



WORK HARDENING/ CONDITIONING

FUNCTIONAL RESTORATION AND PAIN MANAGEMENT PROGRAMS

For Injured Workers with no 'Red Flag' Conditions

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Executive Summary

This report has examined the role of physical conditioning programs for injured workers who have no 'red flag' conditions (ie. major pathology or injuries usually requiring surgical intervention). A wide range of programs conducted by a number of different health disciplines have been reported in the professional and scientific literature and in requests for third party funding. However, there has been considerable confusion amongst providers, funding bodies, and clients over the nature, purpose and expected outcomes of these programs, as well as for whom they might be suitable. This report attempted to address these issues and a number of recommendations are made.

The report attempts to clarify the features of the different types of program and identifies areas of over-lap between them as well as concerns about their conceptual bases. Broadly, these programs may be considered as methods of improving the physical capacity of injured workers to assist them in resuming the sorts of functional activities required for work. Most employ some form of exercise regime.

Evidence from a number of published sources, including systematic reviews of the scientific literature, is reviewed to establish the likely effectiveness of different programs. While there is wide variation in the content of different programs, the skills of the staff, as well as clients/patients treated, some broad conclusions are possible. In particular:

a. Timing

Different degrees and types of intervention are likely to be needed at different stages following injury and depend upon progress and obstacles. In general, the earlier an exercise/activity program is instituted the simpler it should be.

b. Coordination/collaboration

Collaboration in planning and implementation of interventions between treatment and rehabilitation providers, as well as the workplace and the injured worker, is critical.

c. Assessment

Assessment of the injured worker needs to consider not just the injury history and findings of physical examinations, but also the worker's psychological state (fears, beliefs, mood), behaviour, and environment, especially workplace issues. These must be addressed in any intervention or combination of interventions.

d. Interventions

Generic labels for exercise/activity programs should be avoided as they imply consistency of content, which is unlikely. Wherever possible, content of any program should be described and linked to initial assessment and functional goals. If anything, these programs might more accurately be called "Functional Conditioning" as that is what they are trying to achieve.

There is strong evidence that advice to continue ordinary activities of daily living as normally as possible, despite pain, is effective in the early stages after 'non-red flag' injuries. This approach can restrict disability and hasten recovery.

Symptom relief measures (eg. analgesics, nerve blocks, massage, heat) can be used to assist this process, but they must not interfere with activity-based rehabilitation. Thus, waiting until all pain has resolved before resumption of normal activities in these cases is not necessary.

At the sub-acute stage, programs containing **education** (aimed at explanation of injury/pain and strategies for managing pain and disability), **reassurance** and advice (to stay active), **progressive fitness exercises**, and **pain management (using behavioural principles)** are recommended.

Ideally, these interventions should be conducted either at the workplace or linked to the workplace and directed to return to work.

As a worker becomes more disabled and RTW is delayed, s/he is likely to require more intensive versions of the sub-acute stage program.

Psychosocial aspects, particularly, are likely to become more entrenched as time passes and must be addressed as a central element in any intervention where indicated.

No specific exercises are recommended, but exercises are supported by the literature, especially if progress in recovery/rehabilitation is delayed.

If pain is a significant obstacle to rehabilitation, more specific pain management programs will be required. The current evidence is that these must be based on cognitive-behavioural methods and the basic content of these programs can be specified.

e. Staffing/providers

No one professional discipline possesses all the skills required. It is important that each recognises its limitations and the need to work collaboratively with other providers.

The general practitioner, as the 'treating doctor', should be responsible for treatment planning (and coordination) in consultation with all those health providers involved, as well as the rehabilitation provider.

In general, physiotherapists should institute the exercises and basic education elements of these programs, but others like chiropractors and osteopaths may also be able to provide advice in these domains.

Additional training in the assessment of psychosocial factors and cognitive-behavioural pain management principles is likely to be required for most of those working in this area.

A proportion of cases will require expert psychological intervention. Wherever possible, this should be provided by clinical psychologists or psychiatrists with appropriate training in this field.

f. Evaluation

There are major short-comings in this area and all those involved in this work must evaluate their work more consistently and completely. This will enhance accountability and the quality of work. It is recommended that programs are required to use appropriate 'benchmarks' against which their outcomes can be evaluated.

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1. Background

Workers with persisting difficulties in returning to work, or their normal work duties, following non-specific musculoskeletal injuries are at risk of permanent disability once these problems last more than 3-6 months (Waddell and Burton, 1999). Medically, they may be considered no different from similarly injured workers who have returned to work (eg. Cohen et al., 2000), and there is usually no evidence-based medical treatment, such as medication, injections, or surgery available. One line of thinking about such cases is concerned with restoring their normal range of activities as soon as possible, lest the undesirable effects of disuse further complicate the picture. The belief associated with this approach was that the longer an injured worker was off work and not performing their normal range of either work or home activities, the more physically deconditioned they risked becoming (Polatin and Mayer, 1998). This could be reflected in features like reduced muscle bulk, stiff joints, and pain on movement. By helping such people to resume normal activities as soon as they were considered medically stable, even in the presence of persisting pain, it was expected that they would be able to prevent the effects of physical deconditioning. In turn, this was expected to reduce their risk of long-term disability and loss to the work force, with associated financial and social consequences to themselves and society in general. Consistent with this philosophy various types of exercise programs have been promoted for workers with musculoskeletal injuries. These programs have often been designated as either work-conditioning, work-hardening or functional restoration to emphasise their attention on functional activities and return to work outcomes.

Since their development in the mid-1980's in the US from rehabilitation services, and more recently in Australia, many claims have been made for the utility of these programs in terms of return to work outcomes as well as enhancement of quality of life in the injured workers. However, reviews of the literature describing these programs have always noted a great deal of variability in outcomes, between programs and between countries (Teasell and Harth, 1996). Some attempts have been made to regulate these programs to enhance their quality and outcomes. However, currently in Australia there are no regulated standards and no generally-accepted requirements to determine the necessary content of these programs, the types of problems they should treat and the staff they should employ. Thus, it remains very difficult for any potential consumer or third party funder of such programs to know whether a particular program was likely to help a particular person.

In addition to the proliferation of work-hardening, work-conditioning and functional restoration programs, a similar type of program has evolved from the emerging field of pain management. So-called pain management programs, originally developed in the 1970's in rehabilitation and pain clinic settings in the US, have tended to be associated with hospital-based pain services rather than rehabilitation services (Loeser et al., 1990). However, like work-hardening/conditioning and functional restoration programs, pain management programs have also tended to focus on functional outcomes, albeit with more recognition of pain, mood and quality of life issues, than primarily return to work outcomes. Furthermore, like these other programs, pain management programs also have no regulated standards and content, staffing, and even aims can vary widely between programs. Accordingly, potential consumers and third party-funders of such programs are also unclear about which program might offer them a reasonable chance of achieving a desired outcome.

This review will critically examine the nature of these different types of program as well as the existing evidence for their effectiveness. The review will not attempt to simply replicate previous systematic reviews and meta-analyses (where they exist). Rather, the examination of the relevant literature will entail critical appraisal not simply of research designs (as in the systematic reviews), but of rather more contextual considerations (eg. taking into account differences in content between different programs) and clinical factors (eg. the nature of the patients/clients treated in the different programs).

Conclusions and recommendations will be reached on the critical issues of:

1. Desirable features of such programs,
2. Identification of who (if anyone) is likely to benefit from attending such programs,
3. The types of outcomes likely to be achieved and,
4. The skills required to successfully operate such programs.

2. Definitions

Examination of the literature in this domain quickly reveals a considerable degree of overlap in the definitions used for the different program labels. In some cases, these terms seem to be used interchangeably and in others it appears that some are sub-types of a broader approach. A recent review by Gibson, Allen and Strong (2002), for example, contrasted work-hardening and work-conditioning as “more formal strategies for improving the worker’s fitness for return to work” (p. 282), with exercise regimes which were aimed at “improving aspects of physical fitness such as cardiorespiratory endurance, strength and flexibility” (p. 282).

2.1 Work conditioning programs

A position paper published by The Work and Functional Conditioning Industry (NSW) (1998) defined ‘work conditioning programs’ as ‘work related’, physical rehabilitation with the goal of restoring the client’s physical capacity and function so s/he can be returned to, maintained at or upgraded at work. This would be achieved through restoration of the individual’s systemic, neurological-musculoskeletal (strength, endurance, movement, flexibility and motor control) and cardiopulmonary functions. This may be carried out through a specific exercise program or in a real or simulated work or functional task. The definition also noted that these activities may require a multidisciplinary approach, but Gibson et al. (2002) suggested these programs usually required fewer health care disciplines and were less time consuming than the more intensive work-hardening programs.

An earlier report by a senior physiotherapist with the Commonwealth Rehabilitation Service (CRS) Coe (1995) indicated that work conditioning programs consist primarily of exercises aimed at restoration of basic physical fitness than specific preparation for return to work, although that may be the next step. Gibson et al. (2002) also noted that work-conditioning programs “have an emphasis on the physical conditioning of the worker using exercise equipment and aerobic conditioning, with less use of work-related tasks than work-hardening” (p. 282).

2.2 Work hardening

These are considered to be more comprehensive than work conditioning programs in that they are typically delivered by a range of health professionals and often residential in nature. Real or simulated work activities may be used to restore physical, behavioural and vocational functions. They often operate on an 8 hour per day basis, five days a week for up to eight weeks.

