

Conceptual, Methodological, and Measurement Challenges in Addressing Return to Work in Workers with Musculoskeletal Disorders

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24.1 Introduction

Since the mid-1980s, there has been increasing recognition in the management of musculoskeletal disorders of the need to move from a biomedical and biomechanical perspective to a broader biopsychosocial perspective (Gatchel et al. 2007; Waddell 1987). The broader perspective has had impact on the clinical management of pain, evidenced in the development of multifaceted treatment and more recently in the development of patient-centered medicine that attempts to place the patient, rather than patient pathology, at the core of the intervention.

Similarly, the field of occupational medicine has seen a shift from a primary focus on the physical demands of work, the characteristics of the working environment, and productivity to a focus on well-being, engagement in work, and the social context of work. In this, the first of two companion chapters on work disability in people with musculoskeletal disorders, consideration is given to the conceptual frameworks which underpin the

management of work disability. The problem is analyzed using the Flags framework that focuses on different types of obstacles to recovery (or reengagement), which need to be identified and appraised as a precursor to the design of interventions. The focus is on both the worker and the workplace. An appraisal is offered of the difficulties in evaluation and challenges in measurement. Some conclusions are offered as a precursor to consideration of the development and design of interventions in the second (companion) chapter.

24.2 A Conceptual Framework

The high costs of back-associated work disability in terms of lost productivity, wage-replacement costs, and costs of treatment have long been recognized. Traditionally, the primary focus of workplace initiatives has been on injury prevention viewed principally from a biomechanical or ergonomic perspective. However, injured workers do not all return to work (RTW) as expected. When symptoms persist, matters become more complex, and although the consideration of the physical demands is important, the determinants of recovery and successful return to work require a biopsychosocial perspective (Sullivan et al. 2005) necessitating reconsideration of our intervention strategies and their effectiveness in tackling work disability and in facilitating successful and sustained RTW after illness or injury.

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In considering the various treatment and management options, which may be available, a distinction can be made between interventions with a primary *clinical* focus (in terms of content and anticipated outcome) and those with a primary *occupational* focus. Notably, Sullivan et al. (2005) further distinguish between *worker-centered* and *workplace-centered* interventions; this distinction will be used to group the interventions. In the Flags framework (Kendall et al. 1997, 2009), differentiating individual, workplace, and wider contextual factors will also be invoked, as a way of distinguishing the various stakeholders involved in the RTW process in general and in addressing specific obstacles to recovery/optimal reengagement. Indeed, MacEachen et al. (2010) describe the additional “toxic dose” of system problems that can confront the injured worker, over and above the specific effects of the initial injury.

24.2.1 The Nature of the Workplace

The workplace is first and foremost a complex psychosocial environment and as such may be viewed radically differently by different stakeholders, who differ in their knowledge and responsibility for the health/work interface. Not only are there differences in the perception of work across cultures, jurisdictions, and types of work and employer, organizations may differ even within the same industry in terms of workplace culture and management of injury and illness.

However, work should not be seen exclusively as an inappropriate place or source of risk for persons with ill health (Waddell and Burton 2006). In fact, work can be a means by which to reduce some of the broader biopsychosocial risks for chronic pain and to promote musculoskeletal health (Wynne-Jones and Main 2010). Thus, new possibilities for facilitating reengagement in work become available.

24.2.2 The Impact of Musculoskeletal Symptoms

Musculoskeletal disorders (MSDs) may interfere not only with function but also with sleep, leading to fatigue and difficulties in sustained

concentration, which may lead not only to safety issues but also are certainly likely to have an adverse effect on performance. Matters can be compounded by the side effects of medications, thereby decreasing the likelihood of early and sustained RTW after injury.

McDonald et al. (2011) found that workers with arthritic back pain and fibromyalgia had significantly higher levels of work productivity loss than workers without musculoskeletal pain, even after adjusting for demographic and health characteristics.

Following an extensive evidence-based review of the literature on the relationship between musculoskeletal conditions and work, Waddell et al. (2003) concluded *inter alia*:

- Musculoskeletal symptoms, whatever their cause, may certainly make it harder to cope with the physical demands of work, but that does not *necessarily* (their italics) imply a causal relationship or indicate that work is causing (further) harm.
- Certain physical aspects of work are risk factors for the development of musculoskeletal symptoms. However, the effect sizes for physical factors alone are only modest and tend to be confined to intense exposures.
- Psychosocial factors (personal and occupational) exert a powerful influence on musculoskeletal symptoms and their consequences. They can act as powerful obstacles to work retention and return to work.

