



ELSEVIER

Contents lists available at ScienceDirect

Best Practice & Research Clinical Rheumatology

journal homepage: www.elsevierhealth.com/berh



8

Factors that affect the occurrence and chronicity of occupation-related musculoskeletal disorders

Dr. Robyn Horsley

Keywords:

Work

Return to work

Psychosocial

Absenteeism

The components that affect the occurrence and chronicity of musculoskeletal disease are multifactorial. The return to work process and prevention of future chronic disability commences at the time of the initial assessment. The clinician can identify, at an early stage, patients with negative expectations of return to work and adopt a care plan oriented to functional adaptation. Medical and psychosocial treatment plans taking account of coping preferences, beliefs and practices are more likely to help prevent chronic disability. Other factors that can influence the long-term disability rate include medically discretionary or unnecessary time off work and litigation itself. Workplace factors can result in unnecessary absenteeism and poorly managed presenteeism.

© 2011 Published by Elsevier Ltd.

Long-term work absence, work disability and unemployment are harmful to physical and mental health and well-being [1]. The negative impacts of remaining away from work not only affect the absent worker, but also families, including the children of parents out of work, who suffer consequences including poorer physical health, decreased educational opportunities and reduced long-term employment prospects [2]. Work in general is good for health and well-being; work absence is not. Prolonged work absence and chronic disability, however, are never simply a matter of physical pathology. Clinicians play a vital role in the interactions amongst individuals, the employer, society and the legal system in preventing long-term chronic disability.

Definition of disability

The international classification of functioning (WHO, 2000) is based on the biopsychosocial model. Disability encompasses interrelated and interacting dimensions. Disability depends upon interactions between the individual and his or her social context. Capacity for work depends upon interactions

E-mail address: rhorsley@bigpond.com.

between the worker's health condition, his or her physical and mental capabilities, the demands of the job and other psychosocial factors [3].

Clinicians are aware of the discordance in presentation of patients with persisting pain and the level of work disability:

- patients with significant structural abnormalities presenting with no pain;
- patients with minimal pathology presenting with severe pain;
- patients with severe pain, functioning well; and
- patients with much less pain, presenting with high levels of disability [4].

Our role as medical practitioners is to identify, at an early stage, patients at greatest risk of long-term disability, and to orient clinical care towards functional adaptation rather than necessarily finding a 'cure'. Our role is to recognise and address individual barriers and concerns about return to work, facilitate 'stay at work' options and to instigate an early and timely return to work to prevent long-term disability.

Identification of the at-risk patient

Early identification of patients at greatest risk of long-term disability is critical. Once identified, the clinician is then able to address the presenting condition in the context of known barriers to return to work and focus on the patient's functional adaptation with a multidisciplinary approach.

We know that strong predictors of chronic pain and disability include:

- older age, that is, greater than 55 years;
- duration of time off work;
- being non-job attached;
- high local unemployment rate; and
- negative expectations regarding return to work [2].

Predictors of chronic pain and disability of moderate strength include:

- type of occupation;
- education level;
- previous work record;
- psychological distress;
- job dissatisfaction and worker dissatisfaction;
- duration of sickness absence;
- pain intensity/functional disability;
- poor perception of general health;
- depression;
- fear-avoidance behaviour;
- maladaptation of coping; and
- catastrophising/pain behaviour [2].

Predictors of chronic pain and disability of weak strength include:

- co-morbidities;
- anxiety;
- personality traits;
- psychological history;
- stressful life events;
- alcohol and substance abuse; and
- gender; immigrant status [2].

A study which focussed on patients' expectation of return to work assessed injured workers soon after pain onset and 'before' obtaining medical care, lessening the risk that the study was confounded by treatment, clinical course and provider advice [6]. Patient expectations for return to work were unrelated to age, gender, education, income and ethnicity, consistent with other studies of disability duration. Demographic variables were poor predictors of return to work. However, patients who had negative expectations of returning to work were less likely to have resumed normal work at 1 month and at 3 months.

They found at 1 month:

- 57% of workers had returned to full-time duties after an injury;
- 19% had returned to modified alternative duties; and
- 24% had not returned to work.

And at 3 months:

- 74% had returned to full-time duties;
- 8% had returned to modified alternative duties; and
- 18% had not returned to work.

Therefore three-quarters of those workers off work at 1 month were still off work at 3 months. (Other authors have found that 10–15% of workers remain off work into the longer term.) [7].

The study confirmed that patients with (early) poor expectations of return to work were predictive of long-term work absence and chronic disability.

Another study also examined the association between work-related recovery expectations and return to work. The workers' 'Recovery Expectation Scores' were strongly associated with length of time lost, controlling for injury duration, clinician recommendations to return to work and the Pain Disability Index. The authors concluded that, in addition to history taking aimed at diagnostic decision making, primary care providers should explore their patients' beliefs regarding return to work to identify potential barriers [8].