Based on the Commission on Accreditation of Rehabilitation Facilities in the US, King (1998) defined work hardening programs as highly structured, goal-oriented, individualised treatment aimed at maximising the individual’s ability to return to work. Coe’s (1995) report indicated that work hardening programs address not only physical fitness, but psychological and specific work-related difficulties, such as fears and tolerance for standing at a bench or pushing/pulling tasks, as well. These links between performance of work-related tasks, in real or simulated settings, in relation to work-hardening programs has also been made by others (eg. Niemeier et al., 1994; Wyrick et al., 1991). Niemeier et al. (1994) also suggested that these programs might be seen as fitting in between medical interventions and return to work.

2.3 Functional conditioning

The Work and Functional Conditioning Industry (NSW) (1998) defined functional conditioning as 'function related', in which the objective was 'to restore the client's physical capacity and maximise function'. The methods employed were similar to those employed in work conditioning programs, especially through the use of physical rehabilitation, except that in this case return to work was an indirect rather than direct goal. However, this definition of functional conditioning is almost identical to Coe's (1995) definition of work conditioning, so it will not be commented on separately.

2.4 Functional restoration

This term refers to 'any intervention aimed at restoring a reasonable functional level for daily living' (Bendix et al., 1996). Originally, the term 'functional restoration' was coined by Mayer et al. (1985) to refer to a specific program their group had developed, but others have since used the term to describe other, similar, programs. It should be noted that Gatchel and Mayer (1991) have strongly questioned the adequacy of many of these other programs and pointed to differences in content between their original 'functional restoration program' and subsequent versions developed by others. Nevertheless, Bendix et al. (1996) provided a reasonably comprehensive account of typical functional restoration programs.

They are generally characterised by limiting passive modalities to use of measures like cold packs. The patient is strongly encouraged to take responsibility for their participation in the program and its outcomes, with staff acting as supporters and teachers rather than therapists. These programs are usually multidisciplinary in staffing. There is a heavy emphasis on physical rehabilitation through the use of muscle training addressing coordination, trunk control, lumbar flexibility, aerobic capacity, lifting capacity and sitting tolerance.

Typically, full-time functional restoration entails a daily schedule that is similar to a working day of 8 or 9 hours. Three week programs are common, but they range from two to six weeks.

Components typically include aerobic exercise sessions, muscle strengthening exercises (often using machines for resistance and measurement), stretch exercises, graduated increments in lifting different weights at different heights, push and pull exercises, practice of sitting and standing working positions (often in simulated work settings), muscle relaxation exercises, sessions on pain management and coping strategies, goal setting, the use of visualisation and distraction techniques, along with education on anatomy, physiology and pathology as well as medication and sexuality. Encouragement for the resumption of recreational activities is also provided.

Return to work or 'workability' are often used as outcome measures, but so too are measures of specific functions (eg. aerobic capacity, lumbar flexibility and coordination) and specific tasks (eg. stair climbing, sitting tolerance, lifting capacity, etc.).

2.5 Pain management programs

These programs were primarily developed in pain clinic and rehabilitation settings with patients reporting intractable (untreatable) chronic pain conditions (eg. Fordyce, 1976; Loeser et al, 1990). As with the other programs described here, restoration of function has usually been seen as a primary goal rather than pain relief, although in most pain management programs withdrawal from unhelpful medication and improvement in mood (usually depression) have also been common goals. Return to work was not usually seen as a primary goal of these programs although it was often recognised that this could be an outcome once the patients were managing or controlling their pain more effectively.

Typically, pain management programs have been multidisciplinary in nature and the overwhelming majority have been based on operant and cognitive behavioural principles. Thus, psychological input has been a central theme of these programs rather than something added on to an exercise regime. Most PMPs are conducted in non-residential settings now, but earlier ones were often intensive programs of from 3 to 9 weeks in duration. More intensive versions operate on a 3 to 4 week basis, (5 days a week), but less intensive versions may be held on 3-4 hours, one day a week for 6-8 weeks (eg. Williams et al., 1996; Philips, 1988).

PMPs typically consist of a graded exercise program aimed at improving physical function with the explicit expectation that this will lead to specific functional goals in the patient's daily life. The relevance of specific muscles is usually given less prominence than enhancing functional activities, and in contrast to many functional restoration programs, exercise machines are rarely used. Medication rationalisation and withdrawal is a common feature of these programs, as is education about pain, training in pain coping strategies (eg. activity pacing, goal setting/planning, using relaxation, identifying unhelpful beliefs and thought processes and then changing these to more adaptive responses, upgrading more pleasurable daily activities and encouraging the patient to take responsibility for managing his/her pain and recognising his/her achievements). Most PMPs also encourage the significant others in the patient's environment (family, other health professionals) to desist from unintentional reinforcement of pain behaviours. Training in skills for general problem-solving, stress and sleep management, dealing with flare-ups in pain and maintenance of functional gains are also commonly provided.

In some cases, especially in earlier intervention (at the sub-acute stage or 1-6 months post-injury, depending on definition), a PMP may be solely conducted by a clinical psychologist 2 hours a week for 6 weeks with no specifically-linked exercise program (eg. Linton and Ryberg, 2001). In this case, the participants were all working, but were starting to miss days at work due to low back pain.

While pain management programs may appear quite similar in philosophy and content to many so-called 'work hardening' and 'functional restoration' programs (eg Bendix et al., 1996; Mayer et al., 1985), especially in relation to their focus on functional activities, they appear to differ in that they specifically address pain, medication use, and mood disturbance than seems generally to be the case with most of the work-hardening and functional restoration programs described. PMPs are probably closer in practice to medical interventions, in that due to their medication focus they necessarily require a degree of medical involvement and they may be used in conjunction with specific medical interventions (eg. Loeser et al., 1990; Nicholas and Wright, 2001).

2.6 Conceptual links between programs

Despite the different labels, it is noticeable that these programs have much in common. In particular, most include some form of structured exercise or activity. To some degree, all seem to be based on the premise cited by Polatin and Mayer (1996) that inactivity due to avoidance of painful activities can lead to what Mayer and Gatchel (1988) described as the 'deconditioning syndrome', which, in turn can lead to more pain from attempts to move joints stiffened and muscles weakened by disuse. As a result of this disuse or deconditioning syndrome, Polatin and Mayer asserted that muscles may atrophy and become easily fatigued, cardiovascular endurance may decline, as well as neuromuscular coordination and the ability to perform complicated repetitive tasks. The thesis underlying all these programs is therefore the expectation that deconditioning syndrome can be reversed by mobilisation and exercise. The associated expectation is that as physical and functional capacities improve so will the person's capability of returning to work.

However, there seems to be little agreement on which exercises should be included in these programs. Some programs refer to specific muscle groups being targeted (see review by Maher et al., 1999), while others refer to more generalised exercises used as a 'tool' to promote increased functional capacity (eg. Harding, 1998). In fact, Maher et al. (1999) suggest that instead of addressing the question of exercises *per se*, it may be more useful to think of what they termed 'activity prescription'. They suggested that this term might incorporate both formal exercises and simple advice on resuming more normal activities. This would seem to be consistent with the approach used by researchers like Lindstrom et al. (1992) and Frost et al., (1995).

In his conclusions, Coe (1995) suggested that both work conditioning programs and work hardening programs are forms of functional restoration. In turn, he indicates they may be differentiated from each other on the basis that work conditioning programs are less intensive and more based on exercise training with less overt psychological input, especially less cognitive behavioural therapy. However, there is no unanimity on this point. For example, the Lindstrom et al. (1992) program is often described as an example of a work-conditioning program, although Lindstrom et al, themselves, refer to it as a 'graded activity program which utilised behavioural principles'.

Recently, in a systematic review of randomised trials of work conditioning, work hardening and functional restoration based on Cochrane methodology, Schonstein et al. (in submission) considered that work conditioning, work hardening and functional restoration/exercise programs were effectively all variants of what they termed physical conditioning programs. Schonstein et al. did not examine pain management programs, but 'reconditioning' of muscles is often an element of these programs too, although they tend to address other problems as well.

2.7 In summary

The available literature, both local and international, would suggest that all these programs may be viewed as variants of physical conditioning programs. They contain many similar elements, especially exercises. Some may have more or less of simulated work tasks, explicit psychological input, and different health care disciplines. There appears to be a gradient between some programs on the basis of intensity (amount of time involved) and comprehensiveness (in terms of staffing and range of problems addressed).

The simplest type of program, work conditioning, appears to be little more than a structured exercise regime for people who are thought to need some form of 'fitness' training, either at home, in a gym or at work. Next most complex would be work-hardening programs, which vary in time commitment but generally include intensive rehearsal of actual or simulated work tasks as well as exercises. These programs often address additional psychosocial (personal and work-related) difficulties as well. In general, functional restoration programs appear to be a variant of work-hardening programs. Although some functional restoration programs (eg. Bendix et al., 1996; Mayer et al., 1985) may be seen as both pain management and functional restoration programs, it may simply reflect the obvious point that they are dealing with people with problems in common and they share the common goal of trying to help these people resume a more normal lifestyle despite their pain.

Thus, it should not be surprising that these programs end up looking very similar, but it does raise questions about the value of using different labels to describe them.

