

# In Osteoarthritis, the Psychosocial Benefits of Exercise Are as Important as Physiological Improvements

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HURLEY, M. V., H. L. MITCHELL, and N. WALSH. In osteoarthritis, the psychosocial benefits of exercise are as important as physiological improvements. *Exerc. Sport Sci. Rev.*, Vol. 31, No. 3, pp. 138–143, 2003. *Exercise has a major role in the management of osteoarthritis, effecting well-documented physiological improvements on muscle function. However, exercise also has lasting benefits on the complex psychosocial sequelae of osteoarthritis—facilitating appropriate health beliefs, behaviors, pain coping, and self-management strategies—that are as important as its physiological effects.* **Keywords:** osteoarthritis, exercise, sensorimotor physiological improvements, psychological benefits

## INTRODUCTION

Osteoarthritis (OA) is one of the commonest causes of chronic joint pain and disability and imposes enormous personal, social, and economic burdens. OA is usually diagnosed from the clinical history and symptoms in people aged more than 45 yrs who report recurrent and insidiously increasing joint pain, functional limitations, muscle weakness, fatigue, palpable bony changes, but no evidence of other relevant pathologic characteristics. People with OA frequently are referred to rehabilitative exercise programs to improve muscle sensorimotor function, thereby reducing pain and disability. However, the pain and disability experienced by people with OA has psychosocial sequelae. This paper contends that the psychosocial benefits derived from exercise are as important as the physiological improvement because of the complex relationship between the psychosocial and physical effects of OA.

This paper should be read as a *brief overview* of the current work and understanding in several areas. For more detailed information interested readers are referred to articles cited in the reference list of this overview.