Patients at long-term risk of chronic disability can be identified at the first consultation with a simple questionnaire. The primary question that clinicians should ask at the first consultation has been identified as: "When do you think you might return to work?"

- this week?
- one month?
- three months?
- six months?
- one year?
- greater than a year? and
- probably never?[5]

Recommended further associated questions included:

- "What do you think are the problems/obstacles for you returning to work?"
- "How do you think these problems/obstacles may be overcome?" and
- "How do you think that I or your employer can help to overcome these problems/obstacles?"

In the first few days post-injury, identification of patients with negative expectations of return to work provides the clinician with the opportunity to explore barriers and to set up a clinical care plan that is orientated towards functional adaptation and improving the patient's ability to cope with pain and other psychosocial factors.

The probability of return to work as a function of time off work is shown below [2]:

Time off work	The odds of still being off work 1 year later
Day 1	1–10%
1 Month	20%
6 Months	Greater than 50%

The tragedy is that the longer a patient remains off work, irrespective of the nature of the physical condition or the health care he/she receives, the more likely it is that he/she will remain off work into the foreseeable future.

Unemployment is associated with increased rates of overall mortality; and, specifically, increased mortality from cardiovascular disease and suicide and poorer general health.

It is also associated with poorer physical health, including increased rates of cardiovascular disease, lung cancer, susceptibility to respiratory infections, poorer mental health and psychological well-being, somatic complaints, long-standing illness and disability, as well as higher rates of medical consultation, medical consumption and hospital admission [1].

In young people, unemployment leads to a range of psychological problems including depression, anxiety and lowered self-esteem, which may result in consequences for physical health by an association with negative lifestyle choices, such as heavy tobacco, alcohol and drug use, together with higher mortality from suicide and accidents [9].

The development and occurrence of long-term work absence and chronic disability is multifactorial. Accordingly, the following questions should be considered:

“Could clinicians inadvertently contribute to chronic disability?; What about individual psychosocial factors?; What role does the workplace play?; How does litigation potentially complicate the outcome?”

The clinician

The return to work process and prevention of future chronic disability commences at the time of the initial assessment. The treating clinician must have an expectation that the patient will return to work/stay at work and return to normal duties, unless there is a known mismatch between the likely long-term prognosis of the condition and knowledge of the job demands.

Communication

The communication style of the treating clinician can have a significant impact on return-to-work outcomes, particularly in the first 30 days post-injury. Interestingly, as long ago as 1987, an article in the *British Medical Journal* confirmed the value of positive consultations versus negative consultations in general practice. A positive consultation provided a firm diagnosis, clinical prognosis and confident treatment regime. A negative consultation provided an unclear diagnosis, no prognosis and uncertainty about whether the treatment prescribed would be of any benefit. Two weeks after the consultation, there was a significant difference in patient outcomes. Sixty-four percent of patients receiving a positive consultation “got better,” compared with 39% of patients, who received a negative consultation [11].

A more recent study looked at proactive doctor communication and return-to-work outcomes. A positive return-to-work recommendation was associated with shorter disability duration during the sub-acute to chronic disability phases, regardless of injury severity. Workers were 60% more likely to return to work at any given point in time, compared with workers not receiving a positive recommendation. This effect on return to work was apparent in the first 30 days post-injury but dissipated in the sub-acute/chronic phase (greater than 30 days of disability) [12]. Similarly, ‘others’ found that the primary treating practitioners’ interpersonal behaviours, including an understanding of job demands, the need to discuss work restrictions or job change and an explanation of the medical condition and treatment in an understandable way had a significant positive association with return to work and degree of recovery [13].

Clinician attitudes and beliefs

Clinicians' personal attitudes and beliefs influence how they implement clinical guidelines and deal with return-to-work management. Clinicians can inadvertently reinforce behaviours in their patients that result in chronic disability.

In a review of general practitioners' (GPs) fear-avoidance beliefs about low back pain, the authors investigated attitudes to clinical guidelines for bed rest, physical activity and sick leave. General practitioners' fear avoidance beliefs were not related to personal back pain experience and, in a regression analysis, demographic, professional or personal characteristics were not identified as important factors. 'One GP in six' was reluctant to recommend physical activity for low back pain. The study concluded that GPs' personal fear-avoidance beliefs about physical activities in low back pain may influence their recommendations for such activity in their patients [14].

In another study, one-third of interviewed physicians and physical therapists advised patients to avoid painful movements, a third believed that a reduction in pain was required before return to work and a quarter still advised rest for acute back pain [15].

Traditionally, doctors have believed that improvement in structural pathology will lead directly to less pain and that less pain will lead to increased function. Pain and work disability do not behave in a linear and parallel fashion. There must be a paradigm shift in the thinking of clinicians in this area, with clinical care reoriented towards functional adaptation.

