Edition

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OCCUPATIONAL HEALTH CLINICS FOR ONTARIO WORKERS

Resource Guide

Ergonomics Committee Workbook

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Introduction

The Occupational Health Clinics for Ontario Workers (OHCOW) is an organization dedicated to the prevention of occupational illnesses and injuries. A service we offer to Ontario workplaces is to work with Joint Health and Safety Committees (JH&SCs) to identify health and safety problems and to develop practical recommendations to prevent occupational illnesses and injuries.

ICON KEY

See Appendices

Red Flag to Note

Tips to Remember

OHCOW Reference

Ergonomics is concerned with fitting the task and/or environment to the worker. These changes may be in work layout, routine, environment or equipment and focuses on ensuring that the physical abilities and limitations of the user are supported in order to accomplish tasks safely.

Work Related Musculoskeletal Disorders (WMSDs) are musculoskeletal disorders caused or made worse by the work environment (NIOSH, 1997). WMSDs occur when there is a mismatch between the physical requirements of the job and the physical capacity of the worker (Hagberg, 1992). Prolonged exposures to ergonomic risk factors have been shown to likely cause or contribute to the development of a WMSD (NIOSH, 1997).

When an ergonomic assessment is performed by OHCOW ergonomists, a key recommendation made to most workplaces is the formation of a Joint Ergonomics Committee. A Joint Ergonomics Committee is a group of people in a workplace that deals with ergonomic concerns. The group has training in ergonomics to provide them with the knowledge they need to address ergonomic problems and to solve them internally.

Why should I read this book?

This handbook provides workplaces with practical information about setting up and running an Ergonomics Committee. If you are thinking about establishing a committee to deal with ergonomic issues at your workplace, this handbook is for you.

Does my workplace need an ergonomics committee?

- Have there been WSIB claims for musculoskeletal injuries at your workplace?
- Are workers absent because of discomfort?
- Do first aid reports indicate workers are having joint discomfort/pain?
- Are there some jobs that have a high turnover because of physical demands?
- Are there frequent production stoppages or high scrap rates?
- Are any workers wearing wrist or elbow splints?
- Are there jobs at your workplace that are repetitive, awkward, and/or forceful?

If you answered 'yes' to any of these questions, your workplace would benefit from an Ergonomics Committee. This workbook takes you through the following steps:

1. Getting an Ergonomics Committee started
2. Identifying and assessing musculoskeletal injury risk factors
3. Arriving at solutions to reduce risk factors
4. Evaluating the effectiveness of the Ergonomics Committees

Chapter 1

Getting Started

Over half of the lost time claims in Ontario workplaces are due to work-related musculoskeletal disorders (WMSDs).

Therefore, it makes sense to have a group of people in the workplace devote their time to the reduction of WMSDs. It is only through co-operation between workplace parties that WMSDs can be reduced.

Who can suggest the formation of a committee?

1. The JH&SC can recommend the formation of an ergonomics committee to the employer.

2. Some corporations have corporate policies that include Ergonomic Committees or teams. Find out if your corporation has Ergonomic Committees in their corporate policy.

3. Negotiate an ergonomics committee into the collective agreement, if one exists, during collective bargaining.

4. Although it is ideal to have a joint ergonomics committee, if the company does not want to participate, an ergonomics committee could be started amongst workers. This would allow workers to raise ergonomic issues and concerns to the JH&SC.

5. The engineering group may also take the responsibility for workplace ergonomics as part of their design, redesign, and future projects responsibilities.

Who should be on the ergonomics committee?

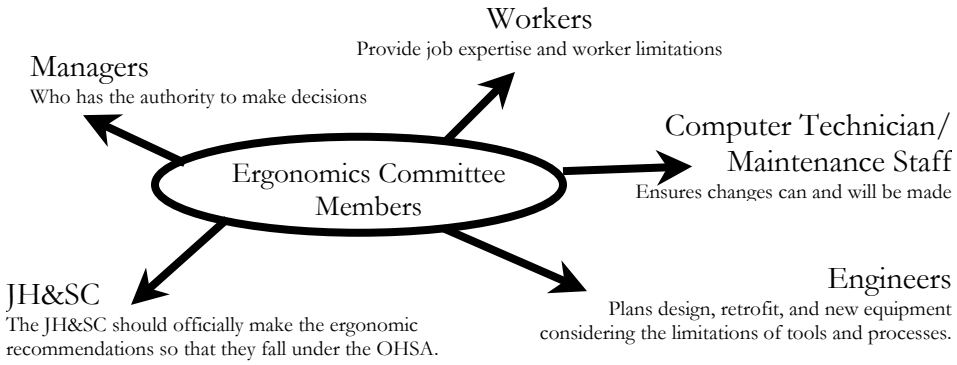

Figure 1: Suggested ergonomics committee members

Support from all different sectors of the work force is needed for the ergonomics committee to be effective. Figure 1 describes some people who should be on an ergonomics committee.

