear of exacerbating symptoms, catastrophic thinking, disability beliefs). In the final stages of the programme, the intervention focuses on activities that will facilitate re-integration into the workplace.<sup>34</sup>

Briefly, the focus of each PGAP session is as follows:

- Session 1: Use of disclosure and validation techniques to establish therapeutic relationship, instruction on the use of the Client Workbook
- Session 2: Introduction to activity planning, re-establishing pre-injury activity structure and walking routine
- Session 3: Goal setting, planning activity involvement in relation to goals
- Session 4: Techniques targeting disability beliefs, mid-treatment evaluation
- Session 5: Evaluation feedback, introduction to thought monitoring to target catastrophic thinking
- Session 6: Exposure techniques to facilitate re-engagement in previously avoided activities
- Session 7: Continued application of techniques addressed in Sessions 5 and 6
- Session 8: Applying task-decomposition techniques to feared activities of the workplace
- Session 9: Final evaluation
- Session 10: Evaluation feedback and discharge planning

For more information on PGAP, the reader is referred to [www.pdp-pgap.com](http://www.pdp-pgap.com).

PGAP is unique among pain rehabilitation interventions in that all the techniques included in the inter-

vention have activity resumption as their primary focus. The information video viewed by clients at the beginning of treatment clearly identifies return to work, as opposed to pain reduction, as the objective of the intervention. No symptom-focused or symptom-reduction techniques (e.g., relaxation) are included in the intervention. Except during the first session, there is no discussion of the client's pain symptoms. In other words, PGAP would be best characterized as a disability-reduction programme as opposed to a pain-management programme.

### **Physiotherapy Intervention**

The content of the physiotherapy interventions varied at the clinician's discretion. However, all interventions conformed to practice guidelines for early intervention for musculoskeletal problems, consistent with reimbursement policies of the workers' compensation board, which emphasize mobilization and activity.<sup>35</sup> All interventions were characterized by a functional restoration orientation and consisted primarily of joint manipulation, active range of motion exercises, and strengthening exercises, progressively increasing in intensity. The frequency of visits ranged from two to four per week. For the purposes of this study, individuals were considered as part of the Physio group only if they met the same inclusion criteria as the Physio + PGAP group (i.e., at least one initial score above the 50th percentile on the psychosocial risk-factor measures).

### **Data Analysis**

Means and standard deviations were computed for all study variables, and *t*-tests for independent samples were used to compare the two treatment groups on pre-treatment measures. Within-group analyses of variance (ANOVAs) were computed on measures of pain, function, and psychosocial risk. Percentage change values on measures of pain, function, and psychosocial risk are presented below in order to compare the magnitude of change between the two treatment groups. Finally, regression analyses were performed to identify the long-term determinants of changes in pain symptoms and occupational disability.

## **RESULTS**

### **Sample Characteristics**

Demographic characteristics of the two treatment groups are presented in Table 1. As would be expected from the matching selection criteria, the two groups did not differ significantly in terms of sex distribution, age, marital status, education, duration of work absence, or type of pre-injury employment.

The results of the pre-treatment assessment are presented in Table 2. Independent-samples *t*-tests were used

**Table 1** Sample Characteristics

	<i>Physio</i> ( <i>n</i> = 24)	<i>Physio + PGAP</i> ( <i>n</i> = 24)	<i>p</i>
Sex (F/M)	15/9	15/9	ns
Age (years)	36.3 (9.5)	39.6 (6.2)	ns
Marital status (% married)	80	84	ns
Education (years)	12.6 (1.5)	12.7 (2.0)	ns
Absence from work (weeks)	5.5 (2.6)	6.7 (2.4)	ns
Occupation			ns
Labour	8	7	
Nursing	9	10	
Trades	3	4	
Clerical	4	3	