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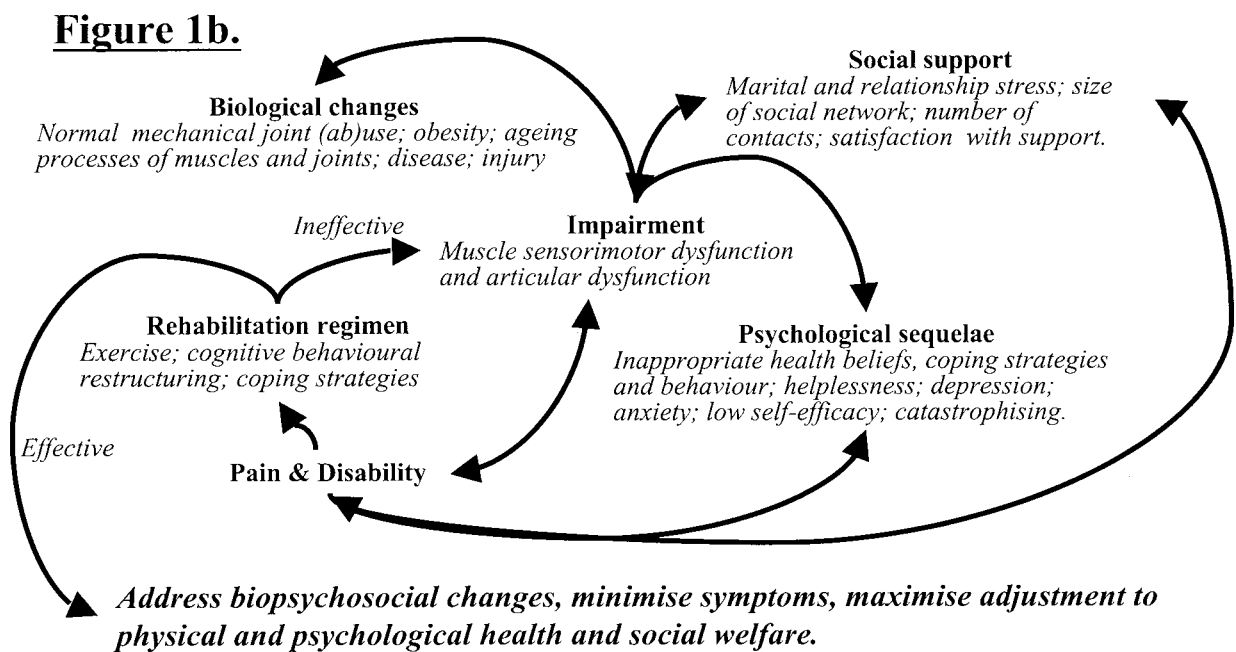
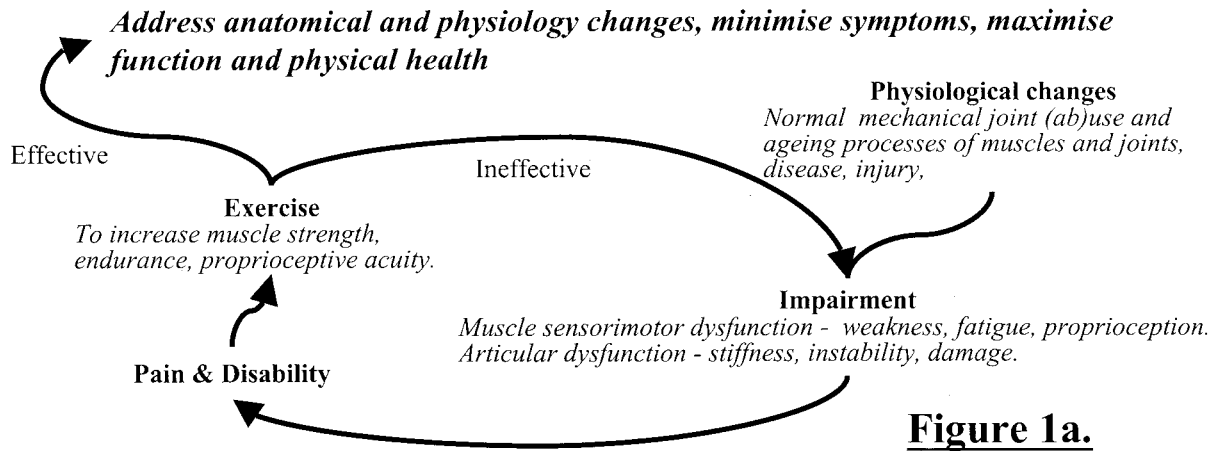
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## MODELS OF ILL HEALTH

The “traditional” biomedical model of ill health posits that pathologic characteristics or injury impair normal anatomic or physiological function giving rise to pain and disability (Fig. 1A). According to the biomedical model, OA is the consequence of a lifetime of mechanical (ab)use that causes joint damage, physiological dysfunction, and impairment. These changes lead to greater pain and disability, and interventions that correct this dysfunction reduce symptoms. Based on the premises of the biomedical model of OA, muscle sensorimotor dysfunction (weakness, fatigue, and proprioceptive deficits) may be a contributory factor in the pathogenesis of OA (6). Exercise-induced improvements in pain and disability usually have been considered to be mediated by physiological improvements in muscle strength, endurance, proprioceptive acuity, and joint stability (6). However, the biomedical model of OA is too simplistic and cannot explain why people with advanced joint damage frequently report less pain than people with minimal joint damage, whereas others with minimal joint damage often report severe pain (2). Nor can it explain why some people receive considerable benefit from a particular intervention (e.g., an exercise regimen), whereas other people with comparable joint damage obtain little or no benefit from the same intervention.

The biopsychosocial model of ill health (Fig. 1B) also accepts that there is usually a biological cause of nociception that is perceived as painful, but it takes a broader view of pain and disability positing that people’s “pain behavior” is a product of their beliefs, understandings, experi-



**Figure 1.** A. The biomedical model of ill health as relevant to changes in muscle joints and exercise for people with osteoarthritis. B. Biopsychosocial model of ill health as relevant to changes in muscle, joints, and exercise for people with osteoarthritis.

ences, and emotions, which may be modulated by their social environment (15). Rather than attempting to “cure” the underlying pathology, the biopsychosocial model emphasizes the role people’s appraisal and coping skills play in adjustment to living with the consequences of ill health. Accordingly, the biopsychosocial model views OA as the result of complex interactions between joint damage, muscle dysfunction, obesity, pain, disability, psychological sequelae, social support, and economic resources. Furthermore, because people have different internal traits and external influences that affect their perceptions, beliefs and behaviors, the biopsychosocial model of OA would explain the weak association between joint damage, pain, and disability (2) and why people with comparable OA do not react in similar ways to the same interventions.

