

Preventing disability from work-related low-back pain



New evidence gives new hope — if we can just get all the players onside

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Abstract

DESPITE THE PUBLICATION IN THE MID-1990S of comprehensive practice guidelines for the management of acute low-back pain, both in the United States and elsewhere, this ubiquitous health problem continues to be the main cause of workers' compensation claims in much of the Western world. This paper represents a synthesis of the intervention studies published in the last 4 years and is based on a new approach to categorizing these studies that emphasizes the stage or phase of back pain at the time of intervention and the site or agent of the intervention. Current thinking suggests that medical management in the first 3–4 weeks after the onset of pain should be generally conservative. Several studies of rather heterogeneous interventions focusing on return to work and implemented in the subacute stage (3–4 to 12 weeks after the onset of pain) have shown important reductions in time lost from work (by 30% to 50%). There is substantial evidence indicating that employers who promptly offer appropriately modified duties can reduce time lost per episode of back pain by at least 30%, with frequent spin-off effects on the incidence of new back-pain claims as well. Finally, newer studies of guidelines-based approaches to back pain in the workplace suggest that a combination of all these approaches, in a coordinated workplace-linked care system, can achieve a reduction of 50% in time lost due to back pain, at no extra cost and, in some settings, with significant savings.

Résumé

EN DÉPIT DE LA PUBLICATION, AU MILIEU DES ANNÉES 90, de guides de pratique détaillés sur la prise en charge de la lombalgie aiguë, tant aux États-Unis qu'ailleurs, ce problème de santé très répandu demeure la principale cause de demandes d'indemnisation des accidents du travail dans la majeure partie du monde occidental. Ce document, qui résume les études d'intervention publiées depuis 4 ans, est fondé sur une nouvelle façon de classer ces études qui met l'accent sur le stade ou la phase de la dorsalgie au moment de l'intervention et sur le lieu ou l'agent d'intervention. On pense actuellement que le traitement médical au cours des 3 à 4 premières semaines après l'apparition de la douleur devrait généralement être conservateur. Au stade sub-aigu (3 ou 4 à 12 semaines après l'apparition de la douleur), plusieurs études effectuées sur des interventions plutôt hétérogènes axées sur le retour au travail ont révélé d'importantes réductions (de 30 à 50 %) du temps de travail perdu. D'importantes données probantes indiquent que les employeurs qui offrent rapidement des fonctions convenablement modifiées peuvent réduire d'au moins 30 % le temps perdu par épisode de dorsalgie, ce qui a souvent des retombées secondaires sur l'incidence des nouvelles demandes d'indemnisation pour dorsalgie. Enfin, de

Education

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An earlier version of this article was issued by the Institute for Work & Health in May 1997 as part of its Working Papers series (no. 43).

This article has been peer reviewed.

CMAJ 1998;158:1625-31



nouvelles études sur des façons d'aborder la dorsalgie au travail fondées sur des guides indiquent qu'une combinaison de toutes ces méthodes, dans un système coordonné de soin en milieu de travail, peut réduire de 50 % le temps perdu à cause de la dorsalgie, sans entraîner de coûts supplémentaires. Dans certains contextes, il pourrait même en découler des économies importantes.

Only 4 years have elapsed since the publication of the comprehensive guidelines of the US Agency for Health Care Policy Research (AHCPR) on the evidence-based management of acute low-back pain.¹ However, several helpful new studies have already appeared concerning the secondary prevention of disability due to back pain (and especially long-term work absence) after the onset of symptoms. Making sense of these studies requires that they be categorized with respect to 2 organizing principles: the *stage* or *phase* of back pain at which intervention occurs and the *site* or *agent* of the intervention (also sometimes described as the stakeholder) — clinician's office, workplace, or an insurer or third-party payer.

In this article we lay out the rationale for these organizing principles, summarize the key recent studies offering new hope that disability due to work-related back pain can be prevented, and discuss the challenging next step in implementing these new interventions: getting all the societal players with a stake in the problem to work together.

