

Physical Training for Improved Occupational Performance

As athletes strive to improve their performance through effective training techniques, so too can workers benefit from optimally planned exercise training programs designed to boost occupational physical performance. Similar to athletics--where skill and fitness demands vary between that of the recreational and the professional athlete--occupational physical demands can vary among employment settings. Physically demanding occupations, such as those found in the armed services, emergency rescue professions, and construction and warehouse industries, require a high degree of physical fitness. Job performance in these occupations can be augmented by participation in formal exercise programs targeted at improving the musculoskeletal and/or cardiorespiratory systems.

Even less physically demanding occupations such as computer or clerical work can benefit from fitness and flexibility training. Tasks involving prolonged and repetitive pushing and pulling, holding, carrying, and lifting can lead to cumulative trauma disorders such as lower back pain, sprains, strains, carpal tunnel syndrome and neck pain. Physical training can be effectively used as both a prevention and rehabilitation tool in occupational settings. In addition to the well-known health benefits of being physically fit, physical training interventions can increase worker productivity by overcoming limitations in job performance due to inadequate muscle strength, power, endurance or aerobic capacity. Physical training can also prevent mismatches between job demands and physical capacities and decrease lost time due to injury-related absenteeism.

Conducting a Job Analysis

The first step in physical training program design is the completion of a comprehensive job analysis. This analysis should identify the most physically demanding and frequently occurring job tasks (critical job tasks). It will help to refer to written job descriptions and training manuals, observe individuals performing the job and interview subject-matter experts (e.g., ergonomists and occupational therapists). Once the critical physically demanding tasks have been identified, additional information regarding the tasks must be recorded to include mass and distance of loads handled, forces and torques exerted, frequency and duration of task performance, and equipment used to complete the job task. Information specific to the worker must also be recorded, such as body position, movement, and muscle groups employed while performing the task. This information is then used to determine the requisite energy systems and fitness components needed for successful job performance. Based on this information, a physical training program to improve job performance can be developed.

Before initiating a rigorous physical training program, it is essential that employees obtain medical approval for exercise.

Types of Physical Training for Improved Occupational Performance

Physical training programs for improving occupational physical performance typically assume one of two forms: 1) job- or task-specific training and 2) generalized physical fitness training. Task-specific training is accomplished by performing the physically demanding tasks of the job. This must be done in a progressive manner. For example, if the main physically demanding task of a given occupation is to lift 20 boxes weighing 40 kg each from a pallet onto a waist-high shelf, this may be beyond the physical capacity of a new employee. The new worker may need to perform fewer lifts or may take longer to complete the task. Simply performing this task is a form of task-specific training. Once a worker is able to perform this task satisfactorily, the intensity of the exercise can be progressively increased to provide a continual training effect. This can be accomplished by manipulating the load lifted (resulting in strength gains), the lifting rate (resulting in aerobic gains), or the total number of repetitions (resulting in muscular endurance gains).



As the physical capacity of the worker increases (be it strength, cardiovascular endurance, or muscular endurance), the percentage of an individual's maximum capacity utilized during the job task decreases. This, in turn, decreases the likelihood or risk of injury for that individual. Task-specific training is valid, and may provide improvement in task performance. The drawback is that it may be difficult and expensive to set up. A generalized physical fitness-training program is developed to improve employees' overall health and physical fitness. The program emphasizes specific muscle groups and energy pathways needed for optimal job performance. For example, a job such as a luggage handler at an airport would involve moving many pieces of heavy luggage from a cart onto a belt, or from a moving belt into the belly of the plane. The periods of rapid lifting are followed by a short rest period while the handler drives the luggage to the next location.

This task is likely to have high strength and aerobic demands, and the individual may be required to work in confined postures. In this case, a general physical fitness program would involve progressive resistance exercise to increase strength and muscular endurance, as well as an aerobic training component to improve aerobic capacity. The advantage of a general physical fitness training program is that it increases overall physical capacity and fitness of the individual. The training program is not narrowly focused, thus avoiding muscular imbalance. Increased physical capacity also may be generalized to other tasks. In other words, the employee may improve performance of other tasks, not just the one they were trying to improve. Generalized physical fitness training using standard exercise equipment reduces risk of injury compared with job-specific training. Ideally, a generalized physical fitness-training program is conducted in a corporate-owned or off-site fitness facility under the supervision of an experienced and certified allied health professional with a thorough knowledge of exercise training. One drawback to generalized physical fitness training is that the improvement in job performance is not so great as those obtained from task-specific training. The fact that improved performance may transfer to other tasks may offset this drawback.

Principles and Recommendations for Program Design

In designing a physical training program for improving occupational performance, several fundamental program-design variables should be considered:

- exercise selection and order
- equipment used
- specificity
- frequency
- sets
- repetitions
- rest intervals
- duration
- variation
- progression

The main factors influencing these variables are the initial fitness and training status of the worker and the desired outcome and goals of the program (i.e., muscle strength, power, endurance, aerobic capacity, and motor performance).

Jobs with little variation and a high skill or technical component will show the greatest improvements with task-specific training programs, while jobs requiring a variety of body movements and utilizing the various components of muscle fitness will benefit mostly from general fitness programs. The worker or "occupational athlete" can derive as much benefit in terms of improved performance as the Olympic athlete can by participating in optimal physical training programs.

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