24.3 Models of Pain and Disability

Over the last two decades, there have been an increasing number of studies identifying prognostic factors for adverse outcome in low back pain (LBP), and there have been attempts also to investigate possible mechanisms linking risk factors and chronicity.

According to Schultz et al. (2007), research into occupational disability has been “largely hampered by lack of a clear definition of return to work” (p. 329), use of RTW both in consideration of process and outcome, and by differing concepts of occupational disability (derived, respectively,

from biomedical, biopsychosocial, and social construction frameworks) which rely on differing research traditions, with differing relative emphases on individual versus system foci and, as a consequence, differing assumptions about the key determinants of RTW. As knowledge has increased, models have become increasingly integrative (and sometimes complex).

However, two models have been particularly influential. The Rochester model (Feuerstein 1991) was one of the earliest models explicitly implicating medical status, physical capabilities, specific psychological factors, and aspects of work (work demands) in a model of work disability. Although conceptual rather than statistically derived, it offered an important alternative to impairment models, which seemed to pay little regard to occupational factors or to the prevailing disability models, with their emphasis almost entirely on ergonomic or biomechanical factors.

Since then, an increasing number of factors have been implicated in work disability. The Sherbrooke model (Loisel et al. 2001; Loisel and Durand 2005) located the worker with musculoskeletal disability at the center of a four-part social framework, comprising personal factors, health-care system factors, workplace factors, and societal economic factors, within which the challenges of work disability and RTW need to be understood.

A further advance is the inclusion of these various factors within stage or phased models of disability (Krause and Ragland 1994). Franche and Krause (2005) discuss facilitating the development of RTW strategies, which take into account the development of disability across time. However, we do not as yet have a single unifying biopsychosocial RTW model; Schultz et al. (2007) recommend both a number of components and a set of criteria if focused research into RTW is to be advanced.

24.4 The Determinants of Work Absence and Return to Work

Any such intervention strategy requires the identification of risk factors for adverse outcome, and the LBP epidemiological literature is replete with studies identifying prognostic factors of various

sorts. Mallen et al. (2007) in a review of 45 studies identified a range of prognostic *clinical* indicators of poor outcome such as higher pain severity at baseline, higher baseline disability, greater movement restriction, longer pain duration, multiple-site pain, and previous pain episodes; *psychological* indicators such as anxiety and/or depression, higher somatic perceptions and/or distress, adverse coping strategies, and *sociodemographic* indicators such as low social support and older age.

Secondary prevention depends on the identification of risk factors for suboptimal outcomes, which are potentially modifiable, and a consistent relationship has been found between psychological factors and pain onset, as well as the transition from acute to chronic pain problems. Research has shown that psychological variables are important determinants of future pain and disability (Crook et al. 2002; Pincus et al. 2002; Shaw et al. 2001; Truchon and Fillion 2000), and there is accumulating evidence that psychosocial factors seem to be stronger predictors of outcome than biomedical or biomechanical factors (Burton et al. 1999; Crombez et al. 1999).

Over the last 15 years, there has been increasing interest specifically in potentially modifiable psychosocial risk factors, and the term “Yellow Flags” has become a familiar term used to describe psychosocial risk factors for chronicity. The primary focus of the original flag system (Kendall et al. 1997) was on clinical variables with a lesser emphasis on occupational factors. Main et al. (2005) have argued that, in these contexts, the term “Yellow Flags” should be reserved for more overtly psychological risk factors, whereas the social/environmental (workplace) risk factors could be divided into two categories: (1) workers’ perceptions that their workplace is stressful, unsupportive, and excessively demanding, which they termed “Blue Flags,” and (2) the more observable characteristics of the workplace and nature of the work, as well as the insurance and compensation system under which workplace injuries are managed, which they termed “Black Flags.” More recently, Kendall et al. (2009) extended the term to encompass broader socioeconomic contexts outside of the control of the individual worker under which workplace

injuries are managed (although their management recommendations are primarily aimed at the clinic and the workplace rather than at policy makers).

24.4.1 Influence of Yellow Flags on Outcomes

Leeuw et al. (2007) highlighted fear-avoidance beliefs, catastrophizing, avoidance behavior, distress, and pain behavior as being of importance in the development of pain, disability, and lowered performance. A number of studies/reviews have specifically investigated influences on occupational variables. Melloh et al. (2009) in a review of nine screening instruments found that work status was best predicted by fear-avoidance beliefs about work and the perceived chance of returning to work; functional limitations were best predicted by poor sleep and fear-avoidance beliefs; and pain was best predicted by baseline pain intensity, pain duration, and coping strategies. Depression and function were predictive of all three outcomes.

In addition to pain severity and level of depressive symptoms, Shaw et al. (2009a) also identified workplace factors such as job stress, coworker support, job dissatisfaction, employer attitudes, job autonomy, and availability of modified work as influences on duration of work disability and RTW outcomes. Their findings are consistent with an earlier more widespread review of predictors of chronic pain and disability (Waddell et al. 2003). It is sometimes difficult, however, to distinguish clinical outcomes, such as increase in activity or postural tolerance, from occupational variables, such as RTW rates or indices of work capability.

In a review by Sullivan et al. (2005), evidence was found for fear, beliefs in severity of health conditions, and catastrophizing as individual risk factors for long-term work disability. This was confirmed in a subsequent review by Iles et al. (2008) who identified expectation of recovery and fear avoidance as the most important psychosocial predictors of failure to RTW.

24.4.2 Influence of Blue Flags on Outcome

Even after controlling for a number of health, psychosocial, and demographic variables, characteristics of work and the work environment remain significant predictors of continued symptoms, functional capacity, and prolonged disability (Shaw et al. 2001). Steenstra et al. (2005), in a systematic review of seven prospective studies meeting stringent criteria, including only using studies with workers who had less than 6 weeks of sick leave, identified a range of prognostic factors for the duration of sick leave, including higher initial disability levels, specific LBP, older age, female gender, more social dysfunction, more social isolation, heavier work, and receiving higher compensation (i.e., a range of clinical and occupational features).

Shaw et al. (2009a) summarized findings from five recent systematic reviews of prognostic factors in which workplace factors had been specifically included. They concluded: “although not conclusive.... if all factors supported by at least one review are included, then the preliminary core set of workplace factors would include the following seven variables: heavy physical demands, ability to modify work, job stress, social support, job satisfaction, RTW expectation, and fear of re-injury” (p. 68). They observed further, that, “these variables suggest that occupational factors in back disability include physical and psychological demands, as well as social/managerial factors and worker perceptions and beliefs” (p. 68). Thus, evidence was found for both Yellow Flags (such as fear, belief in the severity of health conditions, catastrophizing, and poor problem solving) and for Blue Flags (such as low return to work expectancies and lack of confidence in performing work-related activities) as risk factors for long-term disability.

24.4.3 Some Observations on Yellow and Blue Flag Identification

A number of general observations are appropriate at this juncture. To begin with, according to

Nicholas et al. (2011), if modifiable risk factors are targeted specifically rather than indiscriminately, good outcomes are to be expected. In one of the few studies directly comparing prognostic factors for RTW, Steenstra et al. (2005) were able to explain 32 % of the variance in RTW using a combination of Yellow and Blue Flags. Workers at highest risk for delayed RTW: (1) expected to stay on sick leave for more than 10 days, (2) were being treated by a general practitioner or medical specialist, and (3) were unable to appear at the occupational physician's office and had a 10.8 times higher risk for delayed RTW. Similarly, the high-risk workers for *lasting* RTW as well as factors 1 and 2 for RTW also reported job stress as a cause of sick leave. Further, Shaw et al. (2009b) showed that flag identification per se does not necessarily change clinical focus and that even though clinicians may recognize the need for a more detailed assessment of patients with multiple psychosocial factors, increase in communication is focused on medical explanations and therapeutic regimen, not on lifestyle and psychosocial factors. Thus, flag identification must be linked with flag management. The assessment of Yellow and Blue Flags is detailed, respectively, in Nicholas et al. (2011) and Shaw et al. (2009a) but will also be discussed in the measurement of *presenteeism* (below), for which further validation work is required.

Recently, Gray et al. (2011) in their systematic review of Blue Flag assessment instruments for individuals with nonspecific low back pain identified six different questionnaires in eight studies (with a total recruitment of 5630 participants) but did not consider any of the instruments to be sufficiently validated to be able to recommend them. The only positive exception was the Obstacles to Return to Work Questionnaire or ORTWQ (Marhold et al. 2002), which, however, was still considered to be clinically unfeasible in its present format.

24.4.4 Influence of Black Flags on Outcome

Black Flags are not primarily a matter of perception and potentially affect all workers (Main et al. 2005). They include content-specific aspects of

work which characterize certain types of job and which are associated with higher levels of illness. These features of work following injury may hinder or even prevent RTW. Examples include the physical and mental demands of the job, sickness entitlement with access to occupational health, policies of attendance and sickness management, management style, social climate, and specific RTW policies (such as the possibility of modified work or transitory work arrangements). Examples of wider contextual or "system" factors include nationally negotiated pay/conditions and employee entitlements (such as access to union representation and financial protection in the context of illness). Indeed, the influence of the financial rewards of work, financial protection in the context of illness and the net "costs" to the individual and the employer, and redress in the event of injury at work across countries and jurisdictions is well recognized (Waddell et al. 2002). For example, a major component in the genesis of extended claims in schemes like Workers' Compensation has been attributed to failures in the working of the system itself (Wickizer et al. 2001). MacEachen et al. (2010) identified the need for a "critical lens" to be applied to the entire organization of RTW.