### PSYCHOSOCIAL SEQUELAE OF OSTEOARTHRITIS

To understand the wider effects OA has on people’s lives, some of the most important psychosocial factors are outlined briefly in this section (10,15). They are not described in any order of priority.

#### Ill-Health Beliefs

In general, people tolerate acute pain relatively well if it can be explained or rationalized and its prognosis and resolution assured. Chronic pain is more bewildering and distressing because often it has no clear origin, increases insidiously, and is unaccountably episodic. People’s reactions to pain and the meanings they attach to symptoms are highly variable and profoundly influenced by the beliefs and “common-sense explanations” they and their family and friends

hold. Beliefs about the cause, prognosis, and effectiveness of treatment are key determinants of illness behavior and response to treatment (10,15). Unfortunately, the commonly held beliefs about OA (i.e., that it is the inevitable, incurable, and untreatable consequence of ageing; that pain indicates damage, therefore activity associated pain means activity causes damage; and that joint destruction is relentlessly progressive and will result in uncontrollable pain and disability) are negative and erroneous (Fig. 2). Such “catastrophizing” health beliefs demoralize people, who become anxious, depressed, feel helpless, and lose confidence, and these beliefs impinge on many aspects of people’s lives related and unrelated to OA (Fig. 2). They display dysfunctional “fear-avoidance” behavior whereby fear of pain and causing harm makes them avoid activities they believe harmful. Unfortunately, fear-avoidance behavior results in muscle weakness, fatigue, joint instability, and stiffness, which exacerbate pain, disability, and dependency (Fig. 3) (3).

### Helplessness

People feel helpless when they believe they have little control over a situation and any efforts they make to resolve their problems will be unsuccessful. High levels of helplessness are associated with greater pain, depression, and disability. The chronic nature of OA, our poor understanding of its cause, and our inability to correct entrenched health beliefs about the prognosis and management of OA foster feelings of helplessness (3).

### Self-Efficacy

Self-efficacy is a person’s confidence in their ability to perform tasks that will achieve certain goals (1). People with high levels of self-efficacy are more active, less depressed, less anxious, report lower levels of pain, and are more willing to tackle and persevere longer at challenging tasks despite failures than people with low self-efficacy (12). Self-efficacy is closely linked to control and helplessness, but whereas helplessness is a consistent belief of a general loss of control, self-efficacy is task specific and can vary greatly within an

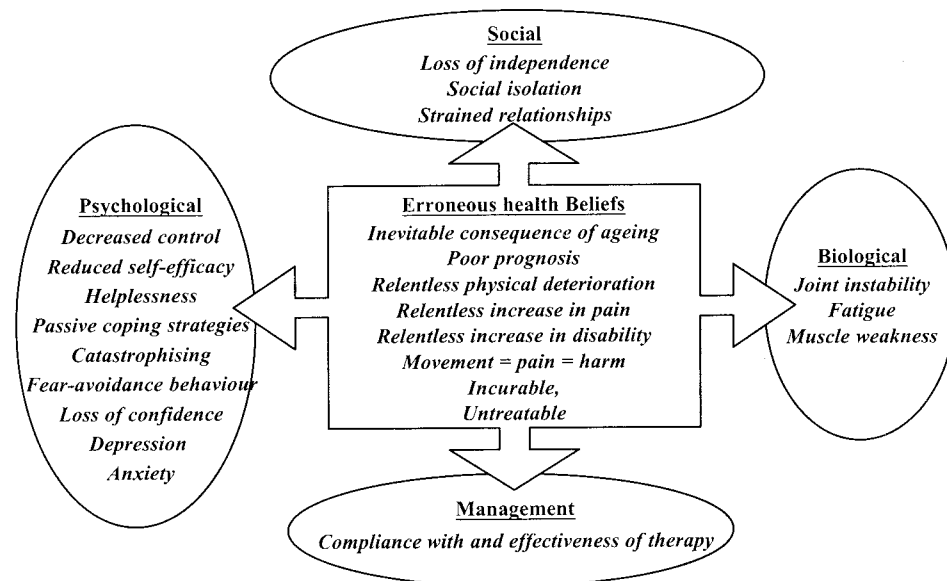
individual. For example, a person’s self-efficacy in their ability to reduce pain by reinterpreting it may be high, whereas their belief in their ability to perform exercise that will reduce pain (termed *exercise self-efficacy*) may be low.

