

Five Approaches to Managing Musculoskeletal Disorders at Work

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Introduction

Musculoskeletal disorders (MSDs) continue to be a major type of loss in today's workplace. Bernardino Ramazzini made one of the first published mention of these injuries as "diseases of those who do fine work" in 1700. In the mid-1980s, the attention of safety professionals and employers expanded to identify cumulative trauma and repetitive motion injuries as an increasing issue and exposure in today's workplace. In Humantech's recent benchmarking studies, employers indicated that MSDs, the common term for these types of injuries today, account for 35% to 72% of their recordable injuries. Upon further investigation, we found that the approaches used to manage these injuries range widely, from reactive to proactive approaches based on personal wellness, fitness, and individual behaviors, to improving the ergonomics of the workplace.

This presentation provides an overview of the five most common strategies used to manage MSDs in the workplace, identifies the pros and cons for each, illustrates the investment and value, and contrasts their effectiveness. The purpose of the presentation is to broaden the safety professional's perspective and understanding of MSD management methods, and to help them identify new opportunities to improve their management of these losses.

Based on published articles and benchmarking studies, we've identified the five most common approaches used today to manage MSDs:

- Fix the person
- Fit the person to the task
- Change the person
- Change how the person performs work
- Change the work and workplace

Fix the person

When an employee experiences an MSD or sprain/strain injury, he or she must be diagnosed and treated, and then managed through the return-to-work process. This is medical management, a reactive program with the purpose of caring for injured employees and reducing losses (time and financial) caused by injuries that have occurred. Typically, this approach is dependent on, and best supported by, health care providers (nurses and doctors) qualified in occupational health and MSD management.

Fortunately, those health care providers experienced and qualified in the diagnosis and treatment of MSDs follow established, common, and accepted protocols. This approach of diagnosis, treatment, and return to work of the injured employee is, obviously, focused on the individual person. The process used by, and the effectiveness and efficiency of, medical management can be greatly influenced (positively or negatively) by several other operational factors. These factors include the system for funding and tracking occupational injuries (i.e., Workers' Compensation system or socialized medicine), method and requirements for classifying workplace injuries, speed of reporting by the injured employee, aggressiveness of treatment and return to work, and the ability to find/accommodate tasks for return to work and resolving the cause of the injury.

Reactive approaches like this are most effective when they integrate immediate and detailed injury/illness investigation methods to find the causes of an MSD injury, and take action to eliminate or reduce the injury cause(s) before the injured employee returns to work. Where there are effective programs, there also tend to be strong working relationships and coordination between the medical staff and the people conducting the investigations. Typically, this partnership is with the site safety staff.

The pros of this approach are as follows: It involves quick responses to, and management of, reported injuries/illnesses.

- Aggressive management can reduce the cost of injuries.
- Resources are focused on known losses.

The primary challenges of this approach are that it

- is reactive; action is taken only after an injury has occurred.
- does not prevent loss and cost (just minimizes it).
- focuses on one job or workstation at a time.

This reactive approach provides value in that it helps treat the injured individual and reduce the associated cost. The investment in time and services is high (medical and associated return-to-work expenses), actual cost and treatment requirements are not well defined initially, and this approach does not identify or address the next source of MSD injury (prevention). Reactive programs are a good fit for those workplaces and tasks that have non-standard work tasks, high employee turnover, and little opportunity to influence the design of tools and workstations.

Fit the person to the task

In an attempt to reduce the incidence of strain injuries, many organizations implement a process to match the capabilities of an employee (or prospective employee) to the physical demands of the workplace, in other words, fitting the person to the task. This approach relies on measuring a person's functional capacities (strength, reach, range of motion, etc.), and then matching them to the requirements of the work, as determined by a Physical Demands Analysis.

This is a preventive approach, which requires an employer's investment in additional time and services to conduct functional capacity analyses and pre-work screening to match physical demands of each job description. This approach typically depends on the services of physical or occupational therapists trained in measuring capabilities of individuals, and requires an investment in time (employee and service provider) to perform tests and to match employees to the physical demands of a task. The actual proof that this approach is effective is limited mostly to anecdotal reports. A few published studies indicate that this approach prevents 15% to 25% of future MSD (and other) injuries, provided the physical demands and functional capacity tests are accurate representations of exposures at work.

The pros of this approach are as follows:

- Screening provides a way to identify pre-existing conditions.
- It illustrates to employees their own physical capabilities.
- It forces employers to measure the demands of their workplace and tasks.

The drawbacks of this approach are that it

- involves high investment in time and cost for screening.
- provides low reliability (payback) of return.
- is dependent on the quality of testing to truly reflect the physical demands of the entire job task.
- does not change or affect causes in the workplace.
- requires reassessment whenever the jobs change.
- focuses on the person, one at a time.