Of the different types of program it could be said that pain management programs can be more distinct in their explicit attention to pain and pain-related medication as well as mood and adjustment issues (eg. beliefs, coping strategies). In that sense, pain management programs are generally closer to medical interventions and are often used in combination with medical interventions. However, there is wide variation between different pain management programs as well, in terms of intensity and comprehensiveness.

In sum, there is no standard, widely accepted definition for any one of these programs.

Clearly, the blurring of definitions for the various types of physical conditioning programs leads to obvious difficulties for any evaluation of their value. What is also apparent from examination of the published studies is the marked variability in the types of patients treated and their problems.

3. Problems addressed by physical conditioning programs

3.1 Chronicity and disability

The term 'chronic' pain typically refers to pain which has persisted for more than 3 months (eg. Merskey and Bogduk, 1994). Pain which has persisted for only 3-4 weeks is usually referred to as 'acute' pain and pain lasting from 4-weeks to 3-months is often referred to as 'sub-acute' (eg. Abenhain et al., 2000). However, these definitions are simply conventions or generally agreed terms and there is no clear clinical or pathological basis for differentiating them other than pragmatic considerations. The Classification of Chronic Pain published by the International Association for the Study of Pain (IASP), for example, notes that "for nonmalignant pain, three months is the most convenient point of division between acute and chronic pain, but for research purposes six months will often be preferred" (Merskey and Bogduk, 1994, p. xi).

Thus, acute pain is expected to settle within hours or a few days and when that doesn't happen such pain may then be referred to as sub-acute and, eventually, chronic. Typically, in health care settings, the focus of attention will shift with each stage. In the more acute stages, the basis of the pain (eg. injury or pathology) will be sought and treatment instituted which is aimed at the presumed source of the pain, or the patient may be advised that the pain should settle of its own accord as healing takes place. However, if these expectations are not realised and no specific cause can be identified or treated directly, then the focus of treatment tends to shift to symptomatic control and encouragement for the patient to gradually resume normal activities as best they can, despite their pain. Thus, in the acute stages more effort is directed towards investigations, tests and diagnostic manoeuvres, as well as pain relief (Loeser and Cousins, 1990).

However, most common industrial injuries have a high recovery rate and the vast majority of injured workers resume work within days of the injury or 1-2 weeks later (eg. Cohen et al., 2000). For this large group little treatment or even investigation is likely to be required (Waddell and Burton, 1999). However, if an injured worker does not resume work within 4-12 weeks after sustaining an injury and no significant physical pathology has been identified for treatment, then s/he will be at increasing risk of never returning to work (eg. Waddell and Burton, 1999). Typically, the most frequently consulted health professionals in the acute stage of an injury will be a general medical practitioner, physiotherapist and, over time, an orthopaedic surgeon (Cohen et al., 2000).

There is good evidence that in the absence of significant physical pathology in that acute period, particularly with low back pain, basic reassurance and encouragement to resume normal activities, including work, is sufficient intervention in most cases (eg. Indahl et al., 1995). But not in all cases. For example, in the Indahl study at 6-months after treatment ended over 30% of workers given this approach had still not returned to work. Nevertheless, this figure was still better than the available local alternative options in Norway (where the study was conducted).

However, as pain and associated disability persist, the focus of treatment turns from cure or expectation of resolution with time to management and restoration of function in spite of pain. Many of those who do return to work after musculoskeletal injuries do so despite persisting pain (eg. Cohen et al., 2001; Fordyce, 1995; Sanderson et al., 1995).

3.2 Deconditioned muscles versus psychosocial factors

In contrast to one of the key assumptions underlying physical conditioning programs (eg. Polatin and Mayer, 1998), Waddell and Burton (1999) reported that there was little evidence to support notions that 'deconditioned muscles' or other similar somatic features were predictive of work-related disability in workers with low back pain.

Instead, Waddell and Burton (1999) concluded there was "strong evidence that individual and work-related psychosocial factors play an important role in persisting symptoms and disability, and influence response to treatment and rehabilitation" (p. 21).

Similarly, Linton (2000) in his review of 37 prospective studies of persisting neck and back pain, concluded that psychosocial factors (eg. distress, unhelpful beliefs, fears, workplace issues) made significant contributions to development of disability in patients with persisting musculoskeletal

pain. In fact, this review indicated that psychosocial factors were better predictors of future disability than standard physical measures of injury/impairment.

Thus, there is growing consensus that the pursuit of physical changes (whether they be injuries or 'deconditioning') and somatic treatments in workers reporting persisting pain and difficulties in returning to work needs to be tempered by an assessment of possible psychosocial factors (eg. Loeser, 1996; Waddell and Burton, 1999; Linton, 2000). Where necessary, these factors should also be addressed in any intervention or treatment. The implication of this research is that if these factors are not addressed, treatment outcomes risk being compromised.

In the light of this mounting evidence, the interesting questions for physical conditioning programs are:

- (i) How can an exercise program be justified if it is aimed at reconditioning muscles when there is little good evidence that deconditioned muscles are causally related to disability?
- (ii) To what extent are these programs assessing and addressing the psychosocial factors which may be contributing to the disabilities of their patients/clients?

Examination of the published literature in this area indicates that most physical conditioning-type programs appear to deal almost exclusively with workers reporting chronic back pain, especially chronic low back pain (eg. Bendix et al., 1998; Mayer et al., 1985; Teasell, 1996). Some also include workers with chronic neck pain, but these are few and a recent attempt at a systematic review of suitable randomised controlled studies in this area could only locate two studies which met their quality criteria (Karjalainen et al., 2001). In contrast, much of the pain management literature refers to people with chronic pain at multiple sites or mixed groups of people with back, neck, or limb pain (eg. Morley et al., 1999).

Given that the outcomes from the programs dealing with multiple chronic pain problems are similar to those dealing with chronic back pain alone, it would seem reasonable, and pragmatic (at least until there is good evidence to the contrary), to use the available evidence from studies with mixed pain-site groups and not simply wait until there was sufficient evidence for physical conditioning or pain management programs addressing all pain sites separately.

In the main, the injured workers' problems may be expected to share many similarities, regardless of actual pain site, especially the psychosocial variables (eg. distress, unhelpful beliefs, fears, activity avoidance, medication dependence).

In any event, there is also wide variation in disability levels amongst injured workers with pain in the same region as the return to work data reveal (eg. Waddell and Burton, 1999). By the time such workers attend a physical conditioning program they are likely to have been off work for varying amounts of time, from weeks to years. As noted above, there is a considerable amount of evidence that each of a number of inter-worker psychosocial differences can have a marked effect on any outcomes that may be achieved from physical conditioning or rehabilitation (eg. Linton, 2000; Waddell and Burton, 1999).

Despite this evidence, and the variations between workers attending physical conditioning programs, examination of program descriptions provides little insight on the degree to which these features have been assessed prior to the program and targeted during the program.

To illustrate:

The Oland and Tveiten (1990) study, which has been used to question the effectiveness of functional restoration programs, described a six day a week for four weeks program in Norway for patients with chronic low-back pain and disability. The program was staffed by physiotherapists, sports instructors, nurses, vocational counsellors and physicians. Patients had a median sick leave of 13 months and those thought to have Somatoform Disorder, Fibromyalgia, or had a history of back operations, olisthesis, or inflammatory disease were excluded. The program was said to be based on the Mayer program in Texas, and had a strong exercise and education focus. However, apart from their work status and workers compensation status, no information was provided on other psychosocial variables, such as fears, mood disturbance, beliefs, use of medication and other coping strategies. The only mention of assistance with psychosocial factors referred to a nurse with psychiatric training being available if needed. Thus, it would seem that

psychosocial factors were not seriously addressed in this program. This contrasts to a significant degree with the content of the Mayer program.

Bensten et al. (1997) described a program for women with chronic low back pain which entailed home visits by staff for training in exercises. But psychosocial information was very limited and no intervention for any that were identified was mentioned.

Faas et al., (1995) described a program for people aged between 16 and 65 years with acute (less than 3-weeks) back pain. The program consisted of individual instruction from a physiotherapist on exercises and advice on anatomy and activities of daily living. However, information on psychosocial factors was limited to subjects' ages, gender, education levels, employment status, previous treatment and back pain, and Nottingham Health Profile, but no interpretation of the psychosocial factors was provided so we don't know if the group studied were particularly disabled, distressed or medication dependent, for example. Equally, no intervention was described for those who were identified as particularly fearful or distressed. It appears that exercises and advice on anatomy and daily activities were expected to suffice.

3.3 In summary

The focus of assessment and treatment of injured workers typically shifts from attempts at identifying underlying causes and symptom relief in the earlier, more acute stages after injury to issues of management and restoration of function despite pain as pain and associated disability persist.

The assumption that underpins most forms of physical conditioning programs for injured workers with persisting pain and disability, namely the need to reverse the effects of deconditioned muscles, is increasingly being challenged. Instead, there is considerable evidence that psychological and social/environmental factors play an increasing role in disability (and work loss) as pain persists.

However, it appears that the degree to which psychosocial factors are addressed in the physical conditioning programs is quite variable. In particular, it seems that psychosocial aspects of patients admitted to these programs in the more acute stages (less than 12 weeks after injury) are minimally assessed. Given the evidence that these factors are more predictive of disability than most physical and medical measures in workers reporting neck/back injuries, there would seem to be a good case for physical conditioning programs to attend to these issues far more routinely.