The importance of stage of back pain

It is a decade since the landmark report of the Quebec Task Force on Spinal Disorders was published.² In that report a great deal of attention was given to the staging of low-back pain and associated disability. The task force chose to demarcate the first 7 weeks of pain as a distinct "acute stage," with a prognostic picture and therapeutic and rehabilitation challenges very different from those of the later, "subacute stage." However, both our thinking about the natural history of this condition³ and the evidence concerning its early treatment¹ have shifted in the intervening years.

The conceptual shift

It is illuminating to ask the following question of clinicians experienced in the primary care management of low-back pain resulting in time lost from work: "At what point in the course of this condition do you consider the acute phase over and your thinking about the case to have fundamentally changed? That is, when do you become *really concerned* about failure to recover and the associated risk of long-term disability?" In most cases such clinicians tend to reply, "About 3 or 4 weeks after onset" — considerably sooner than the 7-week point defined by the Que-

bec task force as the end of the acute stage (Dr. Ed Gibson, formerly medical director of Dofasco Inc., Hamilton, and professor of clinical epidemiology and biostatistics, McMaster University, Hamilton: personal communication, 1991).

A natural justification for this cutoff point is the shape of the return-to-work curve depicting the proportion of people receiving compensation who are still off work at various times after the onset of back pain. Such curves can be produced readily from workers' compensation data on duration of wage replacement (Fig. 1).⁴ These curves typically show that the rate of cessation of benefits (a proxy for return to work) — which is a function of the slope of the curve — is greatest soon after time off begins and then drops steeply within weeks, after which there is an ever-declining rate that approaches zero. After some months of time off work, the condition of those still receiving benefits tends to remain chronic, and the prospects of returning to work are poor.

It is therefore easy to show that, for any level of treatment effectiveness, the "number needed to treat" to prevent a single case from passing into chronicity at 6 months off work² drops swiftly over the first month and then remains rather stable.⁴ The inherent efficiency of any treatment thus improves rapidly over the first month after time off begins. Early treatments offered nonselectively to all patients are inherently inefficient simply because it is difficult to accelerate, with treatment, the already high rate of return to work in the first weeks after the onset of pain.

The evidentiary shift

The better-quality intervention studies that have followed the exhaustive AHCPR review suggest that patients with low-back pain who have experienced more than a month or so of time lost from work are paradoxically more treatable than unselected patients seen earlier, in terms of demonstrated treatment benefits, even though they have a worse prognosis. These new studies further substantiate one of the main messages in the AHCPR guidelines: with the possible exception of spinal manipulation, clinical interventions appear by and large to be ineffective (not simply inefficient, as argued above in terms of the "number needed to treat") in reducing subsequent disability *unless* they are targeted to people who are still disabled and off work after the initial acute phase is over,



by which time there is a much higher, and more imminent, risk of chronicity.^{4,6}

Several recent randomized controlled trials (RCTs) and cohort studies suggest that early exercise instruction, physiotherapy, and early activity and education programs are ineffective in changing longer-term outcomes, such as pain and functional status, when implemented in the first weeks after the onset of symptoms.⁷⁻⁹ These results corroborate the negative findings of a Canadian controlled trial of early physiotherapeutic exercise instruction in primary care.¹⁰⁻¹²

Studies of the capacity of early spinal manipulation to reduce disability, as measured by time lost from work, have yielded conflicting results. Manipulation-oriented chiropractic care has been shown, in studies of differing quality, to reduce pain and improve patient satisfaction.¹³⁻¹⁷ In a cohort study in North Carolina, which included both workers' compensation patients and others, Carey and colleagues¹⁸ examined chiropractic versus other types of care (provided by general practitioners in various health care settings or by orthopedic surgeons). Their findings suggested that there was no difference in longer-term outcome between chiropractic care and general-practice care in the capitated health management organization setting (for care given in the first 10 weeks after the onset of back pain), but that the cost of chiropractic treatment to achieve the same eventual outcome was substantially higher. In contrast, a similar cohort study, based only on workers' compensation cases in California, suggested shorter durations of work absence for patients receiving chiropractic care than for physicians' patients.¹⁹ Among