### Coping

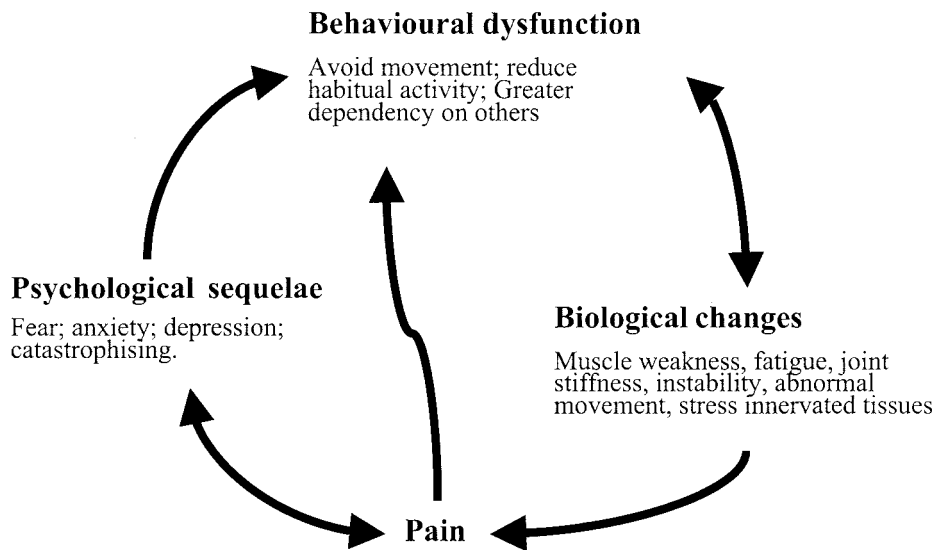
The efforts people make to deal with and minimize the effects of ill-health are described as coping strategies (8). There are many strategies and behavioral changes that help people cope with ill health and gain control of their condition. These strategies can be loosely divided into active coping strategies, such as increasing physical activity, diverting attention, and reinterpreting pain, and passive coping strategies, such as resting, avoiding activities, and relinquishing responsibility for pain control to others. People who deploy active coping strategies avoid catastrophizing and have better control of pain, less physical and psychological disability, and better treatment outcomes than people who deploy passive coping strategies. However, people deploy different pain coping strategies at different times, depending on their beliefs, past experience, their confidence in their ability to influence the pain, and their pain coping skills. Because musculoskeletal pain is so ubiquitous, most people initially cope with it by using simple, home remedies and analgesia, but unexplainable recurrent bouts of pain and unsuccessful attempts to cope with it raise worries about the cause, meaning, and prognosis of the problem and undermine people’s confidence in their ability to cope (5).