This practice was in favor with many employers during the 1960s through the early 1980s but appears to be waning. It is our experience that 10% to 30% of U.S. companies still use this approach. In fact, it is encouraged in parts of Canada where Physical Demands Analysis are recommended by the Occupational Health Clinics for Ontario Workers Inc. when returning injured employees to work. In this case, matching the person to the task is part of a Return to Work program.

Typically, this approach is used by organizations engaged in manual material handling and field tasks with limited control over their workplace conditions (for example, warehousing, stocking and order picking, and driving and delivery tasks).

Change the person

Some organizations take a wellness approach to MSD prevention through activities aimed at changing the capabilities, fitness, and stamina of the person doing the work. This is an investment in the personal fitness and wellness of employees. It relies on stretching, exercise, and

conditioning programs to change the physical conditions of individual employees, and to hopefully prevent an MSD. It relies on physical changes to each individual employee and is heavily dependent on many variables that are outside an employer's control. These variables include employee willingness, interest, and participation; each individual's existing physical condition and pre-existing conditions; and the design of the exercises to match workplace demands.

Although some organizations mandate stretching before and during work, many state that it is challenging to get people to participate in (and continue with) these workplace stretching and wellness programs. In addition, the effectiveness of company-mandated stretching programs has not been proven conclusive in the prevention of MSDs. Proponents of stretching and conditioning identify that these fitness-based approaches are effective only when combined with other approaches (for example, training). Most published studies on the effectiveness are based on anecdotal information, but some organizations report experiencing a 15% to 80% reduction of injuries over a long-term stretching program. Finally, the activities of any stretching or conditioning protocol should be tailored to the tasks and physical demands being performed by employees (task/job-specific stretches). Use of generic stretching programs can further exacerbate issues if the stretches are counter to the physical demands of the work.

The advantages of this approach are that stretching, fitness, and conditioning activities are

- visible,
- provide employees with a short break from work,
- provide a time break from work tasks, and
- increase each individual's awareness of fitness.

The drawbacks of this approach are that it

- has not been proven effective by valid studies.
- does not reduce conditions in the workplace that cause MSD injuries (high force and weights, awkward postures).
- decreases productivity by taking people away from work.
- may expose vulnerable individuals to increased chance of injury.
- requires high investment of funding and time requirements (employee time, program development, and program management).
- is a challenge to sustain over time and with business changes.
- allows employers limited influence on the personal health and wellness of their employees, and employers have no control over employees' pre-existing conditions.

This preventive approach is typically supported by fitness trainers/specialists, physical therapists, and occupational therapists. It works well for organizations that have limitations in changing the setup and configuration of their workplace, have the flexibility to interrupt work, and have a strong commitment and investment in employee wellness and fitness.

Change how the person performs work

Another preventive approach that some employers use is to change how people behave or perform their work tasks in hopes of reducing exposure to MSD risk factors. This relies on behavioral modification most commonly through behavior-based safety programs, work practice

training and awareness campaigns, and by stressing the use of good body mechanics. Safety professionals know that behavioral safety is an administrative control that should be adopted only after engineering controls (workplace changes) have been implemented and exposures to workplace hazards have been reduced to the lowest level achievable. This behavioral approach relies primarily on employees changing their perceptions of work and risk, changing how they perform work, overcoming existing work practices, and maintaining that change throughout the work shift, work week, and their careers.

This approach is supported and promoted by behavioral safety experts, psychology professionals, fitness trainers, and even martial arts experts. A review of research studies did not find any concrete evidence of the effectiveness of this approach in reducing MSDs. However, several web sites have subjective reports of effectiveness in reducing overall injuries (not specific to MSDs).

The pros of this approach are as follows:

- There is a low cost investment to conduct training or establish a behavioral/movement program.
- Employees generally like it (they get a break from work and are doing something different and fun).
- Employers view it as a low-risk option.

There are several drawbacks to this approach:

- Effectiveness and payback are low (even when behaviors do change, they rarely have a significant impact on preventing exposure to MSD risk factors).
- Despite the low cost, the ROI is low or not measured.
- Programs are difficult to sustain.
- The validity of this approach is not proven.
- It does not affect the causes of MSDs in the workplace.
- Managers have expressed their frustrations in getting people to participate in the program and to use safe working practices, requiring additional management time and effort to enforce.

This approach works well for organizations that cannot or choose not to change their workplace, have time available to teach and engage employees, and have an existing behavioral safety observation program, and those with non-standard work environments. There are several strong programs in the hotel/motel and entertainment services industry; with distribution, packaging, and cartage tasks; in trucking and delivery operations; and in construction.

Change the work and workplace

Occupational ergonomics can be described as designing new or changing existing workstations, tools, and equipment to fit the people (population) doing the work. NIOSH defines it as “The science of fitting workplace conditions and job demands to the capabilities of the working population.” This engineering or design-based definition is consistent with other internationally recognized professional associations and organizations (BCPE, ILO, WHO, IEA).