Certification

Certificates are legal and powerful documents that provide information to the employer and insurer, and also impart messages to the patient about their level of disability, the clinician's prognosis and return-to-work timelines and restrictions. The length of time between certificates and details on the certificate are also open to interpretation by the patient. For example, an initial certificate giving greater than a week off work sends a message about a level of disability that the clinician may not have intended. Certificate details and time off work need to be considered decisions, and clinicians must realise they can unwittingly delay the return-to-work process.

The American College of Occupational and Environmental Medicine (ACOEM) 'Guidelines for preventing needless work disability' (2006) [10] delineates the concept of disability as 'medically required, 'medically discretionary' or 'medically unnecessary'.

'Medically required disability' means that there is no practical way to keep a vulnerable employee safe at work. Work is in fact, medically contraindicated. Examples include patients on short-term, high-dose, narcotic analgesia with concentration and attention span issues post surgery and patients with acute psychiatric conditions.

'Medically discretionary disability' generally results from non-communication or miscommunication between the employee and the medical practitioner, resulting in unnecessary time away from the workforce and an inability or a lack of will to find suitable alternative work. Examples include a plant operator with a significant ankle injury, who cannot return to plant work, but could return in a training role or updating procedures in a sedentary capacity and a process worker with a shoulder injury, who cannot return to all of her pre-injury duties, but could return to components of the role if her capabilities were clarified by the treating doctor. 'Medically unnecessary disability' relies upon the clinician's perception that the diagnosis alone justifies work absence. Examples include office workers with lateral epicondylitis or carpal tunnel syndrome (CTS) and process workers with back pain. Other problems that can lead to medically unnecessary disability include job dissatisfaction, the anger of the employee about the nature of the injury, fear about returning to work and further injury, other psychosocial factors, poor communication between the workplace and the treating practitioner and administrative delays.

Medically unnecessary disability occurs when employees, physicians and employers communicate poorly about the nature of the injury/condition and fail to identify capacity, focussing instead only on disability. It occurs when clinicians fail to recognise and address emotional and motivational problems impacting upon the situation. Work readiness does not depend upon the absence of pain, but is determined by considering functional abilities matched with the demands of the job.

Disability that is medically discretionary or medically unnecessary results in 'system-induced disability' that increases the risk of long-term disability. Only a small fraction of medically excused days off work are actually medically required. The other days off work are generally caused by a variety of non-medical factors, such as administrative delays, delays in treatment, specialty referral, lack of available transitional work, ineffective communication, management issues and other logistical problems.

The patient

Patient attitudes and beliefs

In a study looking at patients' expectations of return to work, the patient questionnaire was completed prior to the first consultation with their health-care provider. Patients, who had negative expectations for return to work, were found to be less likely to have resumed normal work at 1 month and at 3 months [6].

This study highlighted the fact that patients, immediately post-injury, present with attitudes and beliefs that will influence the course of their recovery. Unless those negative attitudes and beliefs are identified and addressed, the risk of chronic disability increases.

In a large cross-sectional study, the association between beliefs about back pain and the impact on absenteeism and presenteeism (reduced work productivity) was reviewed. Beliefs about the inevitable consequences of "back trouble" and fear-avoidance beliefs about work and physical activity each showed a significant association with work-related outcomes. The authors controlled for potential confounders, especially pain intensity and activities of daily living (ADL) impairments. Fear-avoidance beliefs were a unique indicator of days of absence from work and reduced productivity upon return to work [16].

Depression as a co-morbid condition

Data from national population studies in the United States and Canada have confirmed that disability in general increased with co-morbidity. Co-morbid depression had one of the largest effects on disability [17,18]. There have been calls for a replication of these studies in employed populations [19].

Gender

The *Special Interest Group of the IASP Consensus Working Group of Sex, Gender and Pain (2007)* [20] noted that 79% of animal studies published in the journal *Pain* over the preceding 10 years included only male subjects. Only 8% of studies included only females. There is growing evidence that sex differences should be considered in the management of pain conditions.

The group review concluded that women are more likely than men to experience disability from a pain condition, and the patterns of disability differ between the sexes. Different medications may be more effective in one sex and the side-effect profiles and side-effect tolerance may also be different, which can impact upon treatment compliance. For example, selective serotonin reuptake inhibitors (SSRIs) in depression are more effective for women than for men. Women with chronic pain seek more social support and use a wider range of coping strategies than men. They also report significantly more use of problem solving, positive self-statements and palliative behaviours. Female pain patients, however, are more likely to catastrophise than male patients. Women tend to present with higher levels of anxiety than men, but some studies suggest that anxiety and pain may be more closely related in men than in women. The evidence at this stage is not strong enough to warrant sex-specific pain interventions in most situations, but further research is indicated.