PGAP = Progressive Goal Attainment Program; ns = not significant

**Table 2** Pain, Function, and Pain-Related Psychological Variables: Pre-treatment

	<i>Physio</i> ( <i>n</i> = 24) <i>Mean (SD)</i>	<i>Physio + PGAP</i> ( <i>n</i> = 24) <i>Mean (SD)</i>	<i>p</i>
Pain intensity (0–10)	5.1 (2.1)	4.8 (1.3)	ns
MPQ-PRI	25.1 (14.8)	22.5 (10.8)	ns
Number of pain sites	1.8 (0.63)	1.9 (0.71)	ns
Finger-to-floor distance (cm)	7.7 (9.1)	8.3 (10.2)	ns
5-min walk distance (m)	328.2 (106.1)	320.1 (99.6)	ns
PCS	24.5 (11.7)	23.1 (9.9)	ns
TSK	42.1 (7.4)	43.3 (6.7)	ns
BDI-II	17.0 (13.2)	17.9 (10.3)	ns
PDI	41.2 (14.5)	40.5 (13.3)	ns
Weeks of treatment	7.7 (3.2)	5.5 (3.5)	0.05

PGAP = Progressive Goal Attainment Program; MPQ-PRI = McGill Pain Questionnaire—Pain Rating Index; PCS = Pain Catastrophizing Scale; TSK = Tampa Scale for Kinesiophobia; BDI-II = Beck Depression Inventory—II; PDI = Pain Disability Index; ns = not significant

to assess the pre-treatment comparability of the two groups. The two groups did not differ significantly on indices of pain severity (pain intensity, number of pain sites, MPQ-PRI), physical function (flexibility, walking distance), or psychosocial variables. Participants' scores on measures of pain catastrophizing, fear of movement, depression, and self-reported disability were similar to those reported in previous research on work-disabled individuals with musculoskeletal problems.<sup>16,26,36</sup> These comparisons suggest that on all indices of clinical severity, the two groups were comparable at initial assessment.

### Treatment-Related Changes

Analyses of covariance (ANCOVA) were used to assess group differences on the results of the post-treatment evaluation. Table 3 presents the adjusted means on post-treatment variables as well as the percentage change from initial treatment. The adjusted means represent the means derived after statistically equalizing both groups on pre-treatment scores. The percentage change values are presented as an index of the clinical meaningfulness of the observed changes.

As shown in Table 3, the two groups did not differ significantly in terms of post-treatment pain intensity ( $F(1,45) = 3.3, p = 0.08$ ) or post-treatment number of pain sites ( $F(1,45) = 0.03, p = 0.86$ ). The Physio + PGAP group obtained significantly lower scores than the Physio group on the MPQ-PRI ( $F(1,45) = 4.5, p < 0.05$ ). The two groups did not differ significantly on the finger-to-floor test ( $F(1,45) = 1.6, p = 0.21$ ) or 5-minute walk distance ( $F(1,45) = 1.7, p = 0.19$ ). The two groups did not differ significantly on post-treatment self-reported disability ( $F(1,45) = 2.7, p = 0.10$ ).

The most pronounced group differences were on the post-treatment psychosocial variables. The Physio + PGAP group obtained significantly lower scores on mea-

**Table 3** Post-treatment Group Differences on Measures of Pain, Function, and Pain-Related Psychological Variables

	<i>Physio</i> ( <i>n</i> = 24)		<i>Physio + PGAP</i> ( <i>n</i> = 24)		<i>p</i>
	<i>Adjusted Mean</i>	<i>% Change</i>	<i>Adjusted Mean</i>	<i>% Change</i>	
Pain intensity (0–10)	3.6	–29	2.5	–48	ns
MPQ-PRI	23.8	–13	14.6	–34	0.05
Number of pain sites	1.2	–41	1.2	–34	ns
Finger-to-floor distance (cm)	5.8	–35	4.5	–40	ns
5-min walk distance (m)	343.2	–11	359.2	+8	ns
PCS	18.4	–24	13.2	–50	0.05
TSK	37.6	–6	33.1	–16	0.05
BDI-II	15.7	–7	6.7	–58	0.001
PDI	32.4	–19	28.1	–27	ns

PGAP = Progressive Goal Attainment Program; MPQ-PRI = McGill Pain Questionnaire—Pain Rating Index; PCS = Pain Catastrophizing Scale; TSK = Tampa Scale for Kinesiophobia; BDI-II = Beck Depression Inventory—II; PDI = Pain Disability Index; ns = not significant

tures of pain catastrophizing ( $F(1,45) = 5.2, p < 0.05$ ), fear of movement ( $F(1,45) = 5.0, p < 0.05$ ), and depression ( $F(1,45) = 23.8, p < 0.001$ ).

