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Vocational rehabilitation of workers with back pain

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This paper concerns the concepts and practices currently in use in occupational health for the rehabilitation of workers with back pain. No conclusive evidence exists for an etiologic model for nonspecific back pain. A difference between acute and chronic back pain is backed up by evidence from the literature. Apart from having the patient stay active and return to ordinary activities as early as possible, there are no significant forms of intervention for acute back pain that effectively decrease the time off work. For chronic back pain multidisciplinary treatment in an occupational setting is effective in enhancing return to work. Clinical practice guidelines consist of diagnostic triage, the assessment of "red flags" for medical emergencies, and guidance in the appropriate application of diagnostic facilities. Occupational health guidelines concentrate on gradual return to work, psychosocial issues, and multidisciplinary rehabilitation facilities.

Key terms clinical practice guidelines, disability evaluation, occupational health services, occupational health physician, return to work, review.

Virtually everyone has some extent of personal experience with pain or stiffness in their back. Not surprisingly, the lifetime prevalence of back pain is estimated to be as high as 57% of the general population (1). Acute back pain is inconvenient, but rarely an urgent medical problem, and for most people pain is gone within 6 weeks (2). For 10% to 30% of patients, however, back pain is not a transient experience; instead it returns frequently or is even present every day (3). In addition, in a large number of countries as many as 2% of all workers are so limited by back pain in their activities that they are out of work and receive a disability benefit (4). Those with chronic pain and disability place considerable demands on the health care and social security systems to help to solve their problem. These demands constitute an enormous burden for health care and the economy in most countries (5). The decade 2000–2010 has been proclaimed by the United Nations as the Joint and Bone Decade to draw attention to the problem of musculoskeletal disorders and, especially, back pain.[2]

In occupational health workers deal with both preventing the occurrence of back pain and preventing disability as a result of back pain. In this article I focus on the prevention of disability by means of rehabilitating workers with back pain. First, I give an overview of current concepts regarding the development of back pain. Next, I describe the assessment of a worker with back pain. A model is used to explain the process of disablement. Then I review the evidence for the effectiveness of different interventions and prognostic factors. Finally, I summarize current guidelines and end with pointing out future trends in back-pain rehabilitation.

Development of back pain

It remains one of the unsolved problems of health care and occupational health to find an appropriate answer to the back-pain problem. In the past, this search has often led to what Frank aptly calls "an unhelpful polemic"

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2 Information currently available at the following internet address: www.bonejointdecade.org

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in musculoskeletal research (6). Persons with different views on the etiology of back pain very strongly advocate a single preventive measure or treatment method in line with their view of etiology. Basically, three different views can be discerned. First, some consider back pain to be the result of an injury caused by adverse workplace biomechanical exposure. Workplace redesign based on ergonomic principles is then the only remedy with which to treat and prevent back pain in their view (7).

Second, other researchers are more of the opinion that back pain is ubiquitous but that psychopathological conditions lead to disability (8). Their answer is the education and psychological treatment of workers. Finally, some authors argue that it is mostly the social context of dissatisfaction with work and the ready availability of workers' compensation and disability insurance benefits that is at the root of the back-pain disability problem (9). This view leads readily to the option of diminishing disability benefits or excluding back pain as a condition for which benefit payments can be received. At the base of this polemic is the lack of consensus about scientific evidence on the etiology of back pain and its associated disability.

A more productive assumption is that all back pain has a physical basis. Probably most attacks of back pain originate in the age-related degeneration of structures in the back. This degeneration is, in turn, influenced by mechanical, biochemical, and environmental risk factors (10–13); however the overall effect of these factors is probably limited (14). The experience of chronic pain and disability is influenced, at least partly, by psychosocial behavioral factors (15, 16). Nevertheless, much of the hypothesized causal pathway between exposure to environmental risk factors and occupational disability is still unknown.