Role of underlying abnormalities/variants and biomechanics

An individual's physical characteristics can potentially predispose to the development of symptomatic musculoskeletal conditions if combined with certain occupationally based activities. One

review concluded that the high background level of musculoskeletal symptoms in the community means that while work is a risk factor for musculoskeletal conditions, a substantial proportion is not caused by work [21]. However, some physical aspects of work are associated with the development of musculoskeletal symptoms, particularly when the exposure is intense [23]. This produces challenges in proving associations of occupation with risk factors and musculoskeletal disease in the individual. CTS and rotator cuff syndrome (RCS) are good examples.

CTS is a neuropathy caused by compression of the median nerve within the carpal tunnel. In a Swedish study [22], the general population prevalence for CTS was 1–5%. As in other studies, the overall prevalence in women was higher than in men (male:female ratio 1.0:1.4) and increased with age.

Most cases are idiopathic. Secondary causes include metabolic disorders (hypothyroidism and rheumatoid arthritis), local infections, neuropathies (associated with diabetes mellitus or alcoholism), physiological conditions (pregnancy) and local space-occupying lesions (fracture callous and local tumours).

CTS is more common in some occupations. However, the contributions of workplace physical activities and personal risk factors in its aetiology are not completely understood. Asymptomatic individuals with median neuropathy (which may represent a preclinical stage of CTS) in the general population have a three- to fourfold increased risk of developing CTS over a period of 5–10 years [27,28]. Work requirements of force, repetition and vibration have been described as risk factors in a number of studies [27,28].

One study assessed the individual contributions of both personal and work-related risk factors for median neuropathy and for CTS and concluded that “forceful work with the hands,” in newly hired workers had the most consistent association with median neuropathy, controlling for gender, age, body mass index (BMI), wrist index and co-morbid disease [24]. The prevalence of asymptomatic median neuropathy has been found to be between 4.7% and 18.9% in the general population and between 15% and 39% among manual workers [25,26].

A large American study called OCTOPUS (Occupational Carpal Tunnel Syndrome Observational Prospective Unified Study – 2007) [27] investigated the aetiological contribution of biomechanical overloads of work, alongside personal factors in the onset and natural history of CTS. At 1 year, the most prominent associations were biomechanical overload and female gender, a well-known risk factor for CTS. Being a woman was associated with a moderate (2.5-fold) point estimate increase in risk among workers exposed to an acceptable load and high (7.0-fold) excess risk in the presence of unacceptable and borderline overload.

Diabetes has been identified as a significant predictor of new-onset CTS in a study of automobile workers. There was a 6.5-fold increase in incident CTS cases amongst diabetics. The study also demonstrated that an obese person (defined with a BMI ≥ 30 kg m⁻²) was 2.5 times more likely to develop CTS compared with a normal person (defined with a BMI ≤ 25 kg m⁻²) even when controlling for diabetes. The mechanism of action has not been established. Predictive work-related factors included non-neutral postures of the elbow and wrist [28]. The prevalence of non-specific shoulder pain in the general adult population is 30–34%, 9% for shoulder impairment and 2% for clinically diagnosed rotator cuff tendonitis [29]. The great majority of full-thickness rotator cuff tears are found in persons aged 55–85 years. These occur infrequently in patients under 40 years of age. Younger patients are more likely to present with rotator cuff dysfunction because of overuse, subtle instability and muscle imbalance.

The aetiology of rotator cuff disease is multifactorial. Extrinsic factors include the morphology of the coracoacromial arch, tensile overload, repetitive use and kinematic abnormalities. Intrinsic factors include altered tendon vascular supply and microstructural collagen fibre abnormalities.

Physical loads at work, such as increasing percent time with shoulder flexion and high hand forces, have been found to increase the odds of RCS. Important individual factors in the study included age and BMI, while those with high job security had a lower prevalence of RCS [29]. When older workers present with symptomatic full-thickness tears of the rotator cuff, it is difficult to ascertain whether the nature of work has rendered a previously asymptomatic tear temporarily symptomatic, given the prevalence of tears with advancing age, or whether workplace factors have caused the tear.

Full-thickness rotator cuff tear prevalence was found to be 22% in one study in patients 65 years and older. The assessment of shoulder function was based on 12 parameters. There was no difference in

shoulder scores between those who had consulted a physician and those who had not. For those who were symptomatic, but did not have a tear, shoulder scores were poorer for those who had consulted a physician compared with those who had not [30].

Cultural issues

Australian society is culturally diverse. Culture is broadly defined as referring to a group's shared set of beliefs, norms, values and practices. After English, the most commonly spoken languages in Australia include Greek, Italian, Cantonese, Arabic, Mandarin and Vietnamese.

The 2006 National Census revealed that 46% of migrants arriving since 1945 are not of Anglo-Celtic origin. Currently, there are almost 400 different languages spoken in Australia, with 79% of the population speaking only English at home [31].