The representatives who will be on the ergonomics committee should be specified at the outset. The Occupational Health and Safety Act clearly defines the composition of a JH&SC. OHCOW recommends using the same composition in an ergonomics committee.

How should the committee be structured?

The ergonomics committee should make its recommendations through the JH&SC (piggyback), so the Occupational Health and Safety Act applies to the recommendations put forward. In Section 9(20) of the Occupational Health and Safety Act, it states the following:

> *A constructor or employer who receives written recommendations from a committee shall respond in writing within twenty-one days.*

If the recommendations are made by the JH&SC, they will be covered by the Occupational Health and Safety Act. If the ergonomics committee has been negotiated into the collective agreement, terms of reference for the ergonomics committee can be specified in the collective agreement.

What kind of education and training is needed?

Members who are on the ergonomics committee will need training. Investigate what training is available and determine which training will best suit the members. Training must be an ongoing process. Further training could include new ergonomic assessment techniques, computer programs for analyzing and presenting data (i.e.

Excel, PowerPoint), or new problem solving approaches, such as participatory ergonomics to involve employees in the problem solving process. As the committee matures, upgrading skills and learning needs will become evident.

Some topics to include in the initial training program include the following:

- General introduction to ergonomics and cost-benefit analysis.
- Learning of assessment tools, such NIOSH, Snook's and/or Mital tables.
- Identifying problem areas in the workplace and assessing them in small groups.
- Forming recommendations and writing reports to improve the jobs assessed.
- Presenting recommendations to the employer.
- Setting goals and priorities for the ergonomics committee.

There are several organizations that can provide training for ergonomics committees. The union in your workplace or your corporation's head office may already have a training program for ergonomics committees.

Some external organizations that provide ergonomics training include the following:

- Workers Health and Safety Centre
- Health and Safety Association for your sector
- Ergonomic Consultants (Contact the Association of Canadian Ergonomists)
- Several universities in Canada also have ergonomics consulting and assessment services

Helpful hints to get an Ergonomics Committee started:

☞ Have the support of the workers and management.

☞ Clearly define goals

☞ Establish realistic expectations.

What goals and objectives should the ergonomics committee have?

The ergonomics committee needs goals and objectives to define reason for being.

GOALS

A goal is the outcome the ergonomics committee expects to achieve. Goals can be used to evaluate the committee in the future.

Examples of goals are as follows:

- Reduce work related musculoskeletal disorders by 20% in the next two years.
- Reduce new carpal tunnel syndrome injuries by 30% over the next two years.
- Reduce musculoskeletal discomfort absenteeism 15% over the next year.
- Reduce the incidence of upper limb discomfort by 20% in the next year.
- Make 50% of shared workstations height adjustable in the next six months.

OBJECTIVES

The operating objectives should be specific, measurable results that the ergonomics committee plans to accomplish. When defining operating objectives, it is important to include the mechanism for evaluation, a timeline, and those members of the committee who are responsible for their completion. Appendix B shows an example a table that outlines operating objectives with responsibilities laid out and timelines defined.

Helpful hints to keep an Ergonomics Committee functioning:

- ☞ Have short-term and long-term goals.
- ☞ Ensure the committee is receiving on-going training development.
- ☞ Work to improve relationships within the team to build a cohesive group.

Chapter

2

Identify & Assess

To set goals and objectives, the ergonomics committee will have to decide how to deal with ergonomics problems at the workplace. For example, will the ergonomics committee start with helping the injured workers? or workers who have the highest exposure to ergonomic risk factors? or the department with highest risk? Who will decide who gets help first, second, third…?

Your ergonomics committee may choose between two approaches, a proactive or reactive approach, or a combination of both approaches when dealing with problems.

The reactive approach is where most ergonomics committees must start. Therefore, the committee begins by dealing with problems that are already present in the workplace by using passive investigation techniques, such as already collected injury rates, to pinpoint the areas of highest risk.

The proactive approach is the ideal approach. This is when the committee anticipates problems before they occur and often need to use active investigation techniques, such as risk factor assessments of each job, to determine where the areas of highest risk for injury are.