4. Outcomes

This section is based on a search in Medline and PubMed (key words: work conditioning, work hardening, functional restoration, musculoskeletal pain, chronic pain) as well as the reference lists of the located papers, studies, guidelines and systematic reviews already known to the author and by asking colleagues for relevant papers. Papers were selected on the basis that they were either randomised controlled trials, reviews of randomised controlled trials or guidelines based on randomised controlled trials.

Particular systematic reviews and guidelines reviewed included:

Abenhaim et al. (2000). The role of activity in the therapeutic management of back pain; Report of the International Paris Task Force on Back Pain. *Spine*, 25: 15-335.

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4.1 Natural history

Consideration of the natural history of these conditions, as far as is known, should be taken into account in evaluating reported outcomes of treatments, especially in the earlier acute and sub-acute phases following injury. Waddell and Burton (1999), for example, pointed out that not only was low back pain common amongst adults of working age (60-80% experience it at some time), but it is also a recurring problem. However, most workers with low back pain do return to work (73% within 6-months – WorkCover NSW, 1996), often despite persisting symptoms.

Those who remain at work despite their back pain tend to have better long-term outcomes than those who stay off work (eg. Sanderson et al., 1995). Even so, Waddell and Burton caution that some consideration needs to be paid to the type of work an injured worker returns to and that, in general, those at risk of recurring low back pain should avoid the more physically-demanding jobs.

In sum, expectations of a 'cure' for problems like low back pain are unrealistic and recurrences are likely almost regardless of work status. Persisting low back pain should not prevent someone from returning to work providing the work is manageable (or modifiable) and adequate support is available as well as good employee-employer relationships are maintained. Rather than 'cure' or complete symptom relief, the prime goals of any treatment for conditions like low back pain should be to facilitate increased function and, where feasible, return to suitable work.

In the clinical context of considering options for the management of recently injured workers, it is also important to consider what the available alternatives might be at present. The guidelines produced by Carter and Birrell (2000) for the Faculty of Occupational Medicine, London, based on Waddell and Burton's (1999) systematic review of treatments for acute low back pain also cautioned that symptomatic relief measures (eg. pain relief interventions, like medication, nerve blocks, TENS) may be used but they "should supplement and reinforce, and must not interfere with the primary goal of rehabilitation" (p. 12).

Waddell and Burton also concluded that "various treatment for chronic LBP may produce some clinical improvement, but there is strong evidence that most clinical interventions are quite ineffective at returning people to work once they have been off work for a protracted period" (p. 23). Furthermore, these authors also noted there was moderate evidence that for the injured worker with low back pain who is having difficulty returning to normal activities at 4-12 weeks, changing the focus from purely symptomatic treatment to more of an activity-based rehabilitation program can produce faster return to work, less chronic disability and less sickness absence.

If further evidence were required of the limited utility of many somatically-focussed symptom-based treatments in this field, a recent, large, six country, prospective study with people sick-listed due to low back pain provides sobering results. This study concluded that "almost none of the commonly occurring and frequently practiced medical (including physiotherapy and chiropractic)

interventions ... had any positive effects on either recorded health measures or work resumption” (Hansson & Hansson, 2000, p. 3055).

Thus, evidence that commonly practised medical (and other somatic) treatments for persisting pain conditions are effective in terms of health outcomes and work restoration is quite limited. It is against this background of the natural history of these conditions and their available treatment options that other interventions should be considered.

4.2 Who is being treated in these programs?

Bearing in mind the difficulties in comparing different programs which have similar names but different components, as well as those having different names but similar components, and that they deal with patients with often widely varying problems, the initial impression is that the available evidence for these interventions is quite patchy. However, this impression may be misleading, especially when it is considered that many systematic reviews appear to effectively regard all patients with back pain as identical. Thus, titles of reviews frequently refer to conditions like ‘low back pain’, or ‘chronic musculoskeletal pain’, or ‘acute low back pain’. For example, Teasell and Harth’s (1996) review of functional restoration programs for patients with chronic low back pain concluded that support for these programs was lacking. But it appears that no attention was paid to the possibility that the variation in outcomes between studies may have been due to differences in types of patients treated.

The problem of heterogeneous patient populations (as well as heterogeneous treatments and outcome measures) was recognised by van Tulder et al. (2000) in their review of exercise therapy for low back pain. As a result these authors decided not to use the statistical methodology known as meta-analysis, but to systematically review the studies which met their criteria by evaluating them according to a system of levels of evidence. These authors also divided the studies reviewed on the basis of chronicity, defining acute low back pain as less than 12 weeks, and chronic low back pain as more than 12 weeks.

While this van Tulder et al. review does represent an improvement over many earlier reviews, the use of different definitions of chronicity to those used elsewhere (eg. Abenheim et al., referred to acute as 1-3 weeks, sub-acute as 4-12 weeks, and chronic as more than 12 weeks, while Maher et al., 1999, referred to acute as less than 6-weeks, sub-acute 6-weeks to 3-months, and chronic as more than 3-months) can be confusing and it can also be argued that chronicity of symptoms does not necessarily equate with level of disability. Thus, patients with chronic back pain usually vary considerably in their degree of disability, which means that van Tulder et al.’s review is still left with comparing interventions on patient groups which differ on levels of disability and psychosocial status.

An example of this can be seen in the Frost et al. (1995) study where their data indicated the patients treated had a significantly higher level of confidence (prior to treatment) in their ability to perform a range of daily activities despite pain than patients with mixed site chronic pain conditions treated at another English hospital (Williams et al., 1996).

Similarly, the systematic review of behavioural therapy for chronic low back pain by van Tulder et al. (2000) drew conclusions about the addition of behavioural therapy to standard rehabilitation based in part on a study by Altmaier et al. (1992). Yet Altmaier’s study specifically excluded any patients who were considered depressed or reported using an opioid drug or had litigation pending in relation to their injury. As a result the fact that there was no difference in outcome in that study between the two groups is hardly surprising (they were doing quite well already).

In addition, the van Tulder review included a study by Turner et al. (1991), also examining the addition of a behavioural therapy component to an exercise program. Again the reviewers neglected to point out that the subjects were mostly working, and had attended the program after responding to advertisements in the media rather than being referred to a pain clinic by their doctor. As a result the population in that study was much less disabled and much less distressed and much less medication dependent than other studies reported in that review (eg. Nicholas et al., 1991; 1992).

Thus, due to the differing selection criteria used, the results of the review of these studies cannot be automatically generalised to populations of injured workers. Yet, these studies were accepted

in the review because they were methodologically sound, even if some were (clinically) of limited value. Unfortunately, the naïve reader of that systematic review (and others) could easily overlook these details if they simply looked at the conclusions.

When considering the question of who is being treated in the studies on these different programs, it is worth noting recent epidemiological research conducted in New South Wales by the NSW Department of Health (Blyth et al., 2001). This study revealed that about half the (close to) 20% of the population who report having a chronic pain condition (more than 3-months) also report little interference in lifestyle due to their pain. Thus, the treatment outcome literature reviews are not referring to all people with chronic back pain but only certain sub-groups (mostly those seeking help). How they might differ from those with similar pain who do not seek help is not known. But Linton's (2000) review does suggest that psychosocial factors are likely to play a significant role.

A recent review, also in New South Wales, of medical assessment and treatment patterns in relation to injured workers (with either neck/arm or back pain) found that those who had returned to work despite persisting pain were essentially no different medically from those who had not returned to work (Cohen et al., 2000). Both groups had received similar treatments but the main difference in treatments given was that those who had not returned to work had received a great deal more of these treatments. They also reported many more psychosocial problems than those who had returned to work, which is consistent with the findings in the literature reported earlier by Linton (2000). In the main, these psychosocial problems were rarely addressed by their treating doctors and physiotherapists, even when noted.

In sum, the reviews of different treatments in the scientific outcome literature are based on fairly select samples of people. How representative they are of all people with similar pain or injury problems is usually unknown and thus the generality of the findings of much of the treatment outcome research needs to be considered with caution.

4.3 Matching patients and treatments

Acute/sub-acute cases (0-12 weeks after injury)

In relation to acute low back pain, Waddell and Burton (1999) in their systematic review of the treatment literature, concluded that there is "strong evidence that advice to continue ordinary activities of daily living as normally as possible despite the pain can give equivalent or faster symptomatic recovery from acute symptoms, and leads to shorter periods of work loss, fewer recurrences and less work loss the following year than "traditional" medical treatment".

Interestingly, Van Tulder et al. (2000a) concluded in their Cochrane-based systematic review of exercise therapy that specific exercises are not more effective than other active treatments for acute low back pain.

However, for cases where the worker is having difficulty returning to work at 4-12 weeks, Waddell and Burton concluded there was "strong evidence that intervention packages at the sub-acute stage can produce desirable occupational outcomes" (p. 23). By this they meant programs containing education (aimed at managing pain and disability, as opposed to simply anatomy/physiology), reassurance and advice (to stay active), progressive fitness exercises, pain management (using behavioural principles). Ideally, these interventions should be conducted at the workplace or linked to the workplace and directed to return to work. They also cautioned that the use of symptom-relief measures (eg. analgesics, nerve blocks, massage) should support and not interfere with rehabilitation.

Waddell and Burton also concluded that there was moderate evidence that such approaches were more effective if they were combined with organisational (workplace) arrangements aimed at facilitating return to work. However, Waddell and Burton did not examine programs directed at long-term (chronic) cases.