### 12-Month Follow-Up

A two-way (group  $\times$  time) mixed ANOVA was conducted on pain ratings assessed at pre-treatment, post-treatment, and follow-up. Significant main effects were obtained for both group ( $F(1,46) = 4.3, p < 0.05$ ) and time ( $F(2,92) = 8.1, p < 0.01$ ). Participants in the Physio + PGAP group reported lower pain intensity, and their pain intensity ratings decreased over time. The pattern of means suggests a trend toward greater maintenance of gains in the Physio + PGAP group; however, the interaction term failed to reach statistical significance ( $F(2,92) = 2.0, p = 0.10$ ).

During the follow-up interview, participants were asked to indicate whether their pain symptoms persisted (see Table 4). All participants in the Physio group (100%) and the majority of participants in the Physio + PGAP group (87%) indicated that their pain symptoms persisted, albeit reduced in intensity ( $\chi^2 = 3.2, p = 0.07$ ). More participants in the Physio group (50%) than in the Physio + PGAP group (21%) reported still receiving some form of treatment for their pain condition ( $\chi^2 = 4.6, p < 0.05$ ). Physiotherapy and massage were the two most frequently reported types of treatment that patients were still receiving. More participants in the Physio group (62%) than in the Physio + PGAP group (33%) reported continued use of pain medication at 12-month follow-up ( $\chi^2 = 4.1, p < 0.05$ ).

A logistic regression was conducted to examine whether reductions in psychosocial variables accounted for group differences in the continuation of treatment. In this analysis, continued treatment (yes/no) was the dependent variable. Group was entered in the first step of the analysis, and pre- to post-treatment changes in the three psychosocial variables (pain catastrophizing, fear of movement, depression) in the second step. In the first step, group was a significant predictor of continued treatment: OR = 3.8 (95% CI: 1.0–13.5), Wald = 4.2,  $p < 0.05$ . When the psychosocial variables were entered in the second step of the analysis, group was no longer a significant predictor of the continuation of treatment: OR = 1.3, (95% CI: 0.28–6.2), Wald = 0.13,  $p = 0.71$ . Of

the psychosocial change variables, only reductions in depression emerged as a significant unique predictor of continued treatment: OR = 0.82 (95% CI: 0.71–0.95), Wald = 6.9,  $p < 0.01$ .

A logistic regression was also conducted to examine whether reductions in psychosocial variables accounted for group differences in the continued use of pain medication. In this analysis, use of pain medication (yes/no) was the dependent variable. Group was entered in the first step of the analysis, and pre- to post-treatment changes in the three psychosocial variables (pain catastrophizing, fear of movement, depression) in the second step. In the first step, group was a significant predictor of continued use of pain medication: OR = 3.3 (95% CI: 1.0–10.8), Wald = 3.9,  $p < 0.05$ . When the psychosocial variables were entered in the second step of the analysis, however, group was no longer a significant predictor of continued use of pain medication: OR = 3.1 (95% CI: 0.72–13.9), Wald = 2.3,  $p = 0.13$ . Of the psychosocial change variables, only reductions in fear of movement emerged as a significant unique predictor of continued use of pain medication: OR = 0.90 (95% CI: 0.81–0.99), Wald = 4.2,  $p < 0.05$ .