In addressing the challenge of work disability, therefore, it is important to include consideration of Yellow, Blue, and Black Flags. In this context, some of the most important features of the work environment are described in the next section.

24.5 Influence of the Workplace

While acknowledging the aforementioned widespread contextual influences, in this chapter, the Black Flag focus primarily will be on the characteristics of the workplace which can influence successful and sustained reintegration into work.

24.5.1 Organizational Structure

According to Christensen et al. (2005), psychosocial factors at the workplace level may be important predictors of sickness absence. They

found that after control for relevant confounders, low sickness absence was predicted by high workplace levels of decision authority in the technical services (rate ratio=0.66, 95 % confidence interval=0.51–0.86) and high workplace levels of skill discretion in the pharmaceutical company. Amick et al. (2000) criticized “one-dimensional” models of the determinants of disability and noted that in practice, organizational research had been conducted separately from employee-level research. They developed four scales: people-oriented culture, safety climate, ergonomic practices, and disability management, all of which predicted work status at 6 months and yielded odds ratios, adjusted for age, gender, and symptom severity of between 1.59 and 2.24. Although the study was on carpal tunnel syndrome, it is one of the few disability management initiatives to examine the influence of organizational factors on work disability using adequately validated assessment instruments.

Van den Heuvel et al. (2010) found that most long-standing health conditions were associated with productivity loss, but they also found that health-related factors were in general more strongly associated with sickness absence than low performance at work. Psychosocial factors such as job autonomy, job demands, and emotionally demanding work were more strongly associated with low performance at work than with sickness absence. The authors recommended the development of a healthy psychosocial climate at work.

24.5.2 Work Characteristics

Shaw et al. (2012) distinguished four different types of workplace risk factors for chronic disability: physical work demands, social climate at work, perceptions about health at work, and perceptions about workplace disability management. In terms of workplace physical demands, they found evidence for fast work pace, heavier physical demand, work demand exceeding work capacity, driving as the principal component of work, and the type of industry (private vs. public). However, it is not always clear whether

objective characteristics of work or perceptions of work are being reported, and in one study in which both were specifically appraised, objective characteristics of work were relatively unimportant in the prediction of future performance (Wynne-Jones et al. 2011).

24.5.3 General Workplace Culture and Practice

There are many ways in which the nature of the general workplace and culture can be described and characterized. In the context of disability management in general and RTW in particular, however, the extent to which management is actively engaged in the RTW processes would appear to be of critical importance. This engagement, however, has to be supported by attendance and absence management policies, which facilitate reengagement in work (Main et al Chap.25 in this Handbook).

In a survey of manufacturing workplaces, lost-time frequency rates were associated *inter alia* with concrete demonstration by management of its concern for the workforce and greater involvement of workers in decision making (Shannon et al. 1996), a finding consistent with the importance of empowerment (Varekamp et al. 2006).

Several researchers have identified the importance of interdisciplinary communication and collaboration, both within and between organizations (Costa-Black et al. 2007; Feuerstein 1996; Loisel et al. 2005; Pransky et al. 2004). Indeed, after injury, there may be competing interests between the employer’s need for business survival and success and the workers diminished work capability (Eakin and MacEachen 1998) and difficulties in procedures for complaining and frank challenge to the work-relatedness of injury, particularly evident in countries with adversarial tort legislation. Interestingly, Butler et al. (2007) found that workers’ RTW was more responsive to satisfaction with how their firm treated their disability claim than satisfaction with their healthcare provider.

According to Shaw et al. (2009a), workplace factors meriting screening include the following: unsupportive or unhappy work environment, neg-

ative experience of workplace and management, and absence of interest from the employer. MacEachen et al. (2006) identified the importance of goodwill and trust. Finally, Brouwer et al. (2009), in a prospective longitudinal cohort study, found social support to be a significant independent predictor of RTW after long-term absence, and, indeed, many studies have found the relationship between the worker and his/her manager to be of importance. Interestingly, Mielenz et al. (2008) found that in RTW, coworker social support was more important than manager support or task satisfaction.