Assessment of workers with back pain

Back pain is a symptom of an underlying physical process that cannot be diagnosed in most cases. In general practice, about 90% of all cases of back pain are diagnosed as nonspecific (17). After 2 weeks of sick leave in an occupational health setting, the percentage of cases diagnosed as nonspecific is 75% (18). Back pain can best be described as the perception of an unpleasant sensation in the brain, the origin of which is ascribed to the back (the part of the body between the horizontal line that can be drawn through the tips of the scapulae and the line through the gluteal folds). In addition, one of the features of back pain is that it can radiate into the buttocks and the legs.

For occupational health, back pain is best classified by a working diagnosis and duration. The classification derives its validity from the difference in prognosis, therapy, and return to work. There is increasing agreement that back pain is best classified into nonspecific back pain, sciatica, and specific back pain (19). Patients for whom it is not possible to attribute the back pain to a specific cause by means of usual clinical methods are diagnosed as having nonspecific back pain. A serious drawback of naming back pain this way is that it stresses the necessity of looking for a medical cause of the pain, with the danger of over using diagnostic facilities. For patients it would be more helpful to refer to nonspecific back pain as typical back pain, typical in the sense that back pain is common and a part of life, and such that many people experience it. Another 25% of back-pain patients have sciatica characterized by symptoms in the leg, which suggest lumbosacral nerve root compromise. Specific back pain makes up less than 1% of all cases of back pain in a primary care setting (20). Specific back pain is a serious spinal condition caused by a tumor, an infection, a fracture, or a major neurological compromise such as the cauda equina syndrome. The following signs or symptoms are called red flags and possibly indicate serious spinal pathology: age younger than 20 or older than 50 years, violent trauma or minor trauma in a potentially osteoporotic patient, constant and progressive pain, history of carcinoma, systemically unwell, weight loss, risk factor for spinal infection such as infection elsewhere, intravenous drug abuse, use of steroids or immune suppression, and severe or progressive neurological deficit evident in a physical examination.

A great advantage of this classification is that simple history taking and a physical examination ensure the physician that there are no medical urgencies. Thereafter, the doctor can confidently outline a policy of rehabilitation and return to work. Moreover, it has been shown that patient satisfaction increases when providers have more confidence in their abilities to manage back pain effectively (21).

It is also generally agreed that it is useful to make a distinction between acute and chronic back pain. Acute back pain is usually a self-limiting condition and most workers with acute back pain return to work spontaneously (2). After a certain time period the chances that the pain will disappear spontaneously are much lower, and return to work is more difficult. The criterion for dividing pain into acute and chronic pain ranges in the literature from 4 weeks to 6 months according to the preference of the author (22–24). This variation emphasizes that the transition from acute pain to chronic pain is gradual, with an increasing risk of no return to work. From the rehabilitation point of view, it seems most efficient to use a criterion of 4 weeks for chronic pain.

There is not much support for classifying back pain into organic or somatic pain on the one hand and nonorganic or psychological pain on the other (25). It is

impossible to experience pain without higher cerebral involvement, which is usually labeled psychological. Therefore, ultimately, all pain is "between the ears". Moreover, patients feel stigmatized by the label that their pain is "in their head", which is then not very helpful in therapy or rehabilitation. In all cases of back pain, whatever the cause, psychological mechanisms can hamper recovery or lead to chronic pain. Even though these mechanisms are not well understood, the following psychological factors are believed to be risk factors for chronic back pain: (i) attitudes and beliefs about back pain, such as the pain being harmful to the spine, (ii) inadequate illness behavior such as the use of extended rest, (iii) compensation issues, (iv) diagnosis and treatment leading to confusion or fear about outcome, (v) involvement of emotions, such as fear, irritation, low mood, (vi) belief that work is harmful, absence of interest of employer, no possibilities for gradual return to work or high biomechanical demands. These psychological risk factors are called yellow flags, comparable with the red flags for somatic risk factors (26).