### Social Support

Interpersonal relationships with a spouse, family, and friends promote physical, social, and emotional well being and self-worth through emotional (promoting feelings of belonging and being valued) and informational (providing explanation of medical conditions and treatment) support (11). Although the size of people’s social network and the number and frequency of social contacts is important, the quality of support is vital, consequently people’s adjustment to ill health is poor if they have a wide circle of support but



**Figure 2.** Erroneous health beliefs about osteoarthritis and their effects.



**Figure 3.** Fear avoidance—the interrelationship between physiological, psychological, and behavioral aspects of chronic joint pain.

they are dissatisfied with the support provided. A particularly important source of social support is marital status. People with high levels of marital satisfaction and support display more effective coping strategies, greater psychological adjustment to illness, greater self-esteem, fewer depressive symptoms, and higher levels of life satisfaction. It may not be coincidental that the age-related increase in the incidence of OA may be associated with decrease in elderly people's social support and increased social isolation resulting from bereavement of spouses, family, and friends; loosening family ties; mobility problems; loss of confidence; and perceptions of personal vulnerability and safety fears.

### Depression

People with OA are more likely to display symptoms of depression, probably because of increased levels of pain and disability. Depressed people have increased feelings of helplessness, decreased social support, and lower levels of self-efficacy and physical activity (2,13).

### COMPLEX INTERACTION BETWEEN OF PSYCHOSOCIAL TRAITS AND OSTEOARTHRITIS

Attempting to identify the relative importance of psychosocial traits is extremely difficult. Not only is the role of all psychosocial traits important, but also these traits are highly labile and their influence on people is likely to vary markedly with the specific trait, with the situation, between and within people, and over time. The variability will be determined by the initial strength of influence of the person's psychological traits, external influences, and their experiences. Moreover, there are complex interactions between psychosocial traits, so a person's beliefs about the harm or benefits of exercise is likely to influence their exercise self-efficacy, exercise behavior, and coping strategies (Fig. 2).

The relationship between psychosocial traits and clinical symptoms of OA adds to this complexity (Fig. 1B). The clinical symptoms of OA (pain, disability, perceived muscle weakness, and fatigue) can alter a person's psychological

traits, for example, their health beliefs, coping strategies, level of self-efficacy. However, people's psychosocial traits determine their reporting of the clinical symptoms of OA and their reaction to these symptoms, by catastrophizing and adopting fear-avoidance behaviors. These can exacerbate physiological changes in muscle weakness and joint instability and lead to further joint degeneration (3). Thus there is a complex "reciprocally deterministic" relationship between clinical symptoms and psychosocial traits (Fig. 1B).

To illustrate this, exercise-induced improvements in the symptoms of OA have been suggested to be mediated by enhancement of exercise self-efficacy beliefs (14). In one study, when people stopped exercising, these self-efficacy beliefs declined but were elevated back to previous high levels during a single follow-up assessment (12). Such immediate improvement during a single assessment is much more likely to be attributable to improvements in psychological traits than physiological variables. These findings highlight not only the crucial role played by people's psychological traits, but also the "plastic" and dynamic nature of these traits—successful implementation and positive mastery experiences facilitate appropriate health beliefs, self-efficacy, and behavior, whereas unsuccessful implementation or unhelpful experiences undermine these cognitions and traits.

Thus, there is a very complex, interdependent, and reciprocal relationship between people's psychosocial traits, behavior, clinical symptoms, and physical consequences of OA (10). These relationships are very labile and impinge on the management of OA. However, they also present us with opportunities to enhance the effective management of OA.

### ADDRESSING THE PSYCHOSOCIAL EFFECTS OF OSTEOARTHRITIS

Effective management of OA necessitates addressing its psychosocial consequences. Of major importance is challenging erroneous ill-health beliefs through cognitive behavioral restructuring. This involves explaining that although OA