### Determinants of Return to Work

As part of the follow-up telephone interview, participants were asked whether they were currently working. Participants were classified as having returned to work if they were employed outside the home for at least 25 hours per week and were no longer receiving a salary indemnity. Participants in the Physio + PGAP group (87%) were more likely than participants in the Physio group (62%) to have returned to work ( $\chi^2 = 4.0, p < 0.05$ ). A logistic regression was conducted to examine whether the degree of reduction in psychosocial variables accounted for group differences in rates of return to work. In this analysis, return to work was the dependent variable. Group was entered in the first step of the analysis, and pre- to post-treatment changes in the three psychosocial variables (pain catastrophizing, fear of movement, depression) in the second step. In the first step, group was a significant predictor of return to work: OR = 0.24 (95% CI: 0.05–1.0), Wald = 3.7,  $p < 0.05$ . When the psychosocial variables were entered in the second step of the analysis, however, group was no longer a significant predictor of return to work: OR = 0.28 (95% CI: 0.05–1.6), Wald = 1.6,  $p = 0.17$ . None of the psychosocial change variables emerged as a significant unique predictor of return to work in this analysis.

**Table 4** Group Differences at 12-Month Follow-Up

	Physio (n = 24)	Physio + PGAP (n = 24)	p
Pain persists? (Y/N)	24/0	21/3	ns
Continued treatment? (Y/N)	12/12	5/19	0.05
Pain medication? (Y/N)	15/9	8/16	0.05
Working? (Y/N)	15/9	21/3	0.05

### DISCUSSION

The primary objective of the present study was to explore differences in the pattern of treatment-related changes that occur when a psychosocial intervention is

provided in addition to a physiotherapy intervention for work-disabled individuals with low back pain. Two samples of patients matched on demographic, injury-related, and psychosocial variables were compared on a number of clinical outcomes. At post-treatment, the two treatment groups did not differ significantly on measures of pain severity, physical function, or self-reported disability. The most marked differences between the two groups were on measures of psychosocial variables: patients in the Physio + PGAP group showed significantly greater reductions in pain catastrophizing, fear of movement, and depression than did patients who received the physiotherapy intervention only.

The absence of group differences in pain severity, physical function, and self-reported disability is not surprising, given that the two groups received comparable physiotherapy treatment. It is also not surprising that the Physio + PGAP group showed a greater impact in psychosocial variables, since PGAP was designed to target psychosocial risk factors for pain and disability. However, the reduction in psychosocial factors is meaningful only if reductions in these risk factors have an impact on other domains of clinical function. The results of the present study join a growing literature suggesting that reductions in psychosocial risk factors are an important determinant of rehabilitation progress.<sup>34,37–39</sup>

The present findings suggest that adding techniques targeting psychosocial risk factors can augment the impact of physiotherapy interventions in meaningful ways. Reductions in depressive symptoms accounted for group differences in post-treatment use of health care services. Reductions in fear of movement accounted for group differences in the continued use of pain medication during the 12-month follow-up period. Reductions in all psychosocial variables accounted for group differences in rates of return to work. The latter finding is consistent with previous research showing that reductions in catastrophic thinking, fear of movement, and depression may be key factors contributing to return to work in individuals with musculoskeletal conditions.<sup>16,37,40</sup>

It is becoming increasingly clear that traditional physiotherapy interventions, even in the absence of techniques designed specifically to target psychosocial variables, also yield significant reductions in psychosocial risk factors.<sup>16,39</sup> It is likely that many non-specific aspects of physiotherapy interventions, such as social contact, support, encouragement, education, and goal setting, yield reductions in catastrophic thinking, pain-related fears, and depressive symptoms. However, reductions in psychosocial risk factors in response to traditional physiotherapy may fall short of the threshold required to affect clinical outcomes such as analgesic intake, use of health care services, and return to work.