The approach to managing ergonomics in the workplace has changed significantly from the early days when OSHA released the *Ergonomics Program Management Guidelines for Meatpacking Plants*. This guide was a common resource for safety professionals beginning to

address MSDs. A common current practice is to manage workplace ergonomics by focusing proactively on identifying and reducing the risk factors that cause MSDs. This approach follows the continuous improvement process of Plan – Do – Check – Act (that is, assess the risk, implement controls, validate the effectiveness of controls, and standardize the controls). This approach has been well defined by the Canadian Standards Association and American Industrial Hygiene Association.

Diagnosis is the first step in identifying and measuring workplace exposures to MSD risk factors. Valid and proven assessment tools are available for whole-body exposure, as well as segmental or specific risk factors (for example, NIOSH Lifting Equation, vibration, etc.). The usability of good qualitative and quantitative MSD assessment tools has evolved to a point where non-safety, ergonomics, or medical professionals can conduct MSD risk assessments effectively. In one study, Winnemuller et. al. (2004) found that 81% of supervisors and 77% of workers completed ergonomic risk assessments that were in agreement with those completed by an ergonomist. The bottom line is that MSD assessment and management can, and should, include people across an organization, not just the local ergonomist.

This approach of changing the workplace depends on engineering controls (adjustments and changes in the physical workplace) to ensure that reach, force, and distance are within acceptable limits of the collective workforce. This means designing the workplace to fit the 5th percentile female to the 95th percentile male to prevent exposure to MSD risk factors for all workers. This approach has been proven by many studies to be effective and efficient.

Administrative controls are a secondary level of control that include changes to work planning like job rotation, rest breaks, and slowed pace. This approach can create additional challenges for managers and supervisors as they shift people in work tasks. Unfortunately, administrative controls do not reduce or eliminate the presence of MSD risk factors; they just reduce the exposure time (when managed correctly).

Goggins et al (2008) reviewed 250 published case studies on the reported benefits of ergonomics programs and control measures. Their findings validated the hierarchy of controls, as applied to improving ergonomic conditions in the workplace. They found the cost effectiveness of several MSD control methods were:

- Eliminate exposures to MSD risk factors: 60-100%.
- Reduce levels of exposure: 40-60%.
- Reduce time of exposure: 20-40%.
- Rely on behavior: 10-20%.

Support and engagement in effective ergonomics processes depend on involvement by people across an organization. Ergonomics/safety teams effectively conduct assessments. Employees bring expertise to cross-functional teams working on controls that reduce exposure to MSD risk factors. Engineering and administrative controls are best supported by ergonomists, engineers, and professionals qualified in ergonomics.

Many organizations are working toward, or have achieved, a proactive ergonomics process to identify and manage exposures to MSD risk factors in their workplace. These are typically organizations that tried and were not successful in changing people, how they worked, or the other approaches discussed above. They have control over their workplace to make changes, and an attitude to accept them. In addition, these are organizations that can and do change the

workplace to reduce MSD risks, are open to making and funding changes, realize that the investment in equipment and changes will pay off, and integrate the change process into their normal methods of business. Examples of the types of organizations applying ergonomics to manage MSDs include office and call centers, production and manufacturing, processing, fleet and delivery operations, healthcare, laboratories, heavy manufacturing, and more.

But there's more... Several organizations have standardized the proactive approach of managing ergonomics in today's workplace, and are now at an advanced level. Advanced operations are evaluating the ergonomics of future products, processes, tools, offices, and layouts, and designing the future operations to fit the capabilities of the people who will work there. Simply put, this is prevention through design. This requires moving the ergonomics process upstream to include and engage product designers, process engineers, and space planners. By providing these designers of future products and processes with the right criteria, they can design correctly for the working population, and prevent the introduction of MSD risk factors in the next-generation workplace. The cost to design new tools, processes, and equipment correctly the first time is 1% to 10% of the cost of retrofitting the workplace later on.

The advantages of this proactive approach include the following:

- Causes of MSDs (risk factors) are identified and controlled before an injury and loss occurs.
- Risk reduction controls benefit all people working at a task, now and in the future.
- Engineering controls are sustained over time, positively affect employee behaviors and performance, and reduce the need for behavioral safety program elements.
- Controls are reliable; they are not dependent on employee behaviors.
- Employee engagement in improvements ensures buy-in and change.
- There is a high return on investment (value); although expense and capital costs accompany engineering controls, this investment is significantly lower than the costs of later MSD claims.

This approach has a few drawbacks; it requires

- changes in how ergonomics has been perceived.
- increased involvement by engineers, maintenance, management, and employees.
- initial, one-time cost for implementing engineering controls.

Conclusion

There are many approaches available for managing MSDs in the workplace. There is a right fit for every organization; depending on current need, culture, resources, goals, and workplace exposures, companies may choose one, several, or all of the above approaches. We do, however, recommend that the last approach, changing the workplace, to be the most effective, efficient, and sustainable approach; if it is done well, an organization becomes less reliant on the other approaches.

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