24.5.3.1 Attendance Management Policies

Absence management is an integral part of the RTW process. Any employer has to have in place systems for recording and managing attendance. It is obviously desirable to retain staff absent with long-term sickness in order to keep specialist skills, maximize investment in training, avoid costs of recruiting and training new staff, and circumvent the shortage of new recruits.

Nice and Thornton (2004) conducted an employers' survey as part of the background to the UK Job Retention and Rehabilitation Pilot (JRRP) scheme. Employers perceived sickness absence to be a problem because of the following factors: difficulties in covering absences, staff overload and stress, costs, productivity and profitability effects, and customer service effects. They wrote: "among managers there was some lack of sympathy towards days off for 'minor' complaints and suspicions that short-term absences were not always 'genuine'" (p. 11). This issue created some tensions with human resources (HR) staff that wanted to avoid a disciplinary approach. The summary is as follows:

In practice, the approach to managing short-term absence was typically non-interventionist. While it was widespread practice for the employee to make contact on the first day of absence, only one employer in the study was proactive at this point in that they offered occupational health advice for selected conditions. There was rather little evidence of active management of sickness absence in the first two to three weeks... Return to work interviews, or less formal discussions, were almost uni-

versal, but sometimes cursory... Although it was sometimes recognized that repeated short spells of absence, like occasional days off, could be the precursor to prolonged sickness absence, there was a tendency for them to be seen as suspect. (p. 13)

There appeared to be a number of ways in which responsibility for sickness absence was organized:

- Prime responsibility with departmental or line managers, common in public sector organizations
- Shared between line managers and human resource managers
- Led by human resource managers
- Led by the occupational health department, in one organization
- Shared by human resources, occupational health nurse, and line managers

Some problems were associated with leaving responsibility to managers: other pressures on their time, limited knowledge or skills, and inconsistent treatment. Backup from human resources included more proactive advice and, in large companies, central telephone-based help teams (Nice and Thornton 2004, p. 14).

There was difficulty dealing with uncertain duration of absence, particularly for mental health conditions, and managers had some skepticism about "stress-related" conditions. In general, for working conditions faced by the employees and the workplace, employers showed willingness to examine and adapt. Modifications included lowering or changing work hours and tasks completed, phasing a return to work, redeployment to other permanent or temporary work, and equipment and work modification. This was to give the wider message to staff and job applicants that they were valued (Nice and Thornton 2004).

However, it might be argued that in practice, absence management is more about attendance than ill health. Attendance management policies that aim at decreasing observed sickness *absenteeism* can easily trigger an increase in presenteeism (Bockerman and Laukkanen 2010) especially among those workers with chronic illnesses (Munir et al. 2008). According to Simpson

(1998), dysfunctional competitive presenteeism constitutes an extreme example of harmful competitive culture at workplaces. Optimal management of absenteeism and presenteeism is a central component of any RTW strategy, and, as already noted, the ways in which absence is managed can be an important obstacle to RTW.

24.6 The Evaluation of Interventions

24.6.1 Methodological Challenges

Durand et al. (2007), following a review of studies of workplace interventions, found marked heterogeneity in the content of interventions and in the diversity of reported actions, even in fairly specific initiatives such as the provision of modified work. However, they found general support in the literature for modifications to the form or nature of work as a means of hastening RTW. The group identified three general objectives: (1) enhancing individuals' work capability, (2) providing temporary transitional arrangements, such as phased RTW, and (3) provision/implementation of sustainable modifications in the workplace. Nonetheless, they found that in the studies, it was often not possible to establish explicit links between the objectives of the workplace intervention and the activities carried out and the proposed process outcomes.

There are also difficulties in the design and implementation of research. Linton et al. (2005) highlight some of the research challenges in evaluating outcomes, including the ambiguity of time to RTW as an outcome indicator, the importance of population definition, the difficulties in measurement, and the challenges of translating research into practice. Even when effectiveness for an intervention is found, interpretation of findings can be problematic.

24.6.2 The Challenge of Measurement

The principal challenge in evaluation of work compromise is the extent to which work productivity is compromised, most clearly evident in

work absence, but also in the adverse effects of symptoms on performance in those at work (referred to as presenteeism), whether prior to sickness absence as possible precursors of absence or in the continuing impact of symptoms following RTW after injury or illness.

Hansen and Andersen (2008) found that more than 70 % of the core workforce goes ill to work at least once during a 12-month period, indicating that presenteeism was just as prevalent a phenomenon as sickness absence. Overall, work-related factors seem to be slightly more important than personal circumstances or attitudes in determining people's "decision" to go to work while ill. However, the relatively low explanatory power of these combined factors suggests that there are still many unknowns in this field of research.

