

# International Handbook of Occupational Therapy Interventions

# Chapter 38

## The Principles and Practice of Work and Ergonomics

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*The worker was experiencing wrist and hand pain. Once the tool was changed to an inline grip, his symptoms began to decrease.*

**Abstract** Occupational rehabilitation programs address worker safety and productivity, using the organizing construct of participation, as defined by the International Classification of Functioning, Disability, and Health, as well as selected frames of reference that facilitate participation in work. Demographic and logistical factors of work-related musculoskeletal disorders, gender and age of onset, and epidemiology are identified. Clinical application and the role of the occupational therapist (OT) are examined in relation to the expected outcomes of an occupational rehabilitation program. Work as a performance area of occupation is discussed with an emphasis on worker function. Evidence related to work and ergonomics is presented from the standpoint of duration and cost, and worker quality of life.

**Keywords** Ergonomics • Human engineering • Occupational health • Task performance and analysis • Work

### Definitions

*Work:* Productive or purposeful activities.

*Task performance and analysis:* The detailed examination of observable activity or behavior associated with the execution or completion of a required function or unit of work.

*Occupational health:* The promotion and maintenance of physical and mental health in the work environment.

*Human engineering (ergonomics):* The science of designing, building, or equipping mechanical devices or artificial environments for the anthropometric, physiologic, or psychological requirements of the people who will use them.

## Background

An occupational rehabilitation program addresses the needs of workers, while focusing on their ability to work safely and productively. The occupational therapist works in collaboration with the worker and other team members including case managers, employers, or selected agencies (AOTA, 2005).

The organizing construct, according to the International Classification of Functioning, Disability, and Health (ICF) as stated in Hemmingsson and Jonsson (2005), that a therapist uses participation in the intervention processes, here participation in work. This process is facilitated by the frame-works of the biomechanical approach (James, 2003), the occupational therapy practise framework (Schultz-Krohn and Pendelton, 2006) and the Person-environment-Occupation model (Law et al., 1996).

In the late 1970s and early 1980s, U.S. industry began to recognize its responsibility for active management and prevention of injury in the workplace (Ellekson, 1997; Jacobs and Baker, 2000). *Occupational rehabilitation* emerged as the umbrella term to describe programs that evolved to serve this worker population. Occupational rehabilitation encompasses work hardening, work conditioning, work rehabilitation, return to work, functional restoration, and other programs that rehabilitate the injured worker (Commission on Accreditation of Rehabilitation Facilities, 2008; Jacobs and Baker, 2000; King, 1998).

## Purpose

The occupational therapist (OT) strives to enhance occupational performance, allowing the individual to engage in task completion, with the goal of full participation in work (American Occupational Therapy Association, 2002). Prevention strategies include ergonomic evaluation and design of the workplace, employee selection and screening, proactive injury management, and education and training of the work force (Larson and Ellekson, 2000; Saunders, and Stultz, 1998; Stein et al., 2006).

Job modifications, or reasonable accommodations, are considered if the worker is unable to perform essential job functions (Americans with Disabilities Act, 1990; Keilhofner, 2004). Modifying the workplace, and the tools and equipment used in the course of work activity, may aid an individual in compensating for the way tasks are completed.

## Method

### *Demographics and Logistical Factors*

#### **Candidates for Occupational Rehabilitation**

Diagnosis or disease categories include diseases of the nervous system, International Classification of Diseases (ICD) codes G00 to G09, and diseases of the musculoskeletal system and connective tissue, M00-M99 (ICD-10, 2007).

## **Gender and Common Age of Onset**

According to the U.S. Bureau of Labor Statistics (BLS) 2007 data, “35 cases” with musculoskeletal disorders “per 10,000 full-time workers were days-away-from-work” and of these “men accounted for 64 percent of injuries and illnesses”. Moreover, among all workplace injuries, 29 percent resulted in musculoskeletal disorders that requires time away from work (BLS, 2007).

## ***Epidemiology***

The U.S. Department of Labor (BLS, 2007), defines a musculoskeletal disorder (MSD) as an injury or disorder of the muscles, nerves, tendons, joints, cartilage, or spinal disks. The overall rate for all MSD cases was 39 per 10,000 workers in 2006 (BLS, 2007).

## ***Settings***

An occupational rehabilitation program may be provided in a hospital-based program, a freestanding program, a private or group practice, or in a work environment. Individuals are referred to these programs by physicians, insurance companies, workers’ compensation agencies, case managers, employee health officers, or other health care providers dependent on local and national law (AOTA, 2005).

## ***The Role of the Occupational Therapist in Applying the Intervention***

The primary role of the occupational therapist (OT) is to provide services to individuals or populations with deficits, problems, or impairments in work performance (AOTA, 2005; Rice and Luster, 2002). The OT addresses factors that influence the participation in and performance of actual job tasks, including the worker’s abilities, skills, neurobehavioral factors, physical health and fitness, cognition, and psychological and emotional well-being, and the environment in which the job exists (AOTA, 2005; Christiansen and Baum, 1997; Law, 2002).

## **Results**

### ***Outcomes of Occupational Rehabilitation***

#### **Clinical Application**

*Intervention planning* for deficits or problems in the performance area of work is a multifaceted, complex process. The physical capacity of the worker as well as knowledge of the work tasks and routines, ergonomic stressors, tools and equipment, and other factors affecting the individual’s ability to return to work must be identified

(AOTA, 2005; Haruko et al., 2006; King, 1998; Stein et al., 2006). A return-to-work program is interdisciplinary in nature, and often uses conditioning, work simulation, strengthening, and education to improve biomechanical, neuromuscular, cardiovascular, and psychosocial functions (CARF, 2008). Program effectiveness requires motivation and active participation by the worker (King, 1998).

### **Intervention that Directs the Worker to Function**

Work is a performance area of occupation; it has specific activity demands and requires certain performance skills (AOTA, 2002). Deficits in body structure or body function limit the worker's ability to meet the activity demands of a given job (AOTA, 2002; World Health Organization, 2001). Changes in the worker's physical, psychological, or sociocultural status affect engagement in the occupation of work (Rice and Luster, 2002). The work capacity of the person is optimized through prevention, rehabilitation, education, and ergonomics (King, 1998; Larson and Ellekson, 2000). Future risk to the worker is minimized, while the individual's health and well-being are maximized through participation in work (Law, 2002).

### ***Evidence-Based Practice***

Workplace-based return-to-work interventions have been shown to have a positive impact on duration and costs of work disability, with weaker evidence supporting an increased quality of life for the workers (Franche, et al., 2005; MacEachen et al, 2006). Return to work was found to be more complex than managing physical function and included an individual's beliefs, roles, and the perceptions of others involved in the process (Christiansen and Baum, 1997; Law, 2002; MacEachen et al, 2006). Social and communication barriers were identified as negatively affecting return to work, while goodwill and trust were noted to play an important role in successful transition to work (MacEachen et al, 2006). While improved productivity through comprehensive ergonomic programming was supported in the literature, the data were reported to be the opinion of respected authorities and experts in the industry (Chiariello, 2003).

### **Discussion**

While there is a need for stronger evidence in this area of practice, the resources available for occupational therapists are expanding. The Institute for Work and Health, an independent, nonprofit Canadian research organization ([www.iwh.on.ca](http://www.iwh.on.ca)), provides evidenced-based information on interventions that enhance work performance, address injury and disability prevention, and facilitate successful return to work (Scheer, 2007).

Reimbursement for occupational rehabilitation services depends on the setting in which the service is provided. Payment sources include direct reimbursement, state or federal programs, or community agencies (AOTA, 2005).

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