Linton and Anderson (2001) demonstrated that a brief cognitive-behavioural pain management (conducted by a clinical psychologist) intervention for workers with sub-acute low back pain (defined by them as 6-8 months) was more effective than standard rehabilitation and information provision in terms of lost sick days and reduced use of health care. These effects were still present a year later and there was a 9-fold advantage for the cognitive-behavioural approach over the alternative interventions in terms of lost work days. Interestingly, however, Marhold et al.

(2001) demonstrated that this same brief cognitive-behavioural pain management intervention for workers with sub-acute low back pain (less than 8 months) was significantly less effective with patients whose pain was chronic compared to those with more sub-acute pain.

The most recent study to have addressed the question of which treatment for which patients was reported by Haldorsen et al. (2002). They compared three different treatment modalities with a large sample of injured workers with a range of musculoskeletal conditions who still had jobs but had been sick-listed for at least 8-weeks in the previous 2-years. Rather than simply randomly assigning the patients to one of the treatments, the authors first classified them according to three prognostic categories for likely return to work (based on a combination of questionnaire evaluation of psychosocial factors and physiotherapy assessment). Then they randomly assigned patients in each category to one of the different treatments. The treatments consisted of 'ordinary treatment' (referral to a general practitioner combined with some physiotherapy, along the lines previously employed as a control by Indahl et al., 1995, and others); 'light multidisciplinary treatment' (like a light mobilisation program or encouragement to resume normal activities, again similar to that reported by Indahl et al., 1995, 1998); and 'extensive multidisciplinary treatment' (4-weeks of an intensive program similar to that described by Jensen et al., 1994 and Bendix et al., 1997, 1998). Patients were followed up 14 months post-treatment.

The results indicated that injured workers assessed to have a good prognosis of return to work achieved good outcomes regardless of whichever level of intervention they received. While those with only medium prognostic profiles benefited equally from the light and intensive multidisciplinary programs, but not from 'standard or ordinary' care. However, those assessed to have a poor prognosis responded best to the intensive multidisciplinary treatment with significantly better return to work rates up to 14 months post-treatment than light mobilisation (55 vs 37%).

It should also be remembered that Indahl et al's (1995) study actually found that over 30% of patients with sub-acute, non-specific low back pain treated with reassurance and encouragement to resume normal activities did not return to work within 6-months of the treatment ending. Haldorsen et al.'s results would suggest that those who failed to return to work in Indahl et al.'s study may have been from this group with poor prognostic indicators in the first place. Thus, they may well have received the wrong treatment.

The Haldorsen et al. study provides graphic illustration of the likely error in much of the treatment outcome literature for persisting musculoskeletal pain in simply randomising all patients to one or other treatment and then comparing outcomes. Experimental designs which involve randomising cases between treatments are expected to result in similar distributions of variations in the cases treated between treatment groups, but they only allow us to conclude that this or that treatment is effective or ineffective for people with, say, low back pain, relative to the alternative tested. They tell us something about the treatment's relative effectiveness but not much about for whom it works best. The Haldorsen et al. study neatly describes which patients are likely to be helped by which type or level of treatment.

Chronic cases (more than 12 weeks post-injury)

Interventions for chronic pain conditions were reviewed by Morley et al. (1999) who examined randomised controlled trials of cognitive behavioural pain management programs for patients with a range of chronic pain conditions. They concluded that these programs were effective in reducing pain experience and disability, as well as improving the use of active coping strategies. Return to work was not assessed as many pain management programs by their nature (they are often set in hospital pain clinics where many patients' pain problems are not work related) do not address this issue, in the same way that most studies of medical and surgical procedures with these patients do not measure return to work outcomes.

However, a useful example of improved return to work outcomes after combined physical conditioning and cognitive-behavioural pain management versus physical conditioning alone was reported by Bendix et al. (1998). This study found that over a 2-year follow-up, those workers who received the combined physical upgrading and cognitive-behavioural intervention were three times less likely to have sick leave than those in the physical conditioning group. The combined group could be considered to have received a treatment very similar to an intensive cognitive behavioural pain management program.

Interestingly, Van Tulder et al. (2000a) concluded from their systematic review that while specific exercises are not more effective than other active treatments for acute low back pain, there was evidence that exercises may be helpful for patients with chronic low back pain to resume more normal activities, including work. Even so, whether exercises are actually necessary or graduated increments in activity would suffice was not established. A recent study by Vlaeyen et al. (1999), for example, indicated that simply encouraging patients who are avoidant of certain activities due to fear or pain and/or re-injury to gradually engage in these activities achieved better short-term outcomes than general exercises.

Van Tulder et al. (2000b) systematic review of behavioural treatments for chronic low back pain concluded that these interventions seemed to be an affective treatment for patients with chronic low back pain, but they added a caveat that it was unknown which patients with chronic low back pain might benefit most from which type of behavioural treatment. Apart from the short-comings identified earlier in that review, there have since been a number of studies published which provide some answers to that caveat (eg. Marhold et al., 2001; Haldorsen et al., 2002).

More recently, Guzman et al. (2001) concluded after a systematic review of multidisciplinary team approaches (all of which included cognitive-behavioural input) to chronic back pain that there was support for the more intensive versions of these programs relative to less intensive versions of the same sorts of program.

Similarly, Williams et al. (1999) demonstrated that a more intensive multidisciplinary cognitive-behavioural pain management program for a mixed sample of chronic pain patients was significantly more effective than a less intensive version of the same program in terms of mood, pain medication, and functional outcomes. Importantly, these differences were still present 1-year after the end of the program.

Most recently, Schonstein et al. (in submission to Cochrane Collaboration), examined randomised controlled trials of physical conditioning programs (including those described as work conditioning, work hardening and functional restoration). Schonstein et al. concluded that there is evidence that these programs “that include a cognitive-behavioural approach can reduce the number of sick days lost for workers with chronic back pain” (p.5). They also concluded that “there is no evidence for or against specific exercises which are not accompanied by a cognitive-behavioural approach being effective” (p.5) (in terms of sick days lost, for both acute and chronic back pain cases).

4.4 In summary

The treatment outcome studies available suggest that while reassurance and encouragement to resume normal activities can be effective, relative to more symptom-relief based treatments, in the first few weeks after the onset of low back pain, this approach is less effective with more chronic and disabled cases.

Similarly, there is evidence that general exercises may be more useful in chronic cases than in acute cases. However, this mainly applies to those exercises that are coupled with the application of cognitive-behavioural therapy methods for maintaining exercises and pain management.

In the more disabled, distressed and chronic cases there is stronger support for more intensive cognitive-behavioural programs which include a focus on achievement of functional goals as well as exercises, relative to lighter, less intensive versions of the same approach.

4.5 Return to work

Return to work is a commonly cited and sought after goal associated with physical conditioning programs. However, while reviews of the outcomes of these programs (and other interventions) typically examine this question (eg. Teasell and Harth, 1996; van Tulder et al., 2000a,b), few appear to consider how increased levels of activity or fitness that may be achieved in these programs might translate into return to work outcomes.

It is widely acknowledged that return to work for injured workers is often based on a number of factors, including characteristics of the injured worker (behaviours, mood, fears, beliefs, skills, education) (eg. Linton, 2000), the availability and nature of the job (eg. Waddell and Burton, 1999), and the workplace’s ability to facilitate the process (eg. Hunt and Harbeck, 1993). Even so, it is also evident that what seems to work in one setting may not apply generally, nor may simply

attending to one dimension by itself be sufficient. A good example of this would be simply performing rehabilitation in the workplace, which has been associated with successful outcomes in some studies, but not in all (eg. Greenwood et al., 1990; Loisel et al., 1997). However, when such factors are attended to in combination, such as addressing the individual worker's problems and improving workplace arrangements at the same time, then better results may be obtained (eg. Carter and Birrell, 2000).

However, examination of the descriptions of physical conditioning programs rarely provides much insight into how return to work have been facilitated as a result of a given program. Even such well-known programs as that of Mayer et al. (1986), Hazard et al. (1989), Bendix et al. (1996) give little indication of this matter, apart from some mention of using a vocational counsellor and work simulation activities. Given the evidence cited by Waddell and Burton (1999) that return to work rates can be enhanced by workplace arrangements designed to facilitate it, it seems a curious omission from these studies, given the importance of the return to work goal. But it does make interpretation of the results of these studies harder to interpret.

4.6. Treatment providers

A neglected topic in reviews of the treatment outcome and physical conditioning literature concerns the qualities and adequacy of the treatment providers. The implicit assumption seems to be that once a treatment is identified as useful then virtually anyone can do it (or use its name to describe what they do). There are regulations governing who prescribes medicines and who performs invasive treatments, but it seems that such standards are overlooked in the area of physical conditioning, at least in Australia.

Given that the published outcome literature in physical conditioning (and pain management) is generally (but not always – see below) produced by groups led by highly experienced and qualified clinicians, it would seem implicit that anyone attempting to use similar interventions should be similarly qualified to do it (or supervised by someone who is). One measure of that could be whether or not their outcomes are consistent with those of the better published literature (as benchmarks) for similar patients.

The common experience of those working with injured workers who report persisting pain is that preparation of these health professionals for this sort of work, where symptom relief measures are less emphasised compared to encouraging patients to become more active despite their pain and other symptoms, is often quite limited. There is some evidence in support of this impression. For example, Jones' (1998) study of education on pain and its management in Australian undergraduate physiotherapy schools found considerable variation in quality and quantity between schools. Overall, Jones found that physiotherapy students felt poorly prepared in their training in the area of pain, especially in the cognitive and behavioural aspects of pain.

Similarly, the training of Bachelor's degree psychologists in Australian Universities generally includes almost no mention of pain, pain management and injury management (together with no training in psychological therapies). Being a Registered Psychologist in NSW is not a reliable index of competence in this area either as such registration can be obtained without any clinical training or supervision, let alone supervision and training in relation to the assessment and management of pain and injury. In contrast to Bachelor's degrees in Psychology and Registration alone, post-graduate university clinical training (Masters and Doctorate) courses generally place strong emphasis on training in cognitive-behavioural therapies (which have been repeatedly been shown to help people with persisting pain and associated adjustment difficulties). However, the amount of attention given to pain/injury management in these courses is variable. This suggests that mere possession of a post-graduate degree in clinical psychology may not be sufficient to provide confidence that the degree-holder is competent to deal with some of the common problems of injured workers. Additional training may therefore be required in this regard for clinical psychologists but at least it would build on established competencies in clinical assessment and cognitive-behavioural therapies.

Training of medical students in the field of pain management is also generally poor, with most appearing to make only passing reference to it (with one or two lectures only) and the impression given is that it maybe something individual doctors might take up at a post-graduate level. The University of Sydney, for example, offers the only post-graduate courses in this field in Australia.

Training for psychiatrists in this field is also very limited. A survey of practising Australian psychiatrists, for example, indicated that while 78% of those surveyed felt that specialised training was required for those psychiatrists wishing to work with this population (patients with chronic pain conditions), 54% of those completing their training felt they were incompetent to deal with this patient group (Harris, 1997).

In sum, there is little evidence that health care professionals across a range of disciplines (at least at undergraduate stages) have anything approaching the level of education and training in the field of pain and pain management recommended by bodies such as the International Association for the Study of Pain (IASP Core Curriculum, 1994).

Apart from training in relevant skills, the actual types of staffing, and therefore available skills, also seems to vary greatly between published programs. For example, some physical conditioning programs employ only physiotherapists, while others are more multidisciplinary in nature and utilise physiotherapists, clinical psychologists, occupational therapists, nurses, and various medical specialists. It is hard to imagine that such discrepancies might not have some implications for what patients receive in these programs.

Unfortunately, not all studies reported in the treatment outcome literature in the physical conditioning and pain management field appear to be based on adequately trained and experienced staff. It is not difficult to imagine that if the staff on one of these programs don't have the skills required to do the job properly high quality programs will be unlikely and their results will be disappointing. One study which did address this issue was reported by Williams et al. (1999). The staff engaged to conduct that program were all experienced in their respective professions prior to their employment, but they still required 6-months of training in the application of multidisciplinary cognitive-behavioural methods to the management of chronic pain. In addition, the quality of the treatment program was then reviewed by two internationally recognised clinical psychologists with extensive expertise in this field to ensure that the study would provide an adequate test of cognitive-behavioural pain management. Few other studies in this field would meet such criteria for ensuring treatment validity.

One example of where this may well have been a problem was illustrated in a study comparing a cognitive-behavioural treatment for chronic pain (provided by a single psychologist), with the antidepressant drug, Amitriptyline (Pilowsky et al., 1995). This study used patients with chronic pain attending a pain clinic as outpatients and they saw the psychologist on an individual basis once a week (45 minutes) for eight weeks. The results showed no difference between interventions and no change from pre- to post-treatment on any measure. This is quite inconsistent with the outcomes usually reported with cognitive-behavioural treatment for patients attending pain clinics (eg. Morley et al., 1999). However, when it is considered that the psychologist had had no formal clinical training (having only a Bachelor's degree in Psychology), perhaps the results are not so surprising. Although the authors did say she was "familiar with the principles of cognitive-behavioural intervention" and was supervised by an experienced clinical psychologist, the fact remains that a complex clinical treatment was provided by someone who was only "familiar" with its principles. This would make it difficult to know whether the result of the study was due to a true parity of ineffectiveness between cognitive-behavioural therapy and Amitriptyline or that the treatment as delivered was inadequate. Given that other studies have amply demonstrated the effectiveness of cognitive-behavioural therapy methods with chronic pain patients it is more likely that the version (of CBT) provided in this study was inadequate and therefore the results can be discounted.

What is clear to those with considerable experience in using cognitive-behavioural treatment methods with chronic pain patients is that this is usually a complex area of work (generally the simple, straight-forward cases either resolve by themselves or are dealt with effectively at the acute stage and never appear in pain clinics) (eg. Nicholas and Wright (2001)). Dealing with complex chronic pain patients requires skills not only in general counselling techniques (eg. active listening, empathy), but also in the cognitive-behavioural treatment of conditions like anxiety, depression, post-traumatic stress disorder, adjustment disorders, and (frequently) the management of people with difficult personalities, anger/hostility, relationship conflicts, substance dependencies, medication side-effects, and multiple conflicting sources of advice from different health care providers, rehabilitation providers and solicitors (to name a few).

A major review of psychotherapies for the Department of Health in the UK (Fonaghy and Roth, 1997) identified therapist training and expertise as a critical element in the provision of high standard services, especially with the more difficult, complex and long-term cases. It is not difficult to imagine that the same requirements could be made when considering the longer term work injured patients. There is evidence that such high level skills are not required for the majority of injured workers in the first few weeks after injury (eg. Indahl, et al., 1995), but are likely to be increasingly necessary for those who do not respond to Indahl-type encouragement and reassurance as they are likely to be at risk of long-term disability, especially if psychosocial risk factors are identified (eg. Linton, 2000).

This issue was identified previously by the Manpower Planning Advisory Group's (1990) report on Clinical Psychologists in the UK for the Department of Health. That report identified three levels of psychological skill. The first two included more basic skills, like establishing rapport and providing support, basic counselling, as well as some specific techniques like relaxation and behavioural protocols. These types of skills could be expected of most health care providers. The third level of skill requires a thorough understanding of varied and complex psychological theories and their application in clinical cases. Only clinical psychologists can be expected to have skills across all three levels.

The recent International Mid-Term Review of the Second National Mental Health Plan for Australia (November, 2001) conducted by Professors Betts (Nursing) and Thornicroft (Psychiatry) also emphasised the appropriate use of psychologists. That report noted that psychologists should be encouraged to apply their skills in the provision of psychological therapies, especially "at a time when increasing evidence supports the effectiveness of cognitive behavioural interventions for depression, anxiety-related and psychotic disorders" (p.7).

In the context of the current report it should be noted that the evidence for cognitive behavioural interventions with injured workers overwhelmingly has been generated by clinical psychologists, usually working in collaborative ways with members of other disciplines.

4.7 Summary

Reviews of the literature on physical conditioning programs are limited by the difficulty of comparing programs with different components, staffing and patient characteristics/problems. Nevertheless, it is possible to derive some broad conclusions.

There is evidence that physical conditioning programs (which incorporate exercise, reassurance and education, using behavioural principles) can be helpful in restoring function and return to work in injured workers. However, this finding is qualified by a number of caveats:

- (i) This applies mainly to those workers with more chronic conditions (more than three months), as opposed to more recent onset
- (ii) This also applies primarily to those programs which incorporate a cognitive-behavioural approach. Programs which do not incorporate a cognitive-behavioural approach have still to demonstrate their efficacy with this group of injured workers.
- (iii) As the injured workers become more disabled, distressed and medication dependent they generally require more intensive cognitive-behavioural pain management/physical conditioning programs to have a realistic chance of responding.
- (iv) Return to work after one of these programs requires active facilitation and support by rehabilitation providers, treating doctors and the workplace.

In the first few weeks after injury, workers with no evidence of red-flag conditions (eg. non-specific low back pain) generally respond well to comprehensive musculo-skeletal examination, reassurance that they are alright and encouragement by the treating doctor to resume normal activities. However, a small but significant proportion (up to 30%) of this group will not respond well to this approach and this group is at risk of developing chronic disabling pain. This at risk group can be identified within the first few weeks after injury by the identification of 'yellow flag' signs, such as fears of pain/re-injury, workplace disputes, and distress. If these aspects are addressed in the first few months, better return to work outcomes can be achieved than when these aspects are overlooked.

It needs to be remembered when considering the treatment options for injured workers that the evidence for commonly practised medical (somatic) treatments for the same problems addressed in physical conditioning programs is either no better or worse than the evidence for physical conditioning programs. This is especially true when these approaches are compared with those programs that incorporate a cognitive-behavioural approach.

5. Conclusions

Treatment outcome evidence in this area should be considered under a number of headings. These include:

- (i) The nature or content of the treatments or treatment 'packages' (eg. exercises, multidisciplinary programs, general practitioner advice) and their validity.
- (ii) The quality and expertise of the treatment staff.
- (iii) The different categories of injured patients (eg. acute, chronic, degree of disability and distress, and those with different prognostic indicators).
- (iv) The different environmental conditions (eg. those with a job to return to, those still at work but missing days, those with no job).

Thus, the questions asked about different types of physical conditioning programs should include which treatment (content), provided by whom, for which injured worker, and in which situation (working/non-working, etc.)? This analysis of the available literature in this field suggests the answers may be different for different cases under different circumstances.

Overall, the evidence for physical conditioning programs as effective interventions for restoring function in injured workers is limited. No general statement of support for these programs could be given without the qualification that it depends upon their content as well as the types of patients and problems (especially their complexity) being treated and the quality (skills and experience) of the staff.

There is evidence that in injured workers with acute and sub-acute back pain, when no identifiable pathology or injury requires specific evidence-based medical/surgical treatment, interventions aimed at encouraging gradual resumption of normal activities can be effective in the majority of cases. This approach is more effective if the worker can do at least part of this activity upgrading at work. In those cases with a good return to work prognosis, reassurance and encouragement for resumption of normal activities can be effectively provided at the primary medical practitioner level. At present, there is no evidence that exercises are necessary in this early period, and certainly no specific exercises seem justified.

However, if progress is slow and it becomes evident that so-called 'yellow (psychosocial) flags' are present and that they may be developing into obstacles to recovery, then more skilled psychosocial assessment is indicated and more specialised psychological intervention may be required. This may be done in conjunction with an exercise or activity program aimed at helping the injured worker to regain his/her confidence in their physical capacity. Thus, the exercise program should incorporate cognitive-behavioural methods (which address the patients' concerns, beliefs, pain responses and behaviour patterns, especially exposure to feared activities) preferably provided by a suitably trained clinical psychologist working closely with the physiotherapist supervising the exercise program. The composite program should be clearly aimed at achieving functional goals desired by the injured worker.

In this sense, rather than the term 'physical' conditioning, it may be more accurate to describe such programs as 'functional' conditioning.

Ideally, such interventions should occur either at the work place or in close coordination with the workplace, with the emphasis being on application at work of the pain management skills being learnt. Close liaison with the injured worker's treating doctor to ensure consistency of approach is also strongly recommended. Such programs would be expected to be quite brief (no more than 12 hours spread over 4-10 weeks).

In the relatively small proportion of injured workers who go on to develop more chronic problems (3-6 months or longer post-injury) more intensive collaborative multidisciplinary interventions are recommended (eg. Guzman et al., 2001). These programs should have a strong cognitive-behavioural nature and would be expected to be at least 100-120 hours (over 3-4 weeks) in length.

This analysis of the physical conditioning and pain management literature would suggest that broad, ill-defined labels for programs, such as 'work-conditioning' or 'functional restoration', should be avoided. Instead, preference should be given to linking the individual worker's assessed problems with the relevant facets of a treatment or rehabilitation program. For example:

Avoidance of activities:	active participation in graduated exercise and activity program with individually-relevant goals
Pain-related distress:	training in reducing distress through problem-solving, challenging unhelpful beliefs and responses; using an applied relaxation technique
Use of unhelpful drugs:	gradual withdrawal and replacement with pain self-management strategies
Fluctuating activity levels:	training in activity pacing and planning.

If labels are to be used, clear definitions should be provided which link the content of the program to the expected outcomes.

6. Recommendations

Key features of physical or functional conditioning programs likely to be effective for injured workers with no red-flag conditions:

6.1 Timing.

Different degrees and types of intervention are likely to be needed at different times following injury. What is likely to be effective in the early stages may not be sufficient if recovery and rehabilitation does not progress as expected. Correspondingly, intensive and time-consuming interventions required for the most chronic and disabled cases are unnecessary in the acute/sub-acute stages after injury. Equally, different skills and disciplines are likely to be required at different stages.

6.2 Coordination/collaboration

Regardless of timing, at all stages coordination or collaboration between all those providing treatment (including treating doctor) and rehabilitation input is essential. This must be linked to the workplace and the injured worker must be actively involved in the decision-making and planning.

Treatment planning and physical/functional conditioning must be logically consistent. If one provider is administering passive treatments while another is attempting to promote functional gains with exercises and graduated activities there is a risk of confusing the worker and reinforcing passivity and greater disability. Passive treatments must cease, or be clearly linked to activity gains, before physical/functional conditioning is attempted.

Delays in the management process must be minimised and all parties, including third-party funding bodies, have a role to play in this.

6.3 Assessment

Before any intervention or program is attempted there needs to be an appropriate assessment of the injured worker from a biopsychosocial or “whole person” perspective. That is, assessing physical/medical aspects, as well as psychological (fears, beliefs, mood) and environmental (work, home) aspects relevant to the case.

Major psychiatric conditions are likely to be relatively rare, psychological aspects are more subtle and easily overlooked. Accordingly, while screening instruments can detect a proportion of ‘at risk’ cases, when a person is not progressing as expected for an extended period more expert psychological assessment skills will be required.

Any intervention following such assessment must be targeted at goals identified in the assessment and these should be specified.

6.4 Content of interventions

(i) Terminology

When a label like “work conditioning” is used there is an inevitable expectation that each program should bear a close resemblance to others of the same name. In the absence of any specific formal regulatory or approval process, this expectation is unlikely to be met and the literature clearly attests to that. One alternative to regulation of content might be to require those offering these different versions of exercise or activity programs to make it clear what problems were to be addressed, by which means and what the expected outcome might be.

The term ‘program’ implies structured, planned intervention which should include reference to a time frame, content, staffing, criteria for suitability of participants, as well as specific goals and outcome evaluation. A program may be delivered to one individual patient or client alone or within a group format, which typically combine individualised and group aspects.

(ii) Content

Regardless of labels, all interventions or programs must be based on assessment of the individual case. Generally, in the initial period after injury, where clinical examination and history taking has revealed no 'red flag' condition is likely, interventions should be aimed at encouraging early resumption of functional activities with the worker playing an active role in the process.

Passive treatment modalities (eg. prolonged rest, splints/braces, massage, short wave therapies, injections, reliance on analgesics, etc.) where symptom relief is often the focus, are discouraged in favour of resumption of normal activities as rapidly as possible. If the worker perceives there to be barriers to restoration of function (eg. inaccurate or unhelpful beliefs, fears of pain or re-injury, pain, and unhelpful work or home environment), these must be addressed in the intervention. Many of these barriers to recovery and rehabilitation are psychosocial in nature rather than physical or somatic, but they are significant predictors of future disability and non-return to work if not addressed effectively.

In general, the available evidence supports the use of exercises/activities which incorporate cognitive-behavioural principles to facilitate early restoration of function and return to work. The longer an injured worker is away from work and the more disabled s/he becomes, the more intensive and time-demanding such interventions will need to be (see next section for specific examples of such programs).

7. Pain management

In cases where persisting pain is a significant obstacle to rehabilitation, then more specific methods (than simply exercises and encouragement) should be employed to assist the injured worker to overcome it. This is especially relevant if pain is leading to avoidance of activities, taking high doses of unhelpful drugs, and causing marked distress. Unless something specific and treatable has been overlooked in comprehensive assessment, curative treatment is very unlikely. Pain management programs offer the best available option for limiting the impact of pain and restoration of functional activities.

Symptom-relieving treatments should not be the main focus in pain management. Rather, interventions that promote the achievement of functional goals and training the injured worker in self-management of their pain and related difficulties should be emphasised.

As recommended generally, the extent (in terms of hours and content) of pain management programs should depend upon the assessed needs of the injured worker. Thus, less disabled / distressed cases should require briefer programs (eg. six 2-hour sessions or possibly ten 1-hour sessions). More disabled / distressed cases would require more lengthy versions (eg. 100 –120 hours over 3-4 weeks).

Content of these programs should include:

- **Education/reassurance** (about pain and realistic management options);
- **Planned activity upgrading** (despite pain), using goal setting and pacing strategies;
- **Exercises** (gradually upgraded) and aimed at achievement of functional goals, not complete relief of symptoms;
- **Cognitive coping/problem-solving strategies** (aimed at coping with pain, not relieving it) to overcome fears, distress, anger, sleep difficulties;
- **Relaxation techniques** for coping with pain and calming arousal/stress in applied settings (not just once a day with a tape);
- **Gradual medication withdrawal** (for all pain-related medication, including analgesics, anxiolytics, anti-convulsants, sedatives). Antidepressants can also be withdrawn unless there is significant mood disturbance and concern about self-harm.
- **Maintenance/relapse prevention strategies** (as pain is chronic or recurrent, it is important to plan for dealing with flare-ups without significant distress and disruption to normal activities, or further treatment-seeking).

8. Staffing/providers

No one professional discipline possesses all the skills required to assist at every stage in the recovery and rehabilitation of all injured workers. It is important that all treatment and rehabilitation providers recognise their limitations and the need to work collaboratively with others as required. This becomes especially critical if the injured worker does not respond to initial interventions and is at risk of developing chronic disability/pain and non-return to work.

There may also be a need for additional training in evidence-based methods of injury and pain management for the treatment and rehabilitation providers, especially in relation to the use of cognitive-behavioural principles. Knowledge of the biopsychosocial model of pain/injury and the ability to recognise the presence of psychosocial factors is also an area where additional training for all providers may be necessary.

The general practitioner, as the 'treating doctor', should be responsible for treatment planning (and coordination) in consultation with all those health providers involved, as well as the rehabilitation provider.

In general, physiotherapists should institute the exercises and basic education elements of these programs, but others like chiropractors and osteopaths may also be able to provide advice in these domains.