According to Dagenais et al. (2008), indirect costs resulting from lost work productivity represented a majority of overall costs associated with LBP, and, according to Wenig et al. (2009), the majority of costs are work-related rather than direct healthcare costs.

Pransky et al. (2002) found that 1 year after injury, 68 % still had pain exacerbated by work, 47 % worried that their condition would worsen with continued work, and re-injury occurred in 42 % of the respondents. Importantly, the work-related outcome measures were largely independent of each other, and exploratory multivariate analyses demonstrated unique patterns of factors associated with each outcome. Thus, simply measuring return to work did not appear to capture the full range of job-related consequences from occupational back injuries.

According to Schwartz and Riedel (2010), the measurement of productivity can be conceptually separated into three interrelated categories: (1) *descriptive* measurement determining the degree to which health status affects worker performance, (2) *comparative* measurement offering an assessment of the differential effect that various health risks and chronic conditions or combinations of risks and conditions have on performance, and (3) *evaluative* measurement assessing change over time, particularly as part of program evaluation. It is through a combination of these functions that employers can begin to determine

the magnitude of the problem and evaluate the effect of targeted solutions.

Kessler et al. (2004) investigated the methodological issues involved in evaluating the indirect costs of illness. They identified three types of data gap in information available to employers: impact of untreated health problems, magnitude of impact of illness, and lack of transformation rules needed to estimate the actual costs of change in workplace functioning. Absenteeism was often measured with a single question, but in the Health Performance Questionnaire (HPQ) (Kessler et al., 2003) there is assessment not only about days but also hours of work: expected hours of work missed on workdays, extra hours to make up for sickness absence, and total hours absent for any reason (work and nonwork related). Presenteeism presented a greater measurement challenge. Although questions or observations tailored to a specific task in a particular setting would be ideal, a broader measure is needed across diverse occupations and populations.

Finally, Koopman et al. (2011) observed that individual work performance is differently conceptualized and operationalized in different disciplines. In their systematic review, they identified a total of 17 generic frameworks (applying across occupations) and 18 job-specific frameworks (applying to specific occupations). Dimensions frequently used to describe individual work performance were task performance, contextual performance, counterproductive work behavior, and adaptive performance. They proposed a heuristic conceptual framework, in which an individual is understood in terms of the four core dimensions, for each of which a number of indicators are identified, yielding a theoretical basis for future research and practice.

24.6.3 Assessment of Productivity Loss (Absenteeism and Presenteeism) in the Individual Worker

Sickness absence is sometimes collected routinely (usually for payroll or attendance monitoring) but often in research studies is obtained by

self-report, which becomes increasingly unreliable beyond 2 months (Severens et al. 2000). Dasinger et al. (1999) observed a sevenfold difference between administrative and self-report data (with higher disability estimated in self-reports), so ideally both types of information should be collected. Hensing et al. (1998) recommended the use of the following measures: frequency of sick leave, length of absence (based on individual), incidence rate, cumulative incidence, and duration of absence (spells).

The measurement of health-related suboptimal performance or presenteeism seems to represent an even bigger measurement challenge. The need for a general way to measure presenteeism across many types of jobs has led to the development of a plethora of self-report workplace productivity measurement instruments, such as the Work Limitations Questionnaire or WLQ (Lerner et al. 2001, 2003), the Work Productivity Short Inventory or WPSI (Goetzel et al. 2003; Ozminkowski et al. 2003), the Stanford Presenteeism Scale or SPS (Koopman et al. 2002; Turpin et al. 2004), with its subsequent short forms, and the Work and Health Interview or WHI (Stewart et al. 2004). The scales have undergone various levels of validity and reliability testing and displayed some level of criterion validity and reliability. Furthermore, a subset of the WLQ has been incorporated into a worksite health risk appraisal (HRA) with success in the study of a variety of health conditions (Burton et al. 2004) and health risks (Burton et al. 2005, 2006).

Turpin et al. (2004, *ibid*) reported the reliability and validity of the 13-item Stanford Presenteeism Scale (SPS) (Lynch and Riedel 2001) in knowledge-based and production-based workers, comparing it with the SPS, Short Form-36 (SF-36), and the Work Limitations Questionnaire (Lerner et al. 2001). They found it to have adequate reliability ($\alpha=0.83$). Factor analysis identified two underlying factors: completing work and avoiding distraction, with knowledge-based workers load on completing work being $\alpha=0.97$, whereas production-based workers load on avoiding distraction being $\alpha=0.98$. There were significant and positive relationships between the SPS, SF-36, and Work

Limitations Questionnaire. They concluded that the SPS demonstrated a high degree of reliability and validity and recommended its use by employers who seek a single scale to measure health-related productivity in a diverse employee population.

