Workplace Stretching Programs: The Rest of the Story

Jennifer A. Hess, DC, MPH and Steve Hecker, MSPH
Labor Education and Research Center
1289 University of Oregon
Eugene, OR 97403-1289
(541) 346-0275
jhesso4@aol.com

Introduction

Advocates of workplace stretching programs claim that improving flexibility can prevent work-related musculoskeletal injuries. Even though many companies have implemented stretching programs, their effectiveness has not been demonstrated. Most reports of the benefits of worksite stretching programs have been published in popular literature or trade journals. They are based on in-house evaluations that rely on self-reported outcomes rather than objective measures. More importantly, most studies seek only to answer one question: does stretching prevent injury? This single focus eclipses more specific questions that should be asked about stretching, such as who does stretching benefit and in what situations? To gain a better understanding, we examined published reports pertaining to flexibility and stretching among workers. While the low back was not the target of our search, all the studies found focused on this body region. Flexibility is usually defined as the range of movement possible around a specific joint or series of joints.

Workplace Stretching Programs

Our search found only three studies that specifically evaluated workplace-stretching programs. A stretching program designed to prevent muscle strains was implemented among pharmaceutical manufacturing employees. [(1)] A significant increase in flexibility measurements for all body regions tested was found after two months of stretching. Participants' perception of physical conditioning, self-worth, attractiveness, and strength also increased. The greatest physiologic improvements in stretching occurred for back flexibility and shoulder rotation, especially in those who attended more than 13 sessions.

A flexibility program among municipal fire fighters evaluated the incidence, cost and severity of joint injuries in stretchers versus nonstretchers. [2] Fire fighters who participated in the program were more flexible than nonstretchers after six months of stretching. In the two-year follow up there were 48 injuries among stretchers and 52 injuries among nonstretchers, not significantly different.

However, the total dollars spent because of injury was $85,372 for stretchers versus $235,131 for nonstretchers. A breakdown of costs revealed that time-loss costs for stretchers were significantly lower than for nonstretchers, $45,597 versus $147,581 respectively, while medical costs were not significantly different statistically between the groups, $39,775 stretchers versus $87,550 in nonstretchers.

A study with manual handling workers looked at strength training combined with stretching. [3] One group of workers received progressive resistance strength training alone, while another group received progressive strength training and trunk flexibility stretches before and after strength training. Flexibility improved in those who performed strength training and stretching, but not in those who performed only strengthening exercises. Also, stretching combined with strength training resulted in higher percentage increases in static and dynamic strength than did strength training alone.

The Controversy

Flexibility and Optimal Range of Motion

It is commonly believed that those who are less flexible are more likely to have musculoskeletal pain and resultant injury. However, the few studies that have evaluated levels of flexibility among populations of working people, such as municipal fire fighters and

manufacturing employees had mixed findings. [4, 5, 6, 7, 8, 9] One study found limited flexion (forward bending) in people with current or previous back problems, while another study found decreases in trunk extension (backward bending) in those with low back pain (LBP). Yet another study showed that men with hypermobile low backs (too much flexibility) were more likely to experience back pain. These discrepancies highlight the issue of a beneficial 'functional' or optimal range of motion. It seems reasonable that individuals who are either too flexible or not flexible enough may be at an increased risk for injury. This raises several questions: Is there a healthy functional range of motion? How much flexibility is too great or too little? And which workers really need to enhance their flexibility? Perhaps placing hypermobile workers in a stretching program puts them at greater risk of injury, while strengthening exercises would be more appropriate. Hypomobile individuals, on the other hand, might benefit from greater flexibility, but these people have not been evaluated as a separate population.

What are the Benefits of Work Place Stretching Programs?

The three studies that evaluated workplace-stretching programs demonstrated that stretching improves flexibility. However, two of these studies did not connect improvements in flexibility with meaningful outcome measures such as injury incidence or severity. Additional studies are needed to define the contribution of stretching programs in the workplace. The enhanced strength demonstrated by manual handling workers who stretch is a notable finding in the real world of workers who bend, lift, carry, pull and push, over many hours a day. The current narrow focus on flexibility might be overlooking this valuable aspect of stretching that could contribute to injury reductions due to worker fatigue.