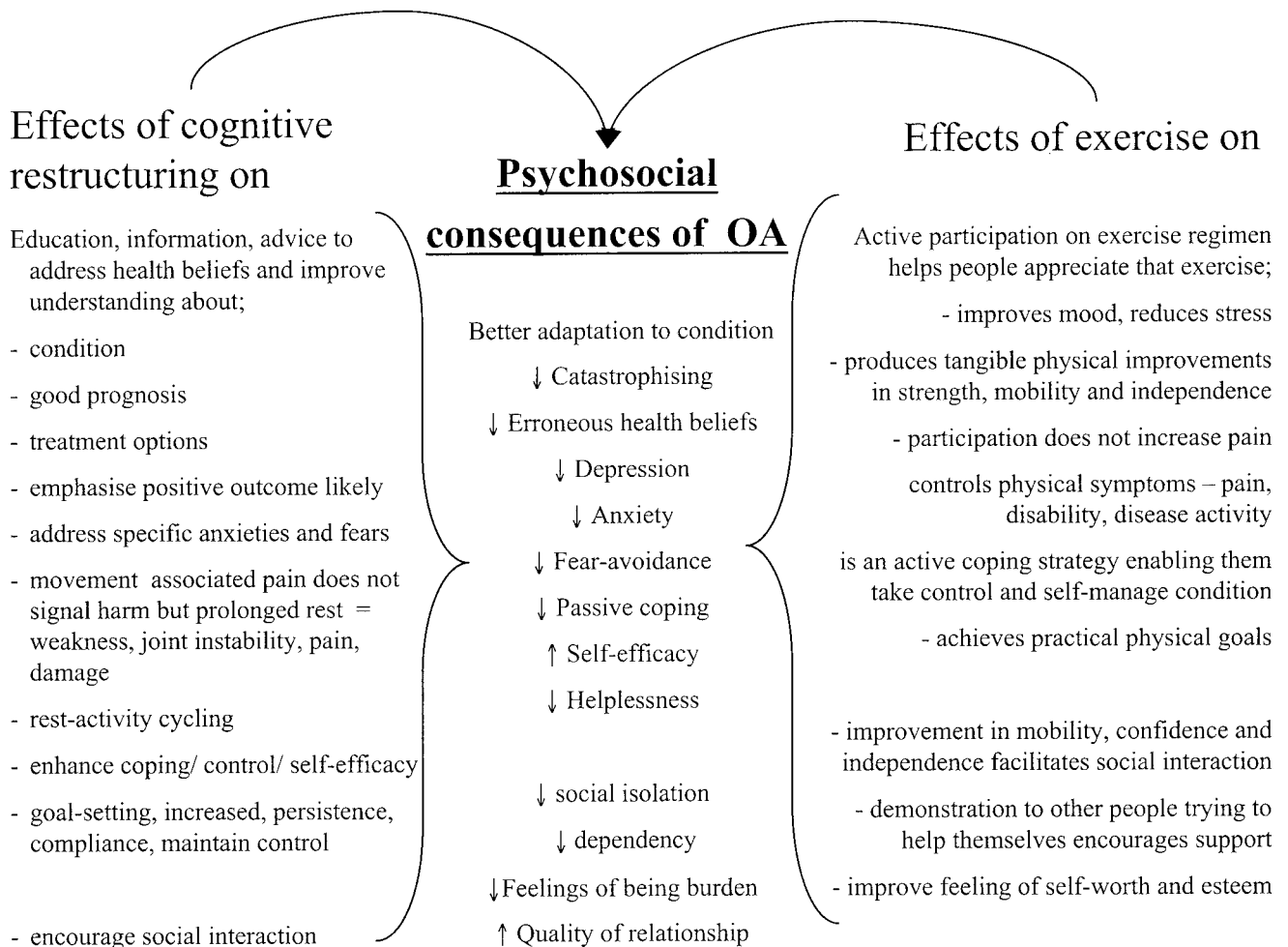
may be incurable it is not untreatable. In addition, because the *raison d'être* of a joint is movement, pain-related activity does not signal joint damage but rather that prolonged inactivity exacerbates muscle dysfunction and articular damage, leading to greater pain and disability. Correcting inappropriate health beliefs reduces anxiety, catastrophizing, depression, and the consequences of fear avoidance (8). Pain coping skills can be taught on self-management programs that enhance self-efficacy cognitions (9,15), enabling people to cope more effectively with OA and increasing their sense of control and reducing helplessness and social isolation by encouraging greater physical activity.

However, people's beliefs, anxiety, fears, and confusion about OA and what they should (not) do often are so entrenched that didactically instructing them about the pathology, (in)appropriate behavior, and what they should (not) do is of limited value. To alter people's health beliefs, to increase their confidence in their ability to control their condition, and to implement appropriate coping strategies and behavioral change, people need to experience the tangible, clinically meaningful benefits that implementing suggested strategies can produce.

## EXERCISE AND PHYSICAL ACTIVITY IN MANAGING BIOPSYCHOSOCIAL SEQUELAE OF OSTEOARTHRITIS

As stated earlier, although exercise regimens improve physiological variables, these improvements are apparent so soon after beginning an exercise regimen that they are very unlikely to be due to solely physiological changes. The "added value" of exercise in the management of OA may be due to concurrent improvements in psychosocial variables achieved during participation on exercise regimens (Figs. 1B and 4) that are evident in healthy and patient populations (4) including those with OA (13).

Participation in regular exercise, consciously or subconsciously, addresses many deficits in psychosocial traits. Exercise promotes acceptance of appropriate health beliefs by challenging beliefs that activity causes pain and joint damage, thereby disrupting detrimental fear-avoidance behaviors. Regular exercise also helps control the symptoms of OA, providing people with an active coping strategy (7); through exercise, they learn how to implement these strategies, enhancing exercise self-efficacy and enabling them to do more for themselves, thereby reducing helplessness, disability, and social isolation.



**Figure 4.** Effects of psychosocial interventions and exercise on the psychosocial consequences of osteoarthritis. ↑, Increase; ↓, decrease.



To encourage regular participation in exercise regimens people must *experience* the benefits of a *simple, practicable* exercise regimen that *they can implement*. Exercise regimens that are complex or require expensive, specialized equipment, facilities, and supervision undermine self-efficacy and encourage passive coping strategies, feelings of helplessness, and dependency on others.

The effectiveness of simple, practicable exercise regimens can be enhanced by integrating into them explicit patient education and practical self-management advice (8,15). They can be further enhanced if people receive support, encouragement and frequent positive feedback from their spouses, close family, friends, and healthcare professionals. When this encouragement and support is not forthcoming, people perceive they are no longer benefiting from the regimen, their enthusiasm wanes, they stop exercising, and the hard-won physiological and psychological benefits are rapidly lost. This emphasizes the importance of social support

Such rehabilitation programs do not attempt to cure OA, which remains an incurable condition, but in line with the tenets of the biopsychosocial model of ill health, it encourages people to learn about, accept, adapt to, and cope with OA by providing knowledge, practical advice, and convincing positive experience of the meaningful improvements people can achieve to help themselves self-manage their problems.

## SUMMARY

Exercise has proven benefits in the management of OA, but the benefits attained cannot be explained solely by physiological improvement in muscle function. Exercise-induced improvements in psychosocial variables have not been widely appreciated, but are as important because they help people understand and live with chronic joint pain. The most important traits have not been identified, and it is likely that the most influential traits will vary from person to person, within people over time, and from situation to situation, depending on a person's internal cognitions, external influences, and experiences. Disentangling what psychosocial traits are most influential, in whom, and when will not only be an extremely difficult and probably futile task because of the complex, reciprocal relationship between the various psychological traits and reported symptoms and consequences of OA. To date, most clinical trials have investigated only a limited number of psychosocial variables, which has limited our ability to gain a better understanding of the effects of OA. To understand the complex interactions between psychosocial traits and the condition requires careful measurement during large, well-designed, complex clinical trials. Addressing these issues and increasing our knowledge of this area will enable us to devise more effective interventions to lessen the impact of OA.

What is apparent is that the most effective rehabilitation programs integrate simple, practicable exercise regimens with cognitive behavioral restructuring interventions. These help people appreciate that exercise, far from being harmful, provides them with an active strategy that enables them to cope with and control the complex physical symptoms and psychosocial consequences of OA.

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