claimants without permanent impairment, however, savings in wage replacement costs were almost offset by higher health care costs for chiropractic treatment. Among permanently impaired claimants, chiropractic treatment generated savings in both wage replacement benefits and health care costs, relative to physician care. Both cohort studies made laudable efforts to control for selection biases through multivariate analysis, but residual confounding due to self-selection for unmeasured patient characteristics of prognostic importance, such as initial pain and severity of disability, cannot be ruled out completely in these nonrandomized studies.

But what of the positive studies of early intervention, such as the often-cited RCT of McKenzie physiotherapy versus a placebo-like "mini-back-school," by Stankovic and Johnell,^{20,21} and the Swedish RCT of early combined medical and physiotherapy management in health care workers versus a control group receiving delayed usual care?²² The former study showed a reduction of about 33% in "sick-listing" (episodes of time lost from work) and a reduction of 40% in recurrences over 5 years. The latter showed a statistically significant effect (of unreported magnitude) on all lost time, including an 8-fold reduction in episodes of over 120 days' duration, but only in a randomized group of patients with no back injury in the previous 2 years. On closer examination, these studies suffer from one or both of 2 methodologic weaknesses: failure to control for nonspecific "attention effects" or placebo effects (widely thought to be critical in care of acute low-back pain¹) and failure to perform clear intention-to-treat analyses,²³ especially to control for differen-

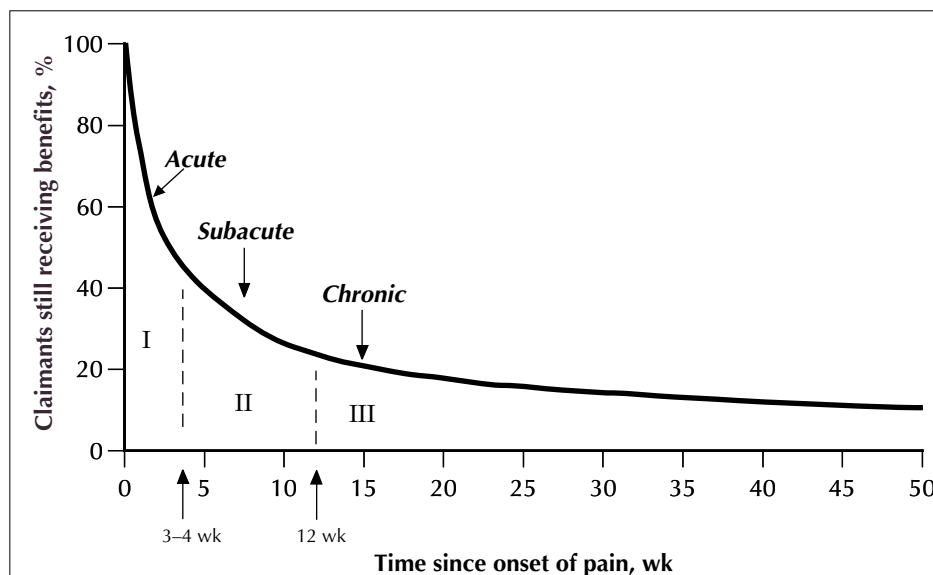


Fig. 1: Three-phase model of low-back pain, showing proportion of people receiving compensation from the Ontario Workers' Compensation Board in 1991 who were still off work at various times after the onset of symptoms. Reproduced, with permission, from Frank and colleagues.⁴ © 1996 Lippincott-Raven Publishers.



tial early attrition in the Swedish trial's early-treatment and later-treatment arms, which might have led to biased comparisons.

On the other hand, for the subacute phase (in current thinking, 4 to 12 weeks after the onset of symptoms, since chronicity is now thought to begin at 3 months^{1,4}) 3 RCTs have provided good evidence of relatively large reductions (by 30% to 50%) in time lost from work because of widely differing interventions for patients still off work 6 to 8 weeks after the onset of symptoms.²⁴⁻²⁶ The 2 more recent studies^{24,25} corroborated the earlier demonstration, in a methodologically exemplary trial,²⁶ of an effect of similar magnitude of intensive work conditioning targeted specifically to the physical demands of each worker's job, in a setting closely affiliated with the workplace, beginning 8 weeks after the onset of symptoms. Indeed, despite an average intervention cost per patient of over \$5000, this program saved \$5 for each dollar spent.²⁷ Indahl and associates²⁵ assessed the effect of a comprehensive review, including CT and muscle-strength testing, of each case by a medical specialist. A great deal of reassurance was given to each patient, particularly regarding the safety of returning to usual activities. Loisel and collaborators^{24,28} compared the effects on time to return to work of 4 intervention packages, to which workers with back injuries were referred after they had been off work for 8 weeks, at 31 different Sherbrooke, Que., firms randomized in a cluster-factorial design. The 4 packages were comprehensive examination and case review by a specialist, accompanied by specific occupational rehabilitation where indicated; participatory ergonomic intervention at the workplace to reduce biomechanical spinal loading in the "job of injury" (both to maximize workplace accommodation of the worker and early return to work and to prevent recurrence); both of these treatments; and "usual care." The largest effect by far — a reduction of 50% in time lost from regular work in the first year of follow-up — was from the participatory ergonomic intervention, with case management by a specialist contributing little additional benefit.

Overall, the interventions tested by these 3 positive subacute-stage studies are rather heterogeneous. This suggests that it may not matter very much exactly what care is provided to patients off work because of back pain for 6 to 8 weeks, as long as the intervention is closely related to the workplace or at least is tied explicitly to the specific goal of "return to work."^{1,29,30}

How can these apparently paradoxical results be squared with conventional clinical wisdom regarding soft-tissue injuries — which states that earlier treatment is better — especially given the notorious unresponsiveness to treatment of cases of more than 3 months' duration?³¹⁻³³ Two broad principles emerge. The first is that early ag-

gressive treatment in the acute phase has the potential for iatrogenesis. Among the legions of patients with low-back pain who are off work for less than a few weeks, there are many who would do well without any treatment.^{1,4} Some of these patients are at risk for increased sick-role behaviour and, consequently, a longer period of disability as a result of well-intended treatment programs that are too intensive for the expected prognosis at this stage and thereby potentially iatrogenic. Several early-intervention studies have demonstrated this trend,^{1,9,11} even if the adverse effect on recovery was not always statistically significant, as in the RCT by Malmivaara and coworkers.⁸

A particularly intriguing example is a recent cohort evaluation of an early active rehabilitation program for patients with back pain or other soft-tissue injuries receiving workers' compensation in Ontario.⁷ The program, provided at over 100 clinics throughout the province, involved daily sessions, with a strong emphasis on active exercise and patient education, for 4 to 6 weeks. The program was evaluated by the Early Claimant Cohort study carried out by the Institute for Work & Health, Toronto, in collaboration with the Ontario Workers' Compensation Board (now the Workplace Safety and Insurance Board). Over 1500 workers with new soft-tissue injuries resulting in time lost from work (half of whom had low-back pain) were interviewed on up to 5 occasions each over 1 year of follow-up. Comprehensive baseline and repeat measures of personal, job-related and selected psychological risk factors for chronicity were collected, as well as generic health-related quality-of-life and injury-specific measures of pain and functional status. These primary data were then merged with workers' compensation claim-file data to allow analysis of health outcomes and of benefits and work status. The clinic patients were compared with controls, who received usual care. The investigators carried out extensive testing for possible confounding in this nonrandomized observational study, using multivariate statistical methods. In the end, little confounding was found, presumably because referral to the clinics by primary care physicians occurred early, in many cases so early that no rational (i.e., prognosis-based) case selection for referral was possible, because there had been only 1 or 2 physician-patient encounters.

Patients who attended treatment clinics were off work 1 week longer on average than patients receiving usual care ($p = 0.47$ for women and $p = 0.02$ for men in the short term, with near-identical sample sizes by sex). However, there were no long-term statistically significant differences between the 2 treatment groups in duration of benefits. The investigators pointed to the fact that about half the patients who attended treatment clinics received treatment physically and organizationally unrelated to the workplace, beginning within 2 weeks after the onset of



symptoms. Furthermore, the province-wide clinic program consisted of daily sessions, with per diem reimbursement of service providers up to a maximum treatment duration of 6 weeks. In sum, too many patients with soft-tissue injuries who had otherwise good prognoses were being seen too early, and for too long, too far from the workplace, so that no additional benefit over regular care resulted.

The second principle is that an essential element of the success of subacute-stage intervention in returning people with back injuries to work (in all but the trial by Indahl and associates²⁵) has been to involve the workplace explicitly in the management process. This should ideally include workplace visits by rehabilitation professionals to assess the job in question and, where appropriate, to negotiate worker-specific job modification. This finding is perhaps not surprising, given that failure to return to work within a few weeks is often the result of a failed social transaction regarding accommodation in the workplace. This problem is amenable to techniques akin to those used in dispute resolution and the provision of incentives aimed at both the firm and the worker.^{4,34-39}

One other common thread exists in the studies demonstrating success of subacute-phase intervention. Patients were thoroughly reassessed clinically at 6 to 8 weeks to rule out relatively rare, specifically treatable conditions,¹ and a management plan focused on return to work was communicated clearly to all parties: the worker, the employer, health care professionals and the insurer.

The importance of the site or agent of intervention

Above and beyond distinguishing clearly between the effectiveness and efficiency of acute-phase versus sub-

acute-phase interventions of a clinical sort, the current literature suggests something that the AHCPR guidelines did not with respect to workplace-based intervention strategies. The AHCPR experts, whose focus was health care, did not pay attention to several workplace intervention studies, with a range of quasi-experimental designs, that have consistently shown reductions of 30% to 45% in the duration of time lost per reported injury.³⁴⁻⁴⁵ Moreover, there are often substantial additional reductions as workers with less severe injuries voluntarily choose modified duties immediately rather than incur any lost time and as deeper changes in “workplace culture” are brought about by accommodative responses to reports of health problems. These results have been seen with a wide range of specific workplace programs, nearly all of which have emphasized offering temporarily modified duties. Workplace intervention “packages” that have been tested and reported repeatedly include “comprehensive disability management,” in which appropriately modified work is offered according to the injured worker’s clinically or functionally assessed physical capacity,^{40,43-45} sympathetic communication with the worker and nonadversarial handling of workers’ compensation claims,⁴¹ and a mixture of approaches.³⁷ Although many of the individual studies have design flaws (co-intervention, clearly unequal controls and uncontrolled confounding, or inadequate sample size or follow-up), the overall body of evidence has now become persuasive by virtue of the large effect sizes reported and their consistency.^{34,37,42} Of special note is the repeated theme in these studies that a supportive workplace response to injury needs to start when the pain is first reported; an individualized and accommodative approach to return to work should follow promptly.

Finally, newer studies document reductions of up to 50% in both time lost from work and health care costs

Table 1: Factors contributing to onset of chronic disability from low-back pain at work and recommended solutions

Stage (wk after onset of symptoms) and contributing factor	Recommended solution	Potential reduction in time lost from work,* %	Key stakeholder†
Acute (3-4 wk)			
Clinical iatrogenesis ^{41,47}	Guidelines-based care by primary providers (e.g., decision aids, educational materials, academic detailing)	50	Patients, care providers, payers
Inappropriate workplace response ^{10,36}	Workplace interventions focused on prompt accommodation (e.g., modification of work duties)	30	Patients, employers, labour unions, payers
Subacute (3-4 to 12 wk)			
Mind and body processes leading to chronic pain syndrome ^{22,26,29}	Intensive work-related case management <ul style="list-style-type: none"> • quota-based exercise program • comprehensive case review • ergonomic work adjustment 	35-50	Patients, employers, labour unions, care providers, payers

*After intervention.