Disability model for back pain

Researchers have argued that the outcome of treatment for back pain should be measured in more dimensions than merely the presence of pain (27). This is a useful approach because the problem of back pain is not determined only by pain alone but also, or even more so, by the patient's functioning and participation in society. The World Health Organization (WHO) has proposed a multidimensional model for the consequences of disease in the International Classification of Impairments, Disabilities and Handicaps (28). This model, which is used for description and communication, can also be helpful in understanding the dimensions of back pain problems (figure 1). It describes the consequences of a disorder in the following three different dimensions or levels: (i) a disease leads to impairments in body function or structure, (ii) impairments can subsequently lead to activity limitations experienced by an individual, and (iii) activity limitations can result in participation restrictions that a person may have in life situations such as work. The disease, as well as personal and environmental factors, influences the outcome at the different dimensional levels.

The rehabilitation process aims at maximizing the participation of the patient in his or her social setting (29, 30). It follows that not only medical intervention directed at eliminating disease or impairment is useful, but intervention aimed at improving environmental or personal conditions, which can then lead to less activity limitation or participation restriction, is also useful. It has been shown, for example, that work tempo and problematic relations with co-workers delay return to work (18). In addition, physiotherapy in the first 4 weeks has a worse outcome for return to work than advice by a general practitioner alone (31). At this time it is not possible, however, to fill in the model in a more quantitative way.

Interventions

A search in MEDLINE revealed that more than 2339 articles have been published about therapy for back pain since 1966. Intervention ranges widely from the application of sclerosing injections to the back (32) to the provision of an educational leaflet (33) and the use of magnetic radiation (34). Therefore, systematic reviews

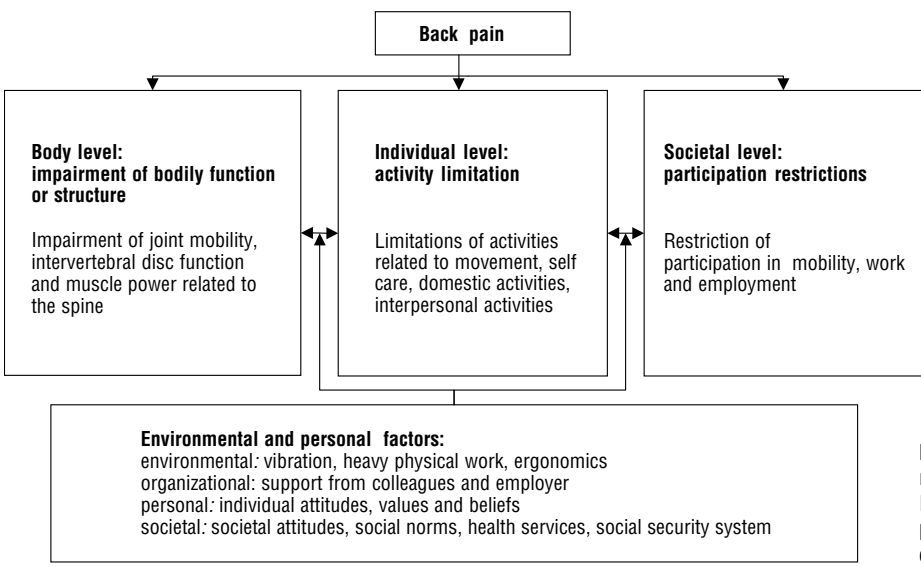

Figure 1. A model of disability as a result of back pain according to the International Classification of Impairments, Disabilities, and Handicaps (ICIDH).

are a great help in summarizing the evidence on the effectiveness of intervention. Van Tulder et al have done the most comprehensive work in this field. They gathered 208 studies on the effectiveness of conservative treatment for acute and chronic low-back pain (35) in combination with the Cochrane Collaboration Back Review Group for Spinal Disorders (36). The effectiveness of intervention is classified according to the evidence into one of the following four levels: strong, moderate, limited, absent or conflicting. The level of evidence for a specific intervention depends on the number, the methodological quality, and the results of randomized clinical trials that the participants of the review group found in the literature. The results of their study are summarized in tables 1 and 2.