What distinguishes the present study from previous research is that return to work (as opposed to pain management) was the primary objective of the psycho-

social intervention. Research is beginning to emerge suggesting that symptom-focused interventions do not necessarily have an impact on functional outcomes.<sup>1</sup> Indeed, some distress-reduction interventions, such as prescribing opioids for musculoskeletal pain, may actually increase rather than decrease disability.<sup>41,42</sup> Many of the techniques included in pain-management programmes can be characterized as symptom focused, in the sense that they are aimed at reducing patients' physical and emotional distress. While distress reduction is an important part of treatment for individuals with musculoskeletal conditions, distress reduction alone does not increase the probability that an individual will return to work. The findings of the present study are consistent with previous research showing that pain reduction is not a primary determinant of return to work following rehabilitation of musculoskeletal injury.<sup>3</sup>

Combining physiotherapy with intervention strategies designed to target psychosocial risk factors for pain and disability may represent one of the most cost-effective approaches to the management of patients at risk of a problematic recovery. Routine evaluation of psychosocial risk factors can facilitate identification of clients who are at risk for chronicity, and providing at-risk patients with interventions that specifically target these risk factors may prevent the development of chronicity. In the past, patients with complex psychosocial risk profiles were identified only after their condition had already become chronic and resistant to treatment. Multidisciplinary programmes were considered one of the few viable approaches to treating these patients, but once their condition had become chronic, in combination with repeated treatment failures, even multidisciplinary treatment programmes tended to produce only modest improvements.

Although programmes such as PGAP may augment the impact of physiotherapy, there are significant barriers to incorporating such an approach into the practice structure of physiotherapy. For example, PGAP requires that the physiotherapist meet with the patient for 1 hour per week for up to 10 weeks; not all reimbursement systems can readily accommodate this type of intervention. Since PGAP can be provided only in an individual (as opposed to a group) format, the remuneration for providing this type of intervention may not be very attractive. Therefore, we must continue to examine alternative approaches to incorporating psychosocial techniques into the skill set of physiotherapists.

In rehabilitation, the boundaries of practice domains across various disciplines are becoming less distinct. A decade ago, it would have been unusual for a physiotherapist to deliver a standardized cognitive-behavioural intervention. Now research is emerging showing that psychosocial interventions delivered by physiotherapists can have a clinically meaningful impact on psychosocial risk factors such as catastrophic thinking and fear of



movement, and even on mental-health variables such as depression. As research continues to elucidate risk factors for problematic recovery, the key to clinical success will lie in the ability to develop risk-factor-targeted interventions that can be incorporated into the repertoire of primary-care clinicians. Since physiotherapy is a dominant primary care discipline for the treatment of musculoskeletal conditions, it is likely that physiotherapists will continue to be called upon to expand their repertoire of intervention techniques, many of which may originate from diverse disciplines of practice.

## LIMITATIONS

Caution must be exercised in interpreting these findings, since patients were not randomized to treatment. In addition, a number of statistical analyses yielded *p* values of 0.06 and 0.07, suggesting that the study may have been underpowered. The results are nevertheless sufficiently compelling to warrant clinical trials on approaches incorporating psychosocial techniques within the skill set of physiotherapists.

## CONCLUSIONS

The results of the present study suggest that a psychosocial intervention provided by physiotherapists can lead to meaningful reductions in psychosocial risk factors for pain and disability. The study also provides evidence that reductions in psychosocial risk factors can contribute positively to clinical outcomes such as reduced use of health care services, reduced analgesic intake, and increased return to work. As the training curriculum for physiotherapy expands to more effectively target a wider range of risk factors for prolonged pain and disability, it may become possible to detect and intervene on psychosocial risk factors at the level of primary care, and thus prevent the development of chronicity.

## KEY MESSAGES

### What Is Already Known on This Subject

There is increased recognition that psychosocial risk factors play a significant role in the development of chronicity following musculoskeletal injury.

### What This Study Adds

This study joins a growing literature suggesting that the skill set of physiotherapists can be enhanced to effectively manage the psychosocial risk factors that might contribute to chronicity. Physiotherapists trained to intervene on psychosocial risk factors may be able to increase functional abilities, improve return-to-work rates, and decrease use of health care services for clients who have sustained musculoskeletal injuries.

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