Cultural factors influence many aspects of illness, including the manifestation of symptoms, coping styles, stigma attached to physical and mental illnesses, and the meanings that people impart to their illnesses, as well as treatment expectations, family and community support and willingness to seek and adhere to treatment.

In the health-care context, cultural sensitivity refers to a health professional's understanding of how culture shapes patients' attitudes and beliefs and his/her ability to acknowledge and respect differences. Of critical importance is the ability to distinguish between what is normal versus impaired functioning within specific cultures and to match interventions to the expectation of the client. Without a cross-cultural assessment, the risks include subtle forms of miscommunication and misunderstanding that can lead to misdiagnosis, over- or undertreatment and poor adherence by the patient to a treatment plan, which could potentially result in chronic disability [32].

Views about ethnicity can influence the outcomes of care given to patients. For example, the Kaneno study demonstrated the need to overcome the stereotype that patients from Asian cultures are inhibited about discussing their emotional problems. Referral for cognitive behavioural therapy for depression and anxiety can be overlooked as a result, and the care received can be suboptimal, resulting in unnecessary disability [33].

A study looking at the pain coping strategies and treatment of the United States Latino population found that Latinos continue to use traditional medicine and have cultural specific beliefs about illness. They found that the role of religiosity and spirituality was not well understood by clinicians and not consistently assessed in patients from alternate ethnic backgrounds. The review questioned the reliability and validity of standard pain questionnaires and their relevance to ethnic groups when the measures have been primarily explored in the literature in Caucasians [34].

Culturally relevant and culturally sensitive medical and psychosocial treatment plans taking account of coping preferences, beliefs and practices are more likely to help prevent chronic disability.

The workplace

Supportive work environment

Supportive workplaces have an impact on reducing the prevalence of long-term and chronic disability. Worker depression and economic and legal factors (such as workers' compensation), as well as clinical factors, have been found to be significant predictors of short-term work role functioning. However, at 6 months, the primary factor in returning to successful work role functioning was improved self-efficacy and a supportive workplace environment. Self-efficacy is defined as confidence in being able to carry out a set of specified activities. The qualities of a supportive organisation included a people-oriented culture, active safety leadership, safety diligence, disability management protocols and ergonomic policies and practices in place [35].

In a large population-based prospective study, the strongest psychological factor associated with the onset of forearm pain was found to be the level of satisfaction with support from supervisors and colleagues. Participants, who had little autonomy in their roles, had double the risk of developing new forearm pain [36].

From the *Good Jobs* report from *The Work Foundation in the UK*, the consensus of research defined the characteristics of 'Good Work' around supportive workplaces. These included employment security, work not characterised by monotony and repetition, employee autonomy, control and task discretion, a balance between the efforts of workers and rewards received, fair workplace procedures, good workplace relationships or social capital and work as safe as reasonably practicable [1].

Absenteeism versus presenteeism

The level of chronic disability related to musculoskeletal injuries is measured by absenteeism (periods away from the workforce post-injury) and presenteeism ('stay at work' management). Presenteeism measures workplace productivity and the ability of injured or ill workers to meet work demands, given his or her health and work status. Reduced workplace productivity can be the result of persistent pain, reduction in power or the effects of medication.

In one study, the effects of presenteeism in chronic occupational musculoskeletal disorders were found to include that 'Presentees' were more likely to return to full-time duty and full-time work schedules compared with 'Absentees'. Presentees compared with Absentees were 1.7 times more likely to return to work and 1.6 times more likely to retain work at 1 year. There was also a significant difference between the type of job duty and hours worked per day between the Presentees and Absentees at 1 year. A higher percentage of Presentees (34.2%) returned to full duties or full-time status compared with Absentees (25.7%). Considering the psychological factors associated with the two groups, Absentees were found to be more likely to develop Axis I clinical disorders post-injury, such as mood disorder, opioid-dependency disorder, anxiety disorder, panic disorder and post-traumatic stress disorder. There were no significant differences between the prevalence of Axis II disorders in Presentees and Absentees [37]. The study validates 'stay at work' as an effective disability management strategy.

Clinician contact with employer

Discussion with employers about return-to-work management is good medicine. A systematic review of workplace-based return-to-work interventions found strong evidence that work absence duration is significantly reduced by work-accommodation offers and contact between the health-care provider and the workplace, and moderate evidence that it is reduced by interventions that include early contact with the worker by the workplace, ergonomic work-site visits and the presence of a return-to-work coordinator. There was also strong evidence that health-care provider information about how to prevent re-injury or recurrence had a significant impact upon work absence duration and chronic disability [38].