Sanderson et al. (2007), in a prospective study, investigated the association of four separate measures of presenteeism (presenteeism days, inefficiency days, WLQ, and SPS) with a measure of anxiety and depression on a patient health questionnaire (Kroenke et al. 2001; Lowe et al. 2004). Only the Work Limitations Questionnaire consistently showed worse productivity as depression severity increased and sensitivity to remission and onset of depression/anxiety over the 6 month follow-up ($N=231$). They also found some evidence of individual depressive symptoms having a differential association with different types of job demands.

Prasad et al. (2004), following a major review of six generic instruments, found variation in psychometric strength and generalizability and considered that further research was needed to assess the accuracy and usefulness of individual instruments. Several other reviews have also examined their merits and the advantages of one instrument over another (Allen and Bunn 2003; Lofland et al. 2004; Ozminkowski et al. 2004), but one of the most informative reviews has been that of Mattke et al. (2007) who reviewed 17 different instruments purporting to measure or monitor health-related productivity loss, essentially absenteeism and presenteeism, based on employees' self-reporting. They considered that absenteeism on the basis of self-report was reliable and valid, provided the recall periods were short (i.e., 1–2 weeks), but recommended caution in reliance on results for recall over longer periods. The instruments varied substantially in length (3–44 items) and in scope with some addressing only specific conditions and incorporating several estimates for the cost of lost work time. They identified three modes of conceiving presenteeism: (1) assessment of perceived impairment; (2) comparative productivity, performance, and efficiency (with others and with norms); and (3) esti-

mation of unproductive time at work. The authors identified several methods designed to estimate the effect of productivity loss on cost but considered that none of them were sufficiently developed or validated.

Kessler et al. (2004) considered that none of these instruments were sufficiently representative to enable overall comparisons and recognized that devising an overall scoring system working equally well across workforces and workers constituted a major challenge. They developed the Health Performance Questionnaire or HPQ (Kessler et al. 2003), described as a brief self-report questionnaire designed to elicit information for screening purposes and basic demographics, but also to evaluate the impact of health on three types of workplace impact: sickness absence, presenteeism, and critical incidents, with a view to evaluating the indirect workplace costs of illness. The HPQ therefore adopted a simple global rating approach based on a 0–10 rating on a single item. Considerable further details on validation, methodology, utility, and suggestions for further contextualization of the HPQ are presented in the two articles.

After reviewing the literature on various measurement instruments, Schultz and Edington (2007) observed that two presenteeism instruments were moving to the forefront in popularity, namely, the WLQ and the HPQ. They considered that their relatively strong validity and reliability make them good choices, particularly since they have been used in a variety of workplace settings and with a variety of health risks and conditions. Many of the other questionnaires reviewed here are suitable for specific patient populations, but the WLQ and the HPQ may be the most useful in general employee populations, and, further, they both give results that may be quantified monetarily.

Zhang et al. (2010), in a direct comparison of the four major measurement instruments, found that the estimates both of work-related productivity loss in the previous 2 weeks and the cost of presenteeism varied significantly depending on the instrument used, with estimates ranging from 1.6 to 14.2 h and with costs of associated produc-

tivity loss (i.e., presenteeism) varying by a factor of almost 10. Variations were also found in the strength of the associations among lost productivity, functional disability, pain, and arthritis.

Measurement instruments have also been used as a basis for cost. Lofland et al. (2004) reviewed several productivity loss instruments. Their review focused on six instruments that provided a metric suitable for conversion to a monetary figure. They found that many instruments are only suitable for use with certain patient groups, such as those with migraines. Others are applicable to broader populations that may have a variety of health conditions.

Finally, according to Brooks et al. (2010), many aspects of measurement still warrant caution, especially when using presenteeism measurements to quantify economic outcomes. They identified a number of fundamental questions:

1. Is there a “best” way of measuring presenteeism?
2. Do all instruments actually measure the same quality?
3. Do the majority or only a minority of employees experience presenteeism?
4. Can more instruments be validated against objective measures of productivity?
5. Why are there so few cross-correlated studies comparing two different presenteeism questionnaires in the same population?
6. Can the construct of presenteeism adequately accommodate the wide variety of job types?
7. Current instruments rely on a short recall period with results frequently extrapolated to give a yearly prevalence of presenteeism.

24.6.4 The Importance of Work-Related Outcomes

According to Elfering (2006), work-related outcome measures are essential indices within evidence-based medicine, and four different dimensions of work-related outcome are distinguished: occupational status, sickness absence, work ability, and work-related expectations and

evaluations that may become obstacles to recovery (note: sickness absence has already been discussed).