It can be concluded that there is strong evidence for the effectiveness of nonsteroidal anti-inflammatory drugs, muscle relaxants, and advice to stay active in case of acute back pain. For chronic pain, strong evidence exists for the effectiveness of exercise therapy and multidisciplinary programs. However, a drawback of this review is that the different outcome dimensions of back pain, such as pain, activity limitation or participation restriction, are all valued equally. For rehabilitation purposes in occupational health a more appropriate outcome would be disability or the number of days on sick leave. Therefore Van der Weide et al (37) reviewed studies on intervention in low-back pain with at least one outcome in terms of disability or sick leave. Also in terms of vocational outcome, it can be concluded that staying active is to be preferred over bed rest. However, no studies were found which had a vocational outcome parameter that favored the effectiveness of drugs for acute back pain or the effectiveness of exercise therapy or multidisciplinary programs for chronic back pain.

Prognosis of return to work

Because acute back pain is such a highly prevalent problem, it would be interesting to know which patients run the highest risk of chronic pain and long-term disability. For the answer to this question, cohort studies are needed of workers who are at the same point in the course of their disease. For a prediction of the chances of return to work, such an inception cohort would consist of workers who are sick-listed because of back pain for less than 4 weeks. It can be concluded that chances of return to work are diminished if workers are older or if they have a higher level of initial disability, a specific diagnosis, or radiating pain (18, 38–41). From the same studies it can be inferred that heavy physical work does not predict time to return to work. There is a lack of evidence of the prognostic value for return to work

Table 1. Evidence for the effectiveness of conservative intervention for acute low-back pain based on systematic Cochrane reviews of the literature as reported by Van Tulder et al (35). (— = no randomized clinical trials found)

Acute low-back pain	Intervention	Evidence for effectiveness
Analgesics	No more effective than nonsteroidal anti-inflammatory drugs Less effective than electro-acupuncture or ultrasound	Moderate Limited
Antidepressants	—	None
Colchicine	No better than a placebo	Limited
Muscle relaxants/benzodiazepine	Pain reduction better than a placebo	Strong
Nonsteroidal anti-inflammatory drugs	Better than a placebo No better than paracetamol, opioids, muscle relaxants, antidepressants, and nondrug treatment	Strong Conflicting
Epidural steroid injections	Not effective	Moderate
Facet joint injections	—	None
Trigger point and ligamentous injections	—	None
Acupuncture	—	None
Advice to stay active	Better than bed rest or usual care	Strong
Back schools	Better than other conservative treatment	Conflicting
Bed rest	Worse than other conservative treatment or no treatment	Strong
Behavioral therapy	Better than traditional care	Limited
Electromyographic biofeedback	—	None
Exercise therapy	No more effective than other treatment	Moderate
Lumbar supports	—	None
Multidisciplinary treatment programs	—	None
Physical agents and modalities (short wave diathermy,ultrasound, ice, heat, massage)	—	None
Spinal manipulation	Better than a placebo or other conservative treatment	Conflicting
Traction	No better than a placebo or other conservative treatment	Moderate
Transcutaneous electrical nerve stimulation (TENS)	Better than other conservative treatment	Conflicting

Table 2. Evidence for the effectiveness of conservative intervention for chronic low-back pain based on systematic Cochrane reviews of the literature as reported by Van Tulder et al (35). (— = no randomized clinical trials found)

Chronic low-back pain	Intervention	Evidence for effectiveness
Analgesics	Less effective than nonsteroidal anti-inflammatory drugs	Limited
	—	None
Antidepressants	More effective than a placebo on pain relief	Conflicting
Colchicine	No better than a placebo	Limited
Muscle relaxants/benzodiazepine	Pain reduction better than a placebo	Limited
Nonsteroidal anti-inflammatory drugs	—	None
	More effective than paracetamol and a placebo on overall improvement and pain relief	Moderate
	Less effective than nonsteroidal anti-inflammatory drugs plus vitamin B	Moderate
Epidural steroid injections	More pain relief than a placebo or anesthetic	Conflicting
Facet joint injections	Not effective	Moderate
Trigger point and ligamentous injections	Combination steroid and anesthetic better than anesthetic alone	Limited
Acupuncture	No better than a placebo	Moderate
Advice to stay active	—	None
Back schools	Better than no treatment in an occupational setting	Moderate
	Not better than other conservative treatment	Moderate
	Better than no treatment or a placebo in nonoccupational settings	Conflicting
Bed rest	—	None
Behavioral therapy	Better than no treatment in reducing pain and disability	Moderate
	Better than other conservative treatment	Conflicting
Electromyographic biofeedback	No more effective than a placebo or relaxation	Moderate
Exercise therapy	Equally effective as physiotherapy	Strong
	More effective than usual care by a general practitioner	Strong
Lumbar supports	—	None
Multidisciplinary treatment programs	Better than traditional case in patient rehabilitation or usual care	Strong
Physical agents and modalities (short wave diathermy, ultrasound, ice, heat, massage)	—	None
Spinal manipulation	Better than a placebo or other conservative treatment	Conflicting
Traction	Not better than a placebo or other conservative treatment	Strong
Transcutaneous electrical nerve stimulation (TENS)	Better than a placebo or other conservative treatment	Conflicting