Employer claim management

Employer management of claims has an impact on employee satisfaction, which is a known predictor of work absence. A study quantified the influence of worker satisfaction with their employer's treatment of their disability claim and satisfaction with their health-care provider on return-to-work outcome. Twenty-two percent of workers satisfied with their employer's management of their claims at 1 month experienced unstable employment patterns at 6 months – this compared with approximately 45% of workers, dissatisfied at 1 month, experiencing unstable patterns of employment at 6 months. Health-care-provider satisfaction showed a similar pattern. Twenty-six percent of workers satisfied with their health-care provider at 1 month were in an unstable employment pattern at 6 months. Forty-one percent of workers dissatisfied with their care at 1 month were in an unstable employment pattern at 6 months. Dissatisfaction with the employer's management of the claim and dissatisfaction with the health-care provider significantly increased the likelihood of a poor employment outcome [39].

Dissatisfaction with a health-care provider may result in care-seeking behaviour and poor compliance with prescribed care [40].

Early intervention at the workplace

Early interventions at the workplace, including work-site assessments, facilitate return-to-work and improve outcomes.

One study looked at early workplace-based interventions including ergonomic improvement, work organisation, in-house vocational training, adaptation of workplace conditions and the effect on long-term disability. The interventions focussed on functional capacity rather than employee disability. Days off work were significantly reduced and the likelihood of return to work was 50% higher in the intervention group compared with the reference group. The study controlled for physical and psychosocial work characteristics, co-morbidity of the musculoskeletal system and self-rated health, gender and socioeconomic factors that may impact upon return to work [41].

The role of litigation

Workers Compensation administrative delays and treatment delays are strongly associated with developing chronic disability. The determination of work relatedness of an injury/condition has financial implications, which include monetary compensation for the injury or illness and compensation for lost wages, medical expenses and rehabilitation costs [42]. According to the definition of work-relatedness in the *National Institute For Occupational Safety and Health Guide (NIOSH Guide/ Occupational Medicine Practice Guidelines)*, a 'determination of work-relatedness' should include evidence of disease, epidemiology, evidence of exposure, consideration of other relevant factors and validity of testimony of others.

Establishing causation can be a difficult task. Presentations can be complicated by the presence of age-related conditions and co-morbidities. However, the determination of whether a condition is compensable remains with the insurer.

There is considerable evidence that 'Worker's Compensation' itself can be a factor in the development of chronic disability. A study consecutively evaluated patients who were treated for cervical pain syndrome following motor vehicle accidents and who were managed through the workers' compensation system or via personal injury or other approaches (the non-workers' compensation group). Participants compensated through the Worker's Compensation system were found to have a significant loss of days from work when compared with patients with a personal injury. At 3 months, the lost days from work for patients insured through worker's compensation averaged 37.1 days per person (compared with 5.1 days for the non-workers' compensation group), and at 2-year follow-up, the average total days lost from work was 131.6 days per person (compared with 28.7 days for the non-workers' compensation group) [43].

Another study compared the functional long-term outcome following multiple trauma between Worker's Compensation patients and non-Worker's Compensation patients. The major goal of trauma care is returning the patient to a productive lifestyle. In the Worker's Compensation group, 22% retired because of injury, and, in the non-Worker's Compensation group, 13% retired. In the Worker's Compensation group, 62.7% required inpatient rehabilitation and in the non-Worker's Compensation group, 49.8% required inpatient rehabilitation. Medical aids and devices were used in 41.2% of the Worker's Compensation patients and in 28.2% of the non-Worker's Compensation patients [44].

One study focussed on the administration of Worker's Compensation systems and the potential for their direct contribution to the development of chronic disability. The largest increase in probability of developing chronic disability occurred between weeks 2 and 4 post-injury, when the injured worker was first notified that his or her claim had not been accepted. The model estimated that an individual with a 'least severe' injury, who experienced neither administrative delay (less than 14 days) nor treatment delay (less than 14 days) had an 18.7% predicted probability of developing chronic disability. An individual with a 'least severe' injury, who experienced both administrative delays and treatment delays of 2 additional weeks, that is, >14 days and <28 days, had a 33% probability of developing a chronic condition, which reflected a 77% increase in probability [44].

Neck pain is a common musculoskeletal symptom with point prevalence rates between 10% and 22%, and a 12-month prevalence rate between 31.4% and 53.6%. Long-term neck-related

disability, much like low back pain-related disability, is problematic from the clinical perspective. Prognosis is often complicated by other variables related to psychological and sociocultural variables.

Litigation may also play a negative role in the resolution of motor vehicle-sustained cervical injuries. One study considered, found at 12 weeks that 70.4% of patients with Workers' Compensation/litigation involvement had functional limitation, compared with 19.2% of patients without Workers' Compensation/litigation involvement. The result suggested that Workers' Compensation/litigation involvement is associated with increased long-term functional limitation in patients with neck pain [45].

Conclusion

Many factors influence how workers deal with injury. These include work characteristics, medical involvement, personal beliefs and litigation issues. The final impact on worker's health depends upon the complex balance between all these factors [1]. There is strong evidence that, in general, long-term disability relates more to individual and work-related social and psychological factors, than to either the physical demands of work or the particular medical disorder. Identifying and addressing these factors can positively influence the prevalence and severity of chronic disability.

Practice points

- The clinician can identify, at an early stage, patients with negative expectations of return to work and adopt a care plan oriented to functional adaptation.
- Medical and psychosocial treatment plans taking account of coping preferences, beliefs and practices are more likely to help prevent chronic disability.
- There is strong evidence that, in general, long-term disability relates more to individual and work-related social and psychological factors, than either the physical demands of work or the particular medical disorder. Identifying and addressing these factors can positively influence the prevalence and severity of chronic disability.

Research agenda

- The reliability and validity of standard pain questionnaires and their relevance to ethnic groups is questioned when the measures have been primarily explored in the literature in Caucasians. The development and testing of questionnaires in non-Caucasian groups would be beneficial.
- Most relevant studies have been conducted on male subjects (animal and human). There is growing evidence that sex differences should be considered in the management of pain conditions.
- Data from national population studies in the United States and Canada have confirmed that disability in general increased with co-morbidity. Co-morbid depression had one of the largest effects on disability. A replication of these studies in employed populations is required.

References

- [1] Realising the health benefits of work, RACP AFOEM position statement; 2010.
- [2] Waddell G, Burton A. Is work good for your health and well being? London, UK: The Stationery Office; 2006.

- [3] Rowlingson K, Berthoud R. Disability, benefits and employment. Department of Social Security Research Project Number 54. London: HMSO; 1996.
- [4] Cocciaarella L, Andersson G. Guides to the evaluation of permanent impairment. 5th ed. AMA Press; 2000.
- [5] Waddell G. Return to work. In: *The back pain revolution*. 2nd ed. Churchill Livingstone; 2004. p. 29–35.
- [6] Kapoor Sachin DO, Shaw W, Pransky G. Initial patient and clinician expectations of return to work after acute onset of work related low back pain. *Journal of Occupational and Environmental Medicine* November 2006;48(11):1173–80.
- [7] Stover B, Wickizer T, et al. *Journal of Occupational and Environmental Medicine* 2007;48(1):31–40.
- [8] Gross P, Battie M. Recovery expectations and the prognosis of chronic low back pain within a worker's compensation setting. *Journal of Occupational and Environmental Medicine* April 2005;47(4).
- [9] Bjarmason T, Sigurdottir T. Psychological distress during unemployment and beyond; social support and material deprivation amongst youth in 6 northern European countries. *Social Science and Medicine* 2003;56:973–85.
- [10] The ACOEM. Guidelines for preventing needless work disability by helping people stay employed. *Journal of Occupational and Environmental Medicine* September 2006;48(9).
- [11] Thomas KB. General practice consultations: is there any point in being positive? *British Medical Journal* 9th May 1987;294:1200–3.
- [12] Dasinger L, Kraus N, Thompson P, et al. Doctor proactive communication, return to work recommendation and duration of disability after a workers compensation low back injury. *Journal of Occupational and Environmental Medicine* June 2001; 43(6):515–525.
- [13] Kominski G, Pourat N, Roby D, Cameron M. Return to work and degree of recovery among injured workers in California's workers compensation system. *Journal of Occupational and Environmental Medicine* March 2008;50(3).
- [14] Coudeyre E, Rannou F, Tubach F, et al. General practitioners fear avoidance beliefs influence their management of patients with low back pain. *Pain* 2006;124:330–7.
- [15] Linton S, Vlaeyn J, Ostelo R. The back pain beliefs of health care providers and fear avoidance. *Journal of Occupational Rehabilitation*; 2002:2229–32.
- [16] Mannion A, Horisberger MD, Eisenring MA. The association between beliefs about low back pain and work population. *Journal of Occupational and Environmental Medicine* November 2009;51(11).
- [17] Merikangas KR, Am M, Cui L. The impact of mental and physical conditions on role disability in the US adult household populations. *Archives of General Psychiatry* 2007;64:1180–7.
- [18] Patten SB. Long term medical conditions and major depression in the Canadian population. *Canadian Journal of Psychiatry* 1999;44:151–7.
- [19] Thomas L, Myette MD. Research on depression in the workplace. Where do we go from here? *Journal of Occupational and Environmental Medicine* April 2009;50(4).
- [20] Greenspan J, Craft R, Le Resche L, Arendt-Neilsen L, et al. The consensus working group of sex, gender and pain, SIG of the IASP. *Pain* 2007;132:S26–45.
- [21] Waddell G, Burton A, Bartys S. Concepts of rehabilitation for the management of common health problems – evidence base. Project Report; 2004.
- [22] Atroshi I, Gummesson C, Johnsson R, et al. Prevalence of carpal tunnel Syndrome in a general population. *Journal of American Research Association* 1999;282:153–8.
- [23] National Research Council. *Musculoskeletal disorders and the workplace*. Washington DC: National Academy Press; 2001.
- [24] Armstrong T, Dale AM, Franzblau A, Evanoff B. Risk factors for carpal tunnel syndrome and median neuropathy in the working population. *Journal of Occupational and Environmental Medicine* December 2008;50(12).
- [25] Rosecrance JC, Cook TM, Anton DC, Melino LA. Carpal tunnel Syndrome among apprentice construction workers. *American Journal of Industrial Medicine* 2002;42:107–16.
- [26] Bingham RC, Rosecrance JC, Cook TM. Prevalence of abnormal median nerve conduction studies in applicants for industrial jobs. *American Journal of Industrial Medicine* 1996;30:355–61.
- [27] Gell N, Werner RA, Franzblau A. A longitudinal study of industrial and clerical workers – incidence of carpal tunnel syndrome and assessment of risk factors. *Journal of Occupational Rehabilitation* 2005;15:47–55.
- [28] Werner R, Franzblau A, Gell N, et al. Incidence of carpal tunnel syndrome among automobile assembly workers and assessment of risk factors. *Occupational and Environmental Medicine* 2005;15:1044–55.
- [29] Silverstein B, Bao S, Fan J. Rotator cuff syndrome; personal work related psychosocial and physical load factors. *Journal of Occupational and Environmental Medicine* September 2008;50(9).
- [30] Fehringer E, Gunfeng S, Vanoveren L, et al. Full thickness rotator cuff prevalence and correlation with function and comorbidities in patients 65 years and older. *Journal of Shoulder and Elbow Surgery*; 2008.
- [31] Clarke K, Phillips J. End of life care. The importance of cultural and ethnicity. *Australian Family Physician* April 2010;39(4).
- [32] Pratt H, Apple R. Cross cultural assessment and management in primary care. *Primary Care: Clinics and Office Practice* June 2007;34.
- [33] Kaneno EJ, Silove D, et al. Agreement in symptoms of anxiety and depression between patients and GPs. The influence of ethnicity. *Family Practice* 2001;18:71–7.
- [34] Campbell L, Andrews N, Scipio C, et al. Pain coping in Latino populations. Critical review. *Journal of Pain* October 2009; 10(10).
- [35] Amick B, Haybeck R, Ossmann J, et al. Predictors of successful work role functioning after carpal tunnel release surgery. *Journal of Occupational and Environmental Medicine* May 2004;46(5).
- [36] Macfarlane G, Hunt I, Silman J. Role of mechanical and psycho social factors in onset of forearm pain; prospective population based study. *British Medical Journal* 2000;321:1–5.
- [37] Howard K, Mayer T, Gatchel J. Effects of presenteeism in chronic occupational musculoskeletal disorders: stay at work is validated. *Journal of Occupational and Environmental Medicine* June 2009;51(6).
- [38] Franche R-L, Severin C, Hogg-Johnson S, et al. The impact of early work place based return to work strategies on work absence duration – a six month longitudinal study following occupational musculoskeletal injuries. *Journal of Occupational and Environmental Medicine* September 2007;49(9):960–74.

- [39] Butler R, Johnson W, Cote P. It pays to be nice: employer worker relationships in the management of back pain claims. *Journal of Occupational and Environmental Medicine* February 2007;49(ii):214–25.
- [40] Rudolph L, Dervin K, Cheadle A, et al. What do injured workers think about medical care and outcomes after work injury? *Journal of Occupational and Environmental Medicine* May 2002;44(5):425–34.
- [41] Arnetz B, Sjogrem B, Rydehn B, Meisel R. Early work place intervention for employees with musculoskeletal related absenteeism: a prospective controlled intervention study. *Journal of Occupational and Environmental Medicine* May 2003;45(5).
- [42] Sinclair D. Epidemiology in the court room: an evidence based paradigm for the determination of causation in compensation environments. *Journal Of Occupational And Environmental Medicine* April 2010;52(4). Volume 44 (5) May 2002.
- [43] Suderi GJ. Symptomatic cervical disc herniation following a motor vehicle collision: return to work comparative study of workers' compensation versus personal injury insurance status. *Spine Journal* Nov 2005;5(6):639–44.
- [44] Zelle B, Panzica M, Vogt M, et al. The influence of workers compensation eligibility upon functional recovery 10 to 28 years after poly trauma. *American Journal of Surgery* July 2005;190(1).
- [45] Landers M, Cheung W, Miller D, et al. Workers compensation and litigation status influence the functional outcome of patients with neck pain. *The Clinical Journal of Pain* October 2007;23(8).