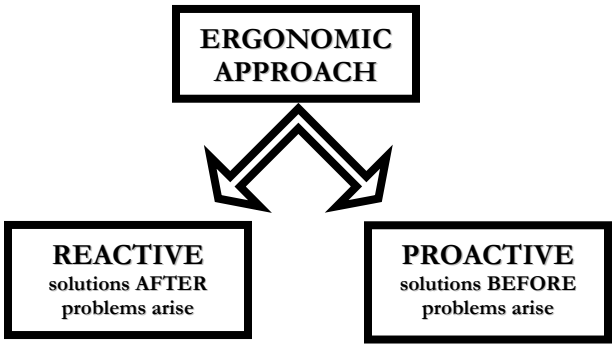

Figure 2: There are two types of ergonomics approaches, reactive and proactive. How do you identify the areas at highest risk?

Generally, the process of identifying musculoskeletal problems in industry can be divided into two procedures: passive and active investigation.

Table 1: Ergonomic intervention strategies: active, passive, or a combination.

PASSIVE	EITHER	ACTIVE
Many injuries in one area may identify need for passive inquiry. E.g. using injury statistics	**Few injuries** reported in any area may require a combined effort. E.g. records along with an assessment	**No injuries** statistics requires active investigation to find areas of high risk. E.g. discomfort surveys or body maps

1. If there are many injuries in your workplace, passive investigation (i.e. looking in injury rates) may be enough to identify the high risk areas.

2. If there are only few reported injuries in your workplace, a combined passive and active investigation may be necessary to identify the high risk areas.

3. If there are no reported injuries in your workplace, active investigation is needed to identify high risk areas. This is a very PROACTIVE approach and is where each committee should focus on getting to.

How do you move towards a proactive approach?

At first, your ergonomics committee will probably start by dealing with problems reactively; for example, you may decide where to begin by choosing the area with the highest injury rates. As the team matures and problems are corrected, the committee will probably become more proactive. A proactive ergonomics committee would identify risk factors and reduce them before health problems occur in workers. For example, during an inspection, a member of the committee may recognize that a work height is too low. Raising the work height to reduce awkward postures may help to prevent workers from showing signs of a WMSD in the future.

What is the importance of tracking discomfort?

Although it is important to track injury rates, it is also important to understand that low injury rates do not necessarily mean there is not a problem. Injuries that are compensated represent the tip of the iceberg of people with pain or discomfort in the workplace. Workers in a department could be suffering from fairly frequent and severe discomfort but have not reported it to the workplace. During the early stages of

a WMSD, discomfort comes and goes, disappearing with rest. Workers may or may not report the problem to the workplace or be absent from work. Active surveillance techniques, like a health survey, are useful for an Ergonomics Committee to compare discomfort levels before and after a workplace change.

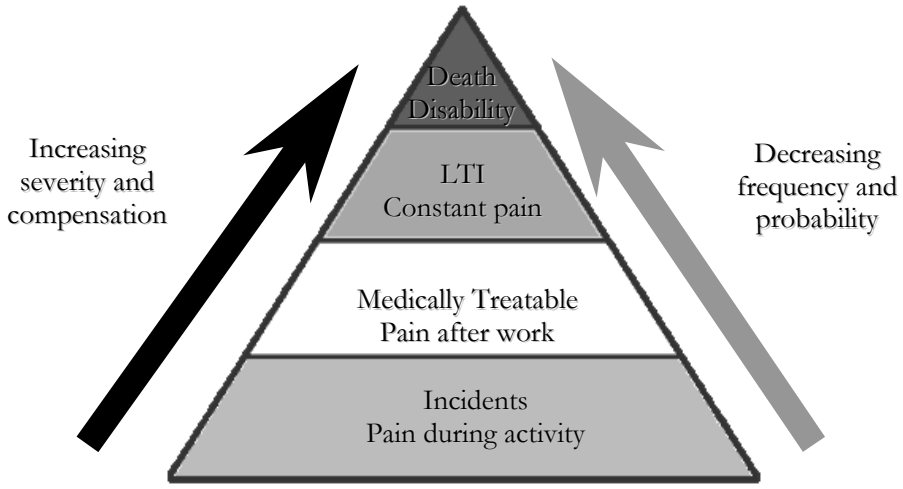

Figure 3: Displays the stages of development of a musculoskeletal injury. As an injury progresses, there is an increase in the severity and frequency of the discomfort.

Helpful hints for identifying problems:

- ☞ Look at **both** passive surveillance methods and physical measurements as indicators of ergonomic need in an area.
- ☞ Be aware of health concerns or physical demands that may increase turnover and discourage workers from applying to a position.

How do you identify risk factors?

When identifying musculoskeletal injury risk factors, it is important to consