

What We Know About the Timing and Site of Interventions for Soft-Tissue Injuries of the Low Back, Neck and Upper Extremity

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INTRODUCTION

Low back pain, neck pain and arm pain are among the most common causes of disability and handicap in industrialized countries. Taken together, they represent the majority of compensable injuries in Canada and the largest burden of cost and suffering [1]. Although they are poorly understood, they are most often changes in soft tissues - i.e., muscles, tendons, ligaments, joints and nerves - in contrast to fractures or other bony disorders. When linked to work, they are often termed Work Related Musculoskeletal Disorders (WMSD), although application of this term is often limited to non-traumatic neck and arm disorders. In the last two decades we have witnessed remarkable changes in the suggested approaches to treatment and work rehabilitation of those with soft tissue disorders, based on slowly accumulating evidence that issues of timing, site and type of interventions are crucial.

This paper aims to describe these approaches. We start with clarification of the nature and burden to society of these disorders followed by a description of their usual course over time, both clinically and administratively. We support the staged approach to assessment and treatment, sharing the best, most relevant evidence available. Finally, we set out several important ongoing issues and suggest some avenues for responding to them.

NATURE AND BURDEN OF SOFT-TISSUE INJURIES

Evidence suggests that between 50% and 80% of the population in industrialized countries will experience back pain during their lifetime [2]. *Occupational* back pain is low back pain either “caused” by work or exacerbated by work [3]. It may result from a traumatic incident such as a fall or a blow, or from repetitive or continuous exposure to physically heavy work, whole-body vibration, bending and twisting or static sedentary posture [4-6]. Growing evidence suggests psychosocial stressors at work also play a role [2,4,6-8] in both the development and the recovery from back pain. Cases of back pain typically constitute the largest single category of lost-time claims to Workers’ Compensation Boards in North America - approximately 30% of all lost time claims are for back injuries [9,10] and the majority of back claims are for sprains and strains.

WMSD of the upper extremity are a multi-faceted group of disorders affecting soft-tissue structures extending from the neck to the hand which are “caused” by or aggravated by work. This group of disorders includes the conditions commonly referred to as “repetitive strain injuries” or “cumulative trauma disorders”. They can be non-specific in nature and present as pain, swelling and discomfort, or be specific pathologies such as carpal tunnel syndrome and epicondylitis. Statistics on the overall incidence of WMSD of the upper limb vary greatly from source to source, due to large variations in how these types of injuries are labeled, classified, and identified [11]. But regardless of how WMSD of the upper extremity are identified, most sources agree that the incidence rate is increasing [12,13]. High incidence and prevalence of WMSD of the upper limb has been found in particular occupational groups and associated with highly repetitive work involving continuous movements and forceful exertion of the arm or hand. In addition, psychosocial factors such as workplace stress [6] are associated with WMSD.

Occupational neck pain is common in the working age population [14]. As for WMSD of the upper extremity, it likely results from a combination of work-related physical and psychosocial factors. Because little is known about the rehabilitation of occupational neck pain, we borrow information from another type of commonly compensated neck pain: Whiplash Associated Disorders (WAD). Although WAD typically result from traffic

collisions, they share common characteristics with work-related soft-tissue injuries, and so they will be discussed here.

COURSE OF THESE DISORDERS

Clinical course refers to the course of a disorder from diagnosis to recovery [15] as observed by a clinician. However, when claims for disability are the primary focus of interest, we are concerned with the “administrative course”, often represented by the length of time receiving wage-replacement benefits from an insurer. For injuries associated with workers’ compensation, the starting point refers to the reported accident date. There are striking similarities in the administrative course of back pain claims, upper extremity WMSD claims and WAD claims. Figure 1 shows the percentage of claimants still receiving benefits at particular points in time post-accident date for low back sprain/strain claimants to the Ontario Workplace Safety Insurance Board¹ (WSIB) (1991), upper extremity WMSD claimants to the Ontario WSIB (1992) and WAD claimants to the Québec Société d’assurance automobile du Québec (SAAQ) (1987)². All three curves are characterized by a very steep descent at the beginning suggesting that for many people, prognosis is good and the injury resolves quickly. Typically, the majority of costs of claims for soft-tissue injury claims are incurred by the small proportion of the claimants with prolonged disability - ie., those who do not recover in the first few weeks [16-18]. Variations in the curve may be found in different jurisdictions, or for particular subsets of injuries such as carpal tunnel syndrome [19] - although the basic shape remains similar.

When appraising the administrative course of a condition, It is important to remember that the accident date may have different meanings for different claimants. For those

¹ The Workers’ Compensation Board of Ontario was renamed the Workplace Safety Insurance Board of Ontario in January 1998.

²Data for Whiplash Associated Disorders originally appeared in Spine (1995) 20(8S): page 16S Table 3 and Figure 3. These data were used here with permission from the editorial coordinator of the Spine supplement [17].

experiencing a traumatic event, such as a motor vehicle accident or a fall, the accident date represents the actual date of the incident. However, for repetitive strain injuries to the back, neck upper limb, the accident date does not necessarily correspond to the appearance of symptoms, but rather to the date when the worker was no longer able to cope with work due to their problem. For instance, a study of RSI claimants to the Manitoba WCB showed that the claim was filed on average eight months after symptom onset [20]. And in a study of primary care shoulder complaints in the Netherlands, 49% of participants had been experiencing symptoms for over one month prior to their first doctor visit [21]. Also in a recent Institute for Work & Health study of newspaper workers, only a small subset of workers with pain and symptoms reported those symptoms to the workplace or filed a claim [22]. Therefore, the onset of the administrative course may occur at different points in the clinical course of the disorder which implies that therapeutic interventions may be more appropriately based on clinical course rather than administrative course of a condition.

PHASING AND STAGING

It is useful to consider three stages of recovery, using time since onset as depicted in Figure 2. These stages were introduced for occupational low back pain (for which most of the research on soft-tissue injuries has been carried out) by Frank et al [3] who were building upon the work of the Québec Task Force on Spinal Disorders [23]. Stage 1, the acute stage, extends from symptom onset up to three or four weeks later. Importantly, it is during this stage that the steepest decline in the duration curve occurs. The percentage of cases recovering during this stage depends on the setting of interest; in a primary care setting (where cases include a range of symptom severity and claimant status) approximately 90% of cases will recover in the first four weeks [24,25]. In a workers' compensation setting, however, approximately 50-60% of claimants will be on wage replacement benefits for four weeks or less. These differences may be explained by differences in severity of symptoms or in duration of symptoms. Evidence suggests back pain sufferers who file lost-time claims and miss time from work are experiencing

more severe symptoms [26,27] than non-claimants. Therefore, they may take longer to recover than someone visiting the doctor for the first time, with milder symptoms. Regardless of setting, the course of these conditions is favourable, with the majority recovering in Stage I. The second stage - the subacute stage - lasts from about three or four weeks up to about twelve weeks after symptom onset. During this second stage, the recovery rate slows down considerably. After twelve weeks, many experts suggest that early chronic pain syndrome has set in [3]. In this third stage, the recovery curve is very flat, indicating a very slow recovery rate for those with unresolved problems. The percentage of claimants remaining on benefits at one year post accident varies from 5-10% depending on the jurisdiction of interest [16,19,28].

For Whiplash Associated Disorders, the Québec Task Force [17] provided a grading system based on initial clinical findings (pain, symptoms, range of motion, point tenderness, neurological signs, X-ray findings) rather than staging alone. Grade I WAD applies to a case where there is pain, stiffness or tenderness but no physical signs. If there are musculoskeletal signs (decreased range of motion and point tenderness) then the WAD is grade II. Grade III WAD is appropriate when neurological signs and symptoms are present. Grade IV WAD, where the injury involves a fracture or dislocation, is not considered further here. The Task Force's guidelines for care are based on both grade of WAD and key time points since onset (i.e., stage). Here again, the interval between three and twelve weeks post-onset represents the critical time to prevent chronicity.

As for back pain and WAD, the course of many upper extremity conditions is often acute and self-limiting [11,21,29,30]. The relevant stages for upper extremity disorders are more difficult to ascertain, partly due to the wide variation in duration of symptoms at the time of clinical presentation [21,29,30]. Staging initially proposed in Australia for RSI [31] has not been widely adopted. Different disorders have varying relevant time courses: two and six weeks for wrist tendinitis [32] to weeks to months for lateral epicondylitis [33]. For shoulder disorders treated by Dutch primary care practitioners,

rates of recovery by one and three months varied from a high of 38% and 67% for acute bursitis, through 20% and 38% for rotator cuff tendinitis to a low of 8% and 32% for chronic bursitis [21].

Such reports of clinical studies use similar time points as in low back pain and neck studies. In a case series of neck and arm pain in office workers, Patkin [34] found that the majority (75%) of those with less than one month of symptoms recovered but that this dropped considerably for those with symptoms of two months duration (50%) and three to twelve months of symptoms (29%). In a case series of patients presenting to a clinic specializing in work-related upper extremity disorders, rates of return to work for those with symptoms of less than six months duration (70%) were substantially higher than those with symptoms of greater than six months duration (41%)[29]. Hence current evidence suggests that for broad descriptive purposes, one month and three month time periods may also be useful for the definition of stages.

INTERVENTIONS BY STAGE

Because of the favourable course of WMSDs, it is important to review the scientific evidence on treatment based on the stages described above. Here we focus on the stage (when?), the site (where?) and the nature of the intervention (what?). Based on the typical administrative history, **a sensible case-management objective** for soft-tissue claims could be to prevent long-term disability by providing appropriate care and interventions while avoiding over-treatment of those cases most likely to recover quickly. Over-treatment in the early stages of WMSDs can lead to iatrogenesis - that is, further problems and complications caused by a physician's treatment [3,35]. There are still many gaps in the current scientific evidence so our summary includes evidence available to date. Various efforts have been undertaken to produce systematic algorithms for managed care [32,36]. But the relationship between these decision rules and the scientific evidence is not always transparent. Note that "insufficient evidence" does not mean there is evidence against a particular intervention; it does mean there

have been insufficient studies of high quality to determine whether a particular intervention is useful or not. Unfortunately, this is true for the majority of health care interventions [37].

Back Sprains/Strains - The Acute Stage

An extensive review of the available evidence for medically prescribed treatment for acute low back pain was released by the Agency for Health Care Policy Research in December 1994 [24]. The panel focused on studies with patient-oriented clinical outcome measures i.e., symptom relief and improved functioning. Despite an extensive literature search which yielded approximately 4000 articles for critical review, the panel found very few studies meeting high scientific standards. However, the panel did provide recommendations for the clinical care of acute low back pain, based on scientific evidence available and the panel's clinical experience. The AHCPR guidelines suggested that in the absence of red flags for serious underlying conditions, diagnostic tests are rarely necessary (e.g., X-ray, MRI) and that the best approach in the first four weeks is reassurance, promotion of activity (such as return to regular activities including work as soon as possible), use of over-the-counter medication and spinal manipulation for pain relief. Although early return-to-work is recommended, the AHCPR guidelines acknowledge that: "specific activities known to increase mechanical stress on the spine, especially prolonged unsupported sitting, heavy lifting, and bending or twisting the back while lifting" (page 50 [24]) should be avoided initially and that modified work may be appropriate. Also, for employed patients, health care providers need to "consider the patient's age and general health, and the physical demands of required job tasks" (page 50 [24]).

Since the release of the guidelines, a number of scientific studies on interventions for back pain have been published. The studies underwent critical appraisal [38] with attention given to methodological quality, applicability to Canadian compensation settings, effect of treatment on return to work outcomes and the nature and timing of the intervention. The evidence to date is reviewed below for four types of intervention in the

acute stage of low back pain. These four categories represent the more common treatments which are paid for by workers' compensation boards and have an existing body of useful evidence concerning their effectiveness.

Physiotherapy and Exercise

The AHCPR panel did not evaluate the evidence on physiotherapy as a whole, but summarized evidence regarding therapeutic modalities used by physiotherapists such as physical agents and modalities (ice, heat, massage, ultrasound, electrical stimulation), transcutaneous electrical nerve stimulation (TENS), exercise and manipulation. The panel concluded there was insufficient evidence to support the use of physical agents and modalities or TENS in a clinical setting. Nevertheless, the panel acknowledged that some patients with acute low back pain obtain symptom relief with physical agents and modalities and therefore they recommended application of heat and cold at home.

Since the release of the guidelines, several high quality studies [39-42] of physiotherapy and supervised exercise programs in the acute stage of injury showed no benefit in terms of time until return to work, pain levels, or functional status.

Spinal Manipulation and Chiropractic Care

The AHCPR panel concluded that the evidence supports the use of spinal manipulation, most commonly performed by chiropractors (but also by some physiotherapists and primary care physicians), to reduce pain and improve functioning within the first month of symptoms. Since the release of the guidelines, further evidence suggests spinal manipulation relieves pain and symptoms during the acute stage of low back pain [43,44]. Patients receiving chiropractic care tend to be more satisfied with their care than patients receiving other types of care [45]. However, as far as returning workers more rapidly to work, the evidence is mixed. A systematic review [46] suggests there is moderate evidence of a short-term positive effect of spinal manipulation over other treatments like physiotherapy. One recent study [45], which included both claimants and

non-claimants, suggests that spinal manipulation does not lead to more rapid functional recovery but costs more than care provided by primary care physicians and orthopaedic surgeons. On the other hand, another recent study of workers' compensation claimants in California showed shorter durations of work absence for those claimants receiving chiropractic care as opposed to physician care [47]. However, the reduced costs for wage-replacement benefits were "more than offset by higher health care costs" [47] associated with chiropractic care.

Back Schools and Formalized Educational Interventions

Two structured reviews [46,48] of back schools and/or group education interventions found mixed results and insufficient details on the content of the programs to allow meaningful comparisons of results. Both reviews concluded there is insufficient evidence to determine the efficacy of these interventions within three months of pain and symptom onset with respect to time away from work.

Medications

The AHCP panel [24] concluded that "relief of discomfort can be accomplished most safely with **nonprescription medication** (nonsteroidal anti-inflammatory drugs (NSAIDs) or acetaminophen) and/or spinal manipulation". The panel also concluded that muscle relaxants and opioid analgesics could be used, but with caution since they may lead to side effects or complications. Currently, reviews of NSAIDs and muscle relaxants for the treatment of acute low back pain are underway as part of the Cochrane collaboration.

Workplace Interventions

In a recent study, a multidisciplinary early intervention program for nurses with compensable back injuries was evaluated at a Manitoba teaching hospital [49,50]. The intervention started immediately after injury and included assessment and treatment by a physiotherapist under the guidance of a physiatrist, occupational therapy for those still off work after four days of lost-time and modified work for up to seven weeks. Compared

to a control group of nurses, the intervention resulted in a decrease of compensable lost-time back claims in the study group and a decrease in amount of time lost and WCB costs. It also led to reductions in pain and functional disability [50].

Back Sprains/Strains - The Subacute Stage

We can expand upon the AHCPR work [24], not only by adding more recent studies [35], but also by considering interventions provided in the subacute stage, and interventions offered outside of a clinical setting. Two recent studies of high quality [38], show promising results.

A graded activity program, provided to blue collar workers who had been on sick leave due to low back pain for eight weeks at a Swedish automobile manufacturer, was evaluated using rigorous methods [51]. The program did not involve any ergonomic changes to the workplace but did include an evaluation of functional capacity, a workplace visit to assess workplace demands, back school for education about back problems, and a graduated exercise program geared to the work demands of the individual workers. Workers who received the graded activity program had at least 30% less sick leave in both the first and second year of the study.

A second study conducted in Québec [52,53] involved 31 workplaces in one city. The intervention was targeted at workers who were absent from work due to low back pain for six weeks. There were two components to the intervention. One component, the “occupational” intervention consisted of a visit to an occupational physician for direction to appropriate care and a participatory ergonomics evaluation involving an ergonomist, the worker, the supervisor and representatives of both management and union. From the ergonomics evaluation, “precise solutions to improve the worksite were submitted to the employer” - i.e., permanent solutions to change the work situation. The “clinical” component started after eight weeks of work absence. It involved a visit to a back pain specialist, back school, and for workers still off work at twelve weeks, a multidisciplinary work rehabilitation intervention. The intervention led to a 50% reduction in duration of

absence, and most of the reduction was attributed to the occupational component of the intervention (although the sample size in the study was likely insufficient to allow a proper evaluation of the clinical component).

Although the nature of the interventions in these “subacute” studies was quite different, their approaches to the management of low back pain, emphasizing contact and cooperation with the workplace, both demonstrated positive effects on return-to-work rates.

Whiplash Associated Disorders - Acute and Subacute Stages

The Québec Task Force on Whiplash-Associated Disorders [17] summarized the evidence available on the effectiveness of interventions for WAD. As for the AHCPR panel on acute low back pain, the Québec Task Force found very few studies that met basic scientific criteria for quality. It concluded there was a lack of evidence available for many of the therapeutic interventions commonly used to treat WAD, including cervical pillows, acupuncture, TENS, electrical stimulation, heat, ice, and massage. Also, there was evidence to suggest that some therapies are not helpful including soft cervical collars, rest, corticosteroid injections and pulsed electromagnetic treatment. On the other hand, there was evidence that the promotion of activity, mobilization, manipulation and exercises in conjunction with analgesics or nonsteroidal anti-inflammatory medications are effective in the short-term. Studies published since the release of the Québec Task Force largely support these findings [54-56].

In the end, the Québec Task Force recommended an immediate return to usual activities for patients with grade I WAD and return to usual activities as soon as possible for grades II and III WAD. They suggested that arrangements for modified work may be appropriate for grade II and III WAD, but that they should be used only on a short-term basis. Symptoms persistent beyond seven days for grade I WAD and three weeks for grades II and III WAD call for reassessment. A specialist referral is warranted if a patient has not recovered after three weeks for grade I and six weeks for grades II and III.

Finally, a multidisciplinary team evaluation is recommended after six weeks for grade 1 and twelve weeks for grades II and III.

Upper Extremity - Acute and Subacute Stages

Guideline development on the care and management of WMSD of the upper extremity has been less systematic than for other conditions. Several guidelines are not published (e.g, Oregon state guidelines for carpal tunnel syndrome [57]) and some are in languages other than English (e.g., guidelines issued by the Dutch College of General Practitioners as described by Van der Windt [21]). The reasons for the lack of guidelines to date, as suggested by Cole and Beaton [15], are the multiplicity of conditions included in “upper extremity WMSD”, and the even greater dearth of rigorous scientific evidence on the management of these conditions.

However, some guidelines for primary care physicians are currently being developed by the American Academy of Orthopaedic Surgeons (AAOS) Task Force on Clinical Algorithms [32]. At the recent annual meeting of the AAOS, drafts of the management algorithms covering the first twelve weeks of symptoms (corresponding to the acute and subacute stages from Figure 2) were circulated for wrist pain and shoulder pain. The algorithms were formulated using a combination of scientific evidence and consensus opinion among clinical experts.

In the acute stage of wrist pain, the AAOS Task Force on Clinical Algorithms recommends ruling out serious underlying conditions (e.g., fracture, dislocation, infection, tumor). They recommend a two to six week course of therapy involving activity modification (including no repetitive tasks, limited exposure to vibration, avoiding extreme wrist positions), splinting and NSAIDS. If there is little or no response after the initial course of therapy, the algorithm recommends further activity modification, rest, injection, aspiration or possible referral to a specialist.

For shoulder pain, after ruling out serious underlying conditions (possibly using imaging), the AAOS algorithms recommend activity modification, NSAIDs and range of motion exercises. No timelines for the length of this course of treatment have been provided. A similar message is provided by guidelines issued by the Dutch College of General Practitioners (as summarized by Van der Windt [21]). They suggest NSAIDs and rest for some shoulder conditions, and NSAIDs and mobilisation, exercise therapy or physiotherapy for other shoulder conditions.

Sheon and colleagues provided a practical strategy to physicians for the management of repetitive strain injuries [58]. The suggested approach has many parallels with the messages of the AHCPR guidelines for acute low back pain, the recommendations of the Québec Task Force on WAD and the algorithms set out by the AAOS Task Force. The authors recommend: ensuring there is no serious underlying condition; identifying and eliminating aggravating factors; reassuring the patient about the essentially benign cause and course of the disorder; instructing the patient in self-help strategies such as heat, massage and exercises; providing relief from pain, preferably with simple measures.

However, some evidence exists that claimants with RSI often delay filing a claim for their pain and symptoms [20], and so may be farther along in the clinical course of the condition at the start of a lost-time claim i.e., they may already be subacute or chronic cases. Given that RSI claimants are less likely than non-RSI claimants to return to the same job [20], Yassi [59] argues that reduction or elimination of ergonomic hazards through work-place interventions is an important means of reducing aggravating factors. Such approaches are echoed by Sheon and colleagues [58], the AAOS Task Force [32], and the National Institute for Occupational Safety and Health [6]. Formal evaluation of the effectiveness of such approaches remains to be carried out.

Chronic Stage

For most musculoskeletal conditions, early chronic pain syndrome is thought to set in at around twelve weeks post-onset [3]. Programs to deal with chronic pain are on the policy agenda for WCBs across Canada. Nova Scotia introduced a new approach for claims management of chronic pain in 1996 and is currently evaluating its impact. The Ontario Workplace Safety Insurance Board identified chronic pain research as a research priority at a recent conference (Shifting the Paradigm, Toronto, February 1998) and an expert panel is now considering the issue with a view to making recommendations to the Ontario Board.

Sufficient evidence on the effectiveness of interventions for chronic pain is available for systematic critical reviews to be performed. For example, the Institute for Work & Health in collaboration with the College of Physicians and Surgeons of Ontario is conducting two systematic reviews for chronic low back pain; one on multidisciplinary team programs and the other on all non-surgical approaches for the management of low back pain (e.g., antidepressants, exercise, manipulation, education, behavioural therapy, multidisciplinary pain clinics, functional restoration, surgery). A multidisciplinary team program is one which addresses the physical, psychological and social/occupational aspects of chronic pain. They typically incorporate physical treatment (i.e., fitness, work conditioning, progressively increased exercises etc.), cognitive and behavioural interventions (dealing with pain, coping skills, problem solving techniques etc.) and a vocational component (including job circumstances, accommodation, communication with the workplace, vocational counselling etc.). Four published reviews of multidisciplinary programs for chronic low back have been consulted for this Institute work [60-63]. Generally, the poorer quality studies demonstrate substantial improvements in return-to-work rates attributable to the multidisciplinary programs. The higher quality studies demonstrated a more modest effect on return-to-work. More extensive results from new systematic reviews for chronic low back pain should be available by the summer of 1998. Crook and Tunks provide an overview of the natural history of chronic musculoskeletal pain and treatment efficacy in this volume.

ISSUES

1. *In the early stage of most **uncomplicated** musculoskeletal disorders, (i.e., in the absence of serious underlying conditions) the evidence supports an approach emphasizing reassurance and education leading toward resuming activities of daily living in a timely manner, since many conditions are self-limiting and will resolve regardless of the clinical treatments provided.*

This message was consistent for all the types of soft-tissue injury considered here. There are iatrogenic risks from over-investigation, over-treatment and inadvertent encouragement of a sick role in mild cases during the acute stage of soft-tissue injury [3,35]. However, patients/claimants need to be reassured about their condition, and the likelihood of a favourable outcome in time. It is important that the reassurance be offered in a meaningful and sincere manner leading to a feeling of validation [64,65], rather than distrust.

But why don't current practices (clinical and case management) consistently conform to the suggested approach? Releasing guidelines alone, delivering them in the mail, or providing the messages in a lecture do not change behaviour [66]. Many factors influence practitioners' integration of evidence based guidelines into their practices including patient expectations, ethics, rewards and incentives, regulations and social norms [66]. To change behaviours of health care practitioners, a concerted effort involving collaboration with policy makers, insurers, recipients and the targeted practitioners in a change process is recommended - and such efforts require an outlay of resources. Efforts are now underway in various locations across North America to integrate the messages of the AHCPH guidelines into clinical practice. An Institute for Work & Health effort in Ontario is targeted at health care practitioners at the community level. It has involved identifying opinion leaders within the community and collaboratively developing tools to educate **both the practitioners and the patients**. An evaluation of effectiveness will be conducted when the study is complete in the fall of 1998.

2. But, health practitioners and case managers face many cases that are complicated or don't match the targetted patient scenarios, and the guidelines do not address what to do in this situation. Patients are not "standardized".

There is wide variation across individuals in symptoms at presentation, duration of symptoms when filing a claim, past history, complicating factors like other health problems, job demands and so on. Some patients/claimants may well fall within the large grey zones of clinical practice [67-69] (or claims management), which refers to those situations where the "evidence alone cannot guide clinical actions" [67].

It is also important in a claimant population to consider the stage of symptoms, and not just the stage of claim, since most of our knowledge about interventions and the guidelines for clinical care are geared toward stage of symptoms. Indeed, some of the guidelines for care may no longer be relevant if the claimant has passed beyond the timelines covered by the guidelines.

At the administrative end, it may prove beneficial to develop a "tiered" rationally structured care system based on stage of symptoms. Such a system would included mechanisms for tracking people. Furthermore, it would provide a structure of support for the health care practitioners and claimants to work through the cases together.

3. It is often necessary to fix the workplace as well as the worker.

If a job is clearly leading to musculoskeletal disorders through continuous or repetitive exposure to risky working conditions, it is most beneficial to acknowledge this and change the job. The successful intervention reported by Loisel and colleagues [52,53] included an evaluation of and suggested changes to the work environment. Similarly, the study by Lindstrom [51] involved an integrated effort between health care practitioners and the workplace, in conjunction with the worker. Therefore, evidence suggests an interactive process between health care practitioners, workplace representatives, the worker and WCB representatives will be the most fruitful for return-

to-work and for staying at work [70]. However, there is no evidence for the acceptability or feasibility of workplace changes in other jurisdictions. Furthermore, interchanges between these parties has sometimes been difficult. But it appears “getting all the players onside” [35] may prove to be the most successful approach for all parties.

4. There is a need for further evidence that is convincing to the full range of stakeholders. (But never let perfection be the enemy of the merely good.)

“Insufficient evidence” was a common summary throughout our review. There is a need for more research programs carried out in collaboration with the various stakeholders to examine this important social issue of work-related disability. Given the similarity in time on benefits and the evidence around best interventions for the various soft-tissue injuries considered here, it appears more cross-condition research would be helpful. A better understanding of the factors which influence outcomes could also lead to a better understanding of the types of interventions which would prove most beneficial - to all the parties involved in work-related disability. Notwithstanding all of this, there is much that can be done now to improve the treatment of soft-tissue injuries. This will require synergistic efforts of the WCB as insurers, health care providers and workplace actors.

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