24.6.4.1 Occupational Status

There are several ways and contexts in which occupational status is appraised both in terms of the type of job and in terms of working status pre- and post-injury. However, in order to maximize an instrument’s sensitivity, a specific focus for use as a treatment-related outcome variable is required (Dionne et al. 1999).

24.6.4.2 Work Ability

Although a measure of *disability* rather than *ability*, the Roland and Morris Disability Questionnaire or RMDQ (Roland and Morris 1983) is one of the most commonly used measures; however, it has no questions directly relating to work. The modified 16-item version of the questionnaire includes two items from the Sickness Index Profile or SIP that refer to disability at work, and a separate analysis of these items is recommended when these instruments are the only work-related outcome measures (Dionne et al. 1999). The Work Ability Index (Ilmarinen 2007), comprising a 7-item rating scale, administered by an occupational health professional and yielding a score based on the worker’s estimate of present and future work capability, is popular in Scandinavia. It is simple to use and has intuitive appeal, and yet surprisingly little research has as yet emerged on its utility. It merits further consideration.

The concept of work ability is linked with the enhancement of well-being, and according to Schulte and Vainio (2010), “the key to maintaining the effective functioning of the workforce is the concept of well-being, which encompasses more than just one’s state of health, it is also a reflection of satisfaction with one’s work and life” (p. 422).

Elfering (2006) concluded that most common measures of work-related outcome, i.e., global work status and RTW measures, lack specificity. It follows that in considering RTW after treatment for spinal disorder that work-related out-

come should be adjusted against prior sick leave history. Measurement of traditional indicators including work status and RTW should be improved and, wherever possible, multiple data sources ought to be used. Furthermore, biomechanical and psychosocial work factors that are risk factors can also function as work-related outcome variables because they can be expected to predict major outcome variables, such as recurrent episodes or maintenance of disability.

During and after treatment, work-related attitudes are important work-related outcome measures. The influence of social context and perception of work colleagues and supervisors regarding their status of sickness absence and RTW expectations are potentially underestimated as important factors for early RTW.

24.6.5 Assessment of Workplace Policies and Practices

According to Tang et al. (2011), the importance specifically of workplace organizational policies and practices (OPPs) in promoting worker safety and effective disability management is increasingly recognized, and factors such as early communication between injured workers and workplace stakeholders and the promotion of a people-oriented work culture have shown to be important not only in preventing new injuries but also in facilitating work reintegration for injured workers (Shannon et al. 2001).

Habek et al. (1991) produced a 95-item OPP questionnaire from which a 20-item scale was later produced (Amick et al. 2000) comprising four major dimensions: *safety practices*, *ergonomic practices*, *disability management*, and *people-oriented culture* as the structure of the scale. It has been used as the basis for development of the OPP-11 (Amick et al. 2004; Katz et al. 2005). Further evidence of its predictive ability in relation to work outcomes is provided by Tang et al. (2011). Although the validation work was undertaken primarily for upper-limb symptoms, the four domains appear to be a helpful way of clustering organizational policies and practices; however, specific rec-

ommendations for the mediation of jobs or ergonomic adjustments would need to include a condition-specific component.

24.7 Conclusions

In this chapter, it has been suggested that the problem of work disability in people with musculoskeletal disorders, as evidenced in the problems of RTW, merits a fundamental reconsideration. The shift in focus in clinical medicine toward patient-centered healthcare and secondary prevention is paralleled by the shift in focus in occupational medicine from ergonomics, biomechanics, and disability toward the psychosocial aspects of work and the nature of the workplace, with its influence on the determinants of reengagement in work after illness or injury. Effective interventions require a foundation of careful identification and evaluation of obstacles to recovery and reengagement. There is a strong evidence-based consensus on the need for consideration both of the worker and the working environment. An important challenge in the design and evaluation of interventions has been the lack of adequately developed and validated measurement tools. Poor conceptualization, weak methodology, and overreliance on measurement tools designed in earlier eras have hindered progress in understanding the processes involved in developing, implementing, and evaluating successful interventions. Methodological shortcomings are evident in attempts to develop all-purpose measurement instruments and in the failure to differentiate the requirements for prognostic screening, treatment targeting, measurement of change, and evaluation of outcome. Measurement does not necessarily need to be complex, but it must be relevant, clearly focused, and feasible. Further comparative studies are needed of the construct validity, reliability, and specific utility of the instruments currently available in the specific occupational contexts in which they are intended to be used, but it is likely that new instruments need to be considered in conjunction with the design and development of

new types of intervention more clearly focused on determinants of behavior change (these are discussed in the companion chapter).

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