†These parties must be involved in order for recommended solution to work well.



from guidelines-based approaches to the clinical diagnosis and treatment of back pain and other soft-tissue injuries. Wiesel and colleagues⁴⁶ have presented data suggesting that guidelines-based management in the workplace, by agents acting in conjunction with insurers and third-party payers to manage low-back pain from day 1 (including greatly increased use of modified work⁴²), can reduce both the incidence and the duration of disability resulting in time lost from work (by 51% and 40% respectively compared with preintervention levels). One is forced to conclude that much of this preventable disability is brought on by essentially “pathogenic” patterns of nonaccommodative workplace response and substandard primary care, such as those discouraged by the AHCPR guidelines. Similar effects were found for guideline-like primary care management by self-selected physicians with a practice style⁴⁷ sensitive to opportunities for preventing occupational disability.

Putting it all together

Table 1 summarizes the 3 underlying factors contributing to the genesis of potentially preventable disability from occupational low-back pain — the targets, as it were, of the successful interventions evaluated in the studies that we have described. Also set out are the solutions evaluated, the demonstrated effects on time lost from work and the societal stakeholders who must be involved in addressing these factors.

So what's the next step?

Although the picture painted here is encouraging, there is a thorny practical problem: How can all the relevant societal players be brought together, and their roles coordinated, so as to bring reason to bear on this multifactorial problem? This is a challenge, given that some of the players have historically taken a narrow, self-interested view, seeking to push off the costs and difficulties onto others. For example, some insurers and third-party payers have little incentive to reduce disability, because their own volume of business or profit margin depends on both the volume of cases and the duration of disability (i.e., total payouts).

We suspect that there is no easy answer here: each community must look for opportunities to persuade these diverse interests that they can all gain from collaborative problem-solving to reduce disability from work-related back pain. Furthermore, the evidence now accumulating suggests strongly that piecemeal approaches, based at only one stakeholder site or addressing only one phase of disability and targeted to only one of the underlying factors, will not work well. Such approaches are far

less likely to result in disability prevention efficiently than are joint efforts spanning groups of stakeholders and tackling both the acute and subacute phases. This is in essence the critical message of the very sound policy statement issued by the Canadian Medical Association on this question in 1997.^{48,49} In other words, as in the preservation of the English commons of 2 centuries ago,⁵⁰ it is only by engaging all those with a common stake in the issue and obtaining their active collaboration that this important cause of disability can be controlled successfully in our time.

We thank Ann-Sylvia Brooker, Judy Clarke, Pierre Côté, Jaime Guzman, Gwen Jansz, Mickey Kerr, Andreas Maetzel, Bob Marx, Michael Mondloch, Jennifer Payne and Lina Santaguida, all of the Institute for Work & Health, Toronto, for their structured reviews of the papers summarized here. We also thank Emma Irvin, Institute for Work & Health, for library assistance.

The Institute for Work & Health is an independent, not-for-profit research organization, which receives support from the Workplace Safety and Insurance Board of Ontario. Ms. Beaton is supported by a PhD fellowship from the Medical Research Council of Canada.

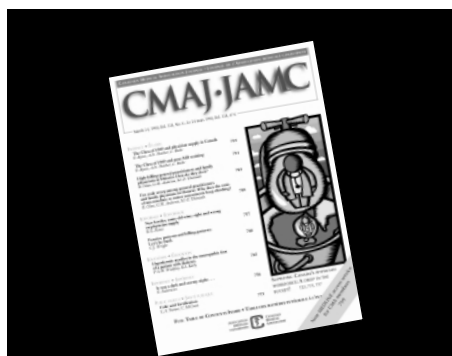
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