Loss Control TIPS
Technical Information Paper Series
*Innovative Safety and Health Solutions*SM

Warming Up to On-the-Job Exercise: Effectiveness of Exercise Programs in Preventing or Relieving Musculoskeletal Disorders

Introduction

It has been suggested that exercise can be an effective part of an ergonomics program designed to address work-related musculoskeletal disorders (WRMSDs). Benefits of exercise as part of a more comprehensive health and safety program have been identified in the literature. However, the effectiveness of on-the-job exercise programs in and of themselves has not been conclusively established. Research results vary as a reflection of differences in research criteria, including study designs, methodologies, populations, design of exercise programs (exercises performed, frequency, duration, etc.), and outcome measures. Some examples are illustrated in the following summaries.

Literature Review

Silverstein et al. evaluated the effectiveness of an on-the-job exercise program in 1) reducing the severity of existing musculoskeletal symptoms of discomfort and 2) preventing future occurrences among active workers in a health products plant. An exercise program was designed by a physical therapist with the objective of controlling musculoskeletal symptoms in the neck and upper limbs. Employees performed the exercises for seven minutes, two times per shift, along with accompanying music, in the manufacturing area. Exercise was specifically isolated from other job changes or treatments to evaluate the effectiveness of exercise. There were no statistically significant differences in localized postural discomfort scores or in the proportion of those whose discomfort decreased based on exercise participation. Although no clear reduction in discomfort was achieved by the exercise program alone, at least 67% of respondents who participated in the exercise program reported that the program made them feel better.

Kohler presents a literature review and reports benefits of preventive stretching programs. At one company, such a program reduced reported carpal tunnel syndrome cases from 11 (in a nine-month period) to one (in two years). Adoption of preventive stretching exercises resulted in injury reductions for five companies ranging from 56 percent to 91 percent. A regime of exercises performed for 7 minutes two times a day brought about a 62 percent decrease in medical department visits for musculoskeletal injury related disorders.

Allers reviews the benefits of a pre-work flexibility stretching program and finds such a program to be effective in reducing medical costs by reducing the incidence of injuries. The specific experiences of several companies are cited.

Manzo et al. Illustrate the effectiveness of corporate exercise programs in reducing or eliminating risk factors that can lead to workplace musculoskeletal disorders (WMSD) in manufacturing operations. There were fewer reported overexertion injuries and lost-time injuries among the group who participated in a worksite program that consisted of 6-minute stretching exercises of the wrist, shoulder, neck, and back. In addition, workers who participated in a lumbar strengthening program gained significantly more strength and lost less time from work.

Laporte compared 10-minute "gymnastic pauses" to 10-minute rest periods among post office workers, and found reduced fatigue in both groups and significantly reduced visual fatigue among the gymnastic pause group.

Cox et al. were able to demonstrate improvement in overall fitness and absenteeism after six months of an employee fitness program implemented in an insurance company, including improvement for those who did not participate in the fitness program.

Hansford et al. found improved blood flow to the wrist among suture winders after five minutes of rest from work, and more improvement with stretching, isometric, and light dynamic wrist exercises.

Lutz and Hansford (among suture winders) and Sawyer (among racquet manufacturing employees) reported reductions in hand/wrist disorders such as carpal tunnel syndrome with the introduction of on-the-job exercise programs. Both programs included job redesign as well as more aggressive medical management.

Seradge suggests that exercises decrease the pressure on the median nerve. He recommends five-minutes of exercise at the beginning of work shifts and at breaks for workers with hand-intensive jobs. He states that daily exercise, combined with job modification, will save employers money that would otherwise be spent on medical care.

Battjes studied the effects of a 12-week preventive/corrective stability training program on self-reported symptoms of cumulative trauma in female computer operators. The intervention consisted of a 30-minute exercise program performed three times per week. Results indicated that the specific types of exercises employed in this program decreased self reported symptoms of cumulative trauma in the participants as compared to a control group.

Thomas et al. studied the effects of participation in an exercise program in increasing upper extremity flexibility, strength, and circulation on symptoms of carpal tunnel syndrome. The exercise group participated in daily upper-extremity exercises for eight weeks. Test results indicated no statistically significant differences in nerve conduction latency or subjective comfort between the two groups. Significant differences did develop in grip strengths over time, suggesting that the exercise group may have benefited physiologically from the exercise program.

Overall, the findings of this research are generally favorable, demonstrating no negative effects on individuals or job performance. In fact, some studies have demonstrated improvement in criteria like productivity and individual comfort as the result of participation in an exercise program, *particularly when the exercise program is an integral part of a comprehensive and coordinated occupational health and safety program.* The literature supports integration of occupational health and safety programs which have traditionally maintained a work related focus, with health promotion and/or wellness programs which address work and non-work related health problems.