for psychosocial factors and work conditions in general. For a cohort of workers on sick leave of up to 8 weeks' duration, Waddell's nonorganic signs predicted a delayed return to work (42).

Guidelines for managing low-back pain at work

Since the beginning of the 1990s, following the report of the Quebec Task Force on Low Back Pain, guidelines on the management of low-back pain in primary care situations have been developed in many countries (22, 24, 43–45). The aim of the guidelines is the restoration to normal functioning for patients with back pain. However, for most of these patients occupational factors are only mentioned superficially. Recently, evidence-based guidelines have been developed for the management of workers with back pain in occupational health (46, 47). In addition to clinical management, these guidelines provide more-detailed recommendations on return to work and active rehabilitation. When a worker with back pain sees an occupational health practitioner, the worker should be encouraged to continue as normally as possible. He or she should remain at work or return to work at an early stage even if he still has some back pain. A temporary adaptation of the job or pattern of work is advised to facilitate early return to work (48). The guidelines recommend active rehabilitation and return to work strategies if the worker is having difficulty returning to normal occupational duties after 4 to 12 weeks of back pain or sickness absence. Then the focus should be shifted from purely symptomatic treatment to an active rehabilitation program in an occupational setting. A combination of optimum clinical management, a rehabilitation program, and organizational intervention to assist the worker to return to work is thought to be the most effective. The rehabilitation program should contain education, reassurance and advice to stay active, graded exercises, and behavioral pain management. It should be carried out in an occupational setting and directed towards return to work.

Future developments

We are highly dependent on systematic literature reviews to synthesize evidence on aspects of the back-pain

problem. The methodology of systematic reviews is not yet very sophisticated. On many occasions, we have to rely on simply adding up the number of studies with positive and negative results to come to a conclusion. In the future, better empirical studies and better synthesis methods will improve systematic reviews and meta-analyses that will lead to new recommendations and guidelines.

Current guidelines, most of which have been recently introduced, aim at reducing the number of people with chronic pain and disability. Research shows that considerable change is needed to implement the guidelines fully (49, 50), but also that the availability of recommended back pain services increased after the introduction of guidelines in the United Kingdom (51). Therefore, we can expect that, as guidelines become better implemented, the number of people with chronic pain and disability will decrease.

Rehabilitation methods will improve with a better understanding of psychological mechanisms leading to chronic pain behavior, such as fear-avoidance beliefs (52). Evaluation studies will learn which components of rehabilitation programs are most effective and appropriate for the primary care and occupational health setting.

In the more distant future, progress can be expected from a better understanding of the process of degeneration of the spine, the development of back pain and pain behavior. Magnetic resonance imaging of the spine will become more widely available and may contribute to clarifying the process of spine degeneration (53). The assessment of metabolic processes in patients with heavy physical load or back pain may be developed into another measure of objective assessment of damage to the cartilage of the spine (54). Some studies suggest that these measurements can also be used to monitor outcome in rehabilitation objectively (55). Nevertheless, vocational rehabilitation will remain one of the cornerstones of back-pain management because we are still far from the time that treatment can be directed towards the causes of back pain.

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