Further, the lowered costs associated with reducing injury severity and time loss noted in firefighters may be as important an outcome as reduction of injury incidence.

College Athletes versus Industrial Athletes

Workers are many times referred to as 'industrial athletes,' and sports studies are frequently cited in the debate over the effectiveness of stretching at work. Yet, studies of college athletes have diverse findings; some demonstrate that stretching before an athletic activity helps reduce the incidence of strains and sprains while others show that stretching has no effect on injury rates or that it may actually increase the risk of musculoskeletal injury in athletes. It is also questionable to rely upon studies relating flexibility and stretching among college-aged athletes who train vigorously, to workers whose age, physical condition, training practices and daily physical demands may differ substantially. It may be erroneous to assume that 'industrial athletes' behave in the same way as college athletes, and there is a need for studies specific to working populations.

Workplace Stretching Program Guidelines

Even researchers who are highly critical of the proposed benefits of stretching recognize that all methods of stretching are not equal. Since businesses continue to implement these programs, they should be done correctly in order to enhance the potential to be effective. Table 1 summarizes stretching guidelines based on a review of the literature and current American College of Sports Medicine recommendations. [10] There are three types of stretches: static, ballistic, or proprioceptive neuromuscular facilitation (PNF). PNF, where a muscle is contracted for 15 - 20 seconds, relaxed and then stretched, probably provides the greatest stretching effect, while static stretching,

where the muscle is stretched and held is simpler to perform and is also very effective. Ballistic stretching, where the individual bounces the muscle being stretched, has been shown to cause injury and should be avoided.

Conclusion

Laboratory research on humans and animals has shown that stretching can alter the elastic properties of muscles and tendons. The presumption is that for individuals with short or 'tight' muscles stretching increases flexibility by elongating tissues to a more physiologically normal range, promoting optimal function and reducing the risk of musculoskeletal injury.

Studies focusing on working populations, however, have demonstrated mixed findings regarding flexibility and its relation to injury. The few available studies specific to workplace stretching programs suggest that stretching at work enhances worker health and decreases the severity and cost of treating musculoskeletal injuries, but fail to definitively prove the case for or against stretching. More information is needed to clarify the relationship between levels of flexibility, injury, and the need for regular workplace stretching. Even though existing studies have shortcomings, many important questions have been raised:

- ? Is stretching beneficial for those with hypermobility, normal ranges of motion, or only for those with hypomobility?
- ? Could stretching actually increase the risk of injury in some workers?
- ? In terms of the low back, should stretching focus on flexion or extension?
- ? Is stretching beneficial only for the low back? No references were found that specifically addressed stretching for the prevention of neck, shoulder, knee or wrist injuries in working populations.

- The findings about stretching in athletes are contradictory, what does this mean for working populations? Would stretching have more or less benefit?
- Is there an ideal time of shift for stretching? For example, should workers stretch at the start of their shift or just prior to some exerting task?
- What constitutes a quality stretching program? Are five or ten minutes sufficient to stretch the entire body? How many repetitions are needed to gain maximum benefit? Are all stretches equally effective and could some be potentially risky for unfit individuals?

The heated nature of this debate has made it difficult to generate in-depth discussion about the role of stretching, and it is not enough to say that stretching at work does or does not work. Stretching is only one component of injury prevention. It is important to remember that total fitness requires a combination of endurance, strength and flexibility, and coordination. These other aspects of musculoskeletal health and an ergonomically optimized work environment must not be overlooked in an effort for a quick fix.

For a more detailed discussion of this topic see *Applied Occupational and Environmental Hygiene*, Vol. 18(5), pp. 331-338, May 2003.

Table 1. Effective Worksite Stretching Program Guidelines

- Warm up for 5 minutes, minimum, prior to stretching
- Exercises should be tailored to commonly performed job duties
- Stretch regularly: 2-3 days/week, minimum
- Perform stretches correctly:
  - Use static or PNF stretches
  - hold stretch 10-30 seconds
  - 3-4 repetitions per muscle group
  - stretch bilaterally, emphasize tight muscles
- Intensity should be to a position of mild discomfort only
- Trained instructors should lead or monitor classes
- Compliance should be monitored
- Stretch at appropriate work times throughout the day
- Company must be committed to work time and program overhead costs

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