A minority of cases will require expert psychological intervention. Wherever possible, this should be provided by clinical psychologists or psychiatrists with appropriate training in this field. It should not be assumed that all psychologists, clinical psychologists and psychiatrists have expertise in pain and injury management. They need to establish this through relevant training and experience with evidence-based approaches. In some cases, the clinical psychologist or psychiatrist should only be required to assess a client and provide advice to the direct care providers (GP, physiotherapist, chiropractor, etc.) on management strategies, rather than provide treatment directly themselves. In other cases, direct treatment will be required, but this must also be coordinated with the other providers involved.

At the same time, it should not be assumed that 'generic' counsellors, therapists, or nurses can provide expert psychological interventions. They can provide basic psychological interventions in the form of emotional support, education, relaxation training, and practical problem-solving skills, but should be mindful of 'over-reaching' what they take on as this may risk sub-optimal outcomes and unnecessarily prolonged disability.

9. Evaluation

All those involved in the treatment/management and rehabilitation of injured workers must evaluate their work.

Evaluation should provide:

- a means of identifying further help required for an individual client
- a measure of accountability
- maintenance of standards
- identification of short-comings in a program which may then be corrected.

Evaluation should not only be determined by broad categories like return to work, which depend on many factors, but also measures of the quality of life of injured workers, ongoing use of healthcare services, and maintenance of functional gains.

Evaluation should be seen as an evolving process, requiring the providers to continuously monitor their work and to incorporate developments in the scientific literature as ways of improving their outcomes.

10. Recommended options for physical or functional conditioning with different categories of injured workers at different stages

This section is offered as a basic format to guide decision-making according to variables such as length of time since injury, nature of injury, presence of pain and likely prognosis (based on assessment of injury, psychological factors, and environmental or workplace issues, like nature of work). It is recognised that this guide should be applied flexibly.

Intervention phases

Strict adherence to specific periods is not realistic, but the periods can provide a guide on likely management considerations over time. The emphasis should be on early identification of relevant issues and intervention as soon as possible to limit time away from the work place.

- **0-12 weeks post-injury; no 'red-flags' and 'good prognosis' for RTW.**

Following competent musculo-skeletal examination and review of history (to exclude 'red flag' conditions), provide reassurance that physically they are OK, and encouragement to resume/continue ADL, including RTW, as normally as possible. Symptom relief measures (eg. mild analgesics) may be provided but in secondary role – they must not be the main focus of attention, but rather an aid to mobilisation. No particular exercises are recommended, but if provided they should be linked to functional goals.

Intervention should be delivered by treating doctor and physiotherapist (or chiropractor/osteopath) in consultation with workplace/rehabilitation provider (or case manager), often an occupational therapist or rehabilitation counsellor.

- **4-12 weeks post-injury; no 'red-flags', but not progressing as expected, persisting pain.**

If not progressing as expected, *even at 3-4 weeks post-injury*, assessment for possible psychosocial factors ('yellow flags') is critical. This needs to identify possible reasons for continuing difficulties/lack of progress (eg. pain, concerns about unassessed injury, fear-avoidance beliefs/behaviours, sleep disturbance, distress, financial concerns, workplace relationship issues).

Psychosocial assessment at this stage may be performed by treating doctor and/or physiotherapist (or chiropractor/osteopath) with training in this area. Self-report questionnaires suitable for this purpose should be used as screening instruments if feasible.

Interventions should be developed on basis of this assessment. Psychosocial factors identified in assessment must be specifically addressed in any intervention. If beyond the skills of the treating doctor and physiotherapist, a clinical psychologist or psychiatrist with relevant expertise should be consulted.

Require an exercise/activity program either at the workplace or in coordination with the workplace.

Focus on improving functional abilities despite pain.

Reassurance is important, but any symptom-relief measures (eg. pain relief) should play a secondary role to improving functional abilities.

Intervention should be delivered in coordinated manner (working to a plan agreed between providers, the injured worker and workplace). Treatment providers could include treating doctor, physiotherapist (or chiropractor/osteopath) and clinical psychologist (who may only be required in consultative capacity, depending upon initial assessment).

Wherever possible, the Clinical psychologist must have post-graduate (ie. Masters or Doctorate level clinical training - Bachelor's degree in Psychology is insufficient for this work). In some areas of the State, less qualified people may have to be used, but they should have access to (and use) supervision by a qualified clinical psychologist with relevant experience.

Physiotherapist (or chiropractor/osteopath) should have demonstrated ability to use cognitive-behavioural principles to direct their work with the injured worker.

Treating doctor must be familiar with the same cognitive-behavioural principles as well in order to provide consistent support for management plan.

Rehabilitation provider/case manager (usually an Occupational therapist or Rehabilitation counsellor) should facilitate implementation of plan at workplace.

- ***More than 12-weeks post-injury; no RTW and moderate or poor prognosis for RTW, persisting pain***

Requires re-assessment of medical/somatic and psychosocial aspects. This is an abnormal group (as most similarly injured workers will have already returned to work) and they represent a growing risk of slipping into long-term disability and no RTW.

Psychosocial assessment should be performed by a Clinical Psychologist (or Psychiatrist) with expertise in this area (Bachelor's degree psychologist is not sufficient). In some areas of the State, less qualified people may have to be used, but they should have access to (and use) supervision by a qualified clinical psychologist with relevant experience. A Psychiatrist should also be required to have expertise in this area as a standard psychiatric interview based on DSM-IV and a mental state examination will not be sufficient to identify important psychosocial factors in these cases.

Where psychosocial factors identified they must be addressed in intervention plan. If reassurance necessary from treating doctor this must be provided.

If particular medical or surgical interventions deemed appropriate they should be expedited and planning for early re-assessment and resumption of rehabilitation plan should be included in recovery/post-intervention arrangements to capitalise on treatment gains.

Reassurance remains important, but any symptom-relief measures (eg. pain relief) for nonspecific conditions should play a secondary role to improving functional abilities.

Requires more intensive multidisciplinary program with strong cognitive-behavioural basis. Twelve to eighteen hours over 6-8 weeks. Program must be linked to workplace with plan arranged between treating providers and rehabilitation provider/workplace.

Exercise program should only be one element. Symptom relief measures should play secondary role. RTW and other functional activities despite persisting pain should be encouraged, providing the worker has been taught appropriate pain management skills which s/he must be encouraged to implement by all treatment and rehabilitation providers.

Requires that clinical psychologist (with post-graduate, ie. Masters or Doctorate level clinical training) be centrally involved in delivery of program (Bachelor's degree in Psychology is insufficient for this work).

Physiotherapist (or chiropractor/osteopath) should have training and demonstrated ability to use cognitive-behavioural principles to direct their work with the injured worker.

Treating doctor must be familiar with the same cognitive-behavioural principles as well in order to provide consistent support for management plan.

Rehabilitation provider/case manager (occupational therapist/rehabilitation counsellor) should facilitate implementation of plan at workplace.

- **26 weeks (plus) post-injury, no red flags, no RTW, poor prognosis, distress, disability, persisting pain.**

At this stage, this group is at significant risk of long-term disability and no return to work. Basic counselling and exercises are very unlikely to help.

Requires intensive cognitive-behavioural program (12-15 days or 100-120 hours, over 3-5 weeks). Program should be similar to less intensive version, but have heavier emphasis on cognitions (fears/beliefs/mood) and behaviours of injured workers. Similarly, cognitive-behavioural principles should inform all aspects of program and all providers involved must adhere to same principles and agreed plans.

Reassurance remains important, but any symptom-relief measures (eg. pain relief) should play a secondary role to improving functional abilities. If medication use has escalated without an associated increase in function then that medication must be reduced. This will require additional medical involvement but can be supervised by appropriately trained nursing staff.

As with 12-26 week program, program must be linked to workplace with plan arranged between treating providers and rehabilitation provider/workplace. Family/significant others of injured worker may also need to be involved in part of program to assist with application of program at home.

Requires that clinical psychologist (with post-graduate, ie. Masters or Doctorate level clinical training) be centrally involved in delivery of program (Bachelor's degree in Psychology is insufficient for this work).

Physiotherapist should have training and demonstrated ability to use cognitive-behavioural principles to direct their work with the injured worker.

In some settings, with access to work-related tasks (eg. work simulation, where work tasks can be practised), occupational therapists could be incorporated into such a program.

Treating doctor must be familiar with the same cognitive-behavioural principles as well in order to provide consistent support for management plan.

Rehabilitation provider/case manager (occupational therapist/rehabilitation counsellor) should facilitate implementation of plan at workplace.

Maintenance/relapse prevention

Given the often persisting and recurrent natural history of many workplace injuries in these categories (eg. low back pain), some provision must be made in the management plan of each injured worker for assistance with any recurrence of pain and work-related difficulties. This would help to increase the chances of an injured worker maintaining his/her RTW in the long-term.

Planning for relapse prevention and dealing with any set-backs should be incorporated in all intervention packages. This should not require major resources, but rather a commitment by the treating doctor and other providers to reinforce the principles of the program and strategies that had helped in the first place, rather than treating it as a failure and pursuing a new round of investigations and trials of treatment. A problem-solving strategy worked out collaboratively with the worker and the workplace to deal with the issues in each case is recommended. Regular reviews at arranged increasing intervals by the treating doctor of the worker after s/he has returned to work could assist the process.

Requests for funding any further passive, symptom-relief interventions should be based on good evidence and closely scrutinised to ensure they do not conflict with the attainment of ongoing functional goals.

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