How Do Exercise Programs Work?

Discomfort or injuries (referred to as WRMSDs) are associated with risk factors in the work environment and with individual characteristics. Risk factors in the work environment include static and/or awkward postures, forceful exertion, and repetitive motions. Individual risk factors include poor nutrition, obesity, and substance abuse (nicotine, alcohol, drugs). The likelihood of an employee's developing physical discomfort can be reduced by maintaining a healthy life style, by working at a well-adjusted workstation, by alternating tasks, and by exercise. In addition, exercise may be a useful preventive measure and an effective tool after an injury has occurred, or when a recovering employee returns to work. Exercise appears to accomplish the following:

- improve circulation, increasing blood flow through the stressed area
- reduce fatigue
- increase muscle strength and endurance
- improve flexibility
- maintain or improve muscle balance
- reduce stress

Types Of Exercise Programs

There are different types of exercise programs. *Warm-ups* are designed to limber up muscles before performing strenuous work, much as an athlete would do. *Regular stretch breaks* are intended to periodically stretch unused muscles and to provide relief from being in the same position for too long. *Conditioning exercises* get people in shape by strengthening muscles and by improving flexibility and endurance.

Suggestions For Designing An Effective Exercise Program

- ☐ *Make the program a positive one for everyone.* A voluntary, but well-supported, exercise program is preferred over a mandatory program. Don't force the program on workers. Appealing to workers' sense of self-responsibility and self-interest will generate more participation and sustained effort than asking workers to protect the company's safety record and expenses.
- ☐ *Provide complete information.* Be sure employees really understand the purpose of the program and how to perform the exercises properly.
- ☐ *Keep the exercise regime short.* Frequency and duration are interdependent and are also influenced by job function. A pre-work warm up exercise regime of 10 minutes, with five minutes of stretching/range of motion exercise every one to two hours during the work day can be effective.
- ☐ *Keep the exercise regime simple.* Select exercises that can *easily* be done at the intended location (e.g., at the work site) and that do not require accessory equipment.

Incorporate these guidelines into the exercise program:

- ☐ *Remember to breathe while exercising.* Breathing increases the level of oxygen in the system. In addition, slow regular breathing helps maintain a slow, steady exercise pace.
- ☐ *Always stretch gently*. Feel a stretch, but not pain.
- ☐ *Go easy at first.* Start out with a few exercises and/or a few repetitions and gradually increase. Slowly increase the number of exercises in the program and be more vigorous with stretching over time.
- ☐ *Move slowly and smoothly.* Avoid sudden jerky movements. Do not bounce.
- ☐ *Exercise regularly.* Try to do some of the exercises every day at regular intervals, even on days off work. Perform some combination of exercises every 1-2 hours.
- ☐ *Discontinue the exercise if pain occurs.* If you experience pain and discomfort after you have exercised, it probably means that you did too much. It does not necessarily mean that the exercise is wrong. When in doubt, or if pain persists, check with a medical professional,
- ☐ *Evaluate and reevaluate* the design and effectiveness of the program.

For a sample of specific workstation exercises, refer to The Hartford's brochure, *Workplace Ergonomics: Exercises To Keep You Comfortable At Work* (Order Number #103071 REV).

Summary

There are a variety of reasons why employers should consider providing for exercise, including overall employee wellness and morale. Improved wellness and morale can contribute to cost savings from lower health care premiums, lower absenteeism, and increased productivity. Well-designed exercise programs can serve as part of a comprehensive musculoskeletal disorder prevention program. While the effectiveness of exercise programs in the prevention of work related musculoskeletal disorders has not been proven definitively, the benefits of exercise have been demonstrated in many situations. While many ask "Does exercise help prevent work related musculoskeletal disorders?" the real question is "Which *types* of exercises help prevent what *types* of musculoskeletal disorder and *under what conditions*?"

Key issues which will influence the success of the program include the design of the program, employees' attitudes, and the and level of employees' participation. The exercise program itself must be appropriate to the job tasks and environment, and the specific exercises must be selected carefully. Avoid exercises which might add to postural discomfort. As necessary, request the assistance of qualified professionals in the development of the exercise program. Occupational therapists, physical therapists, exercise physiologists, ergonomists, or other healthcare professionals who are knowledgeable about WRMSDs and who are experienced in work programs would be capable of providing such assistance. As with other safety and wellness programs, an approach which places primary responsibility on the employee and emphasizes proper behavior and self-care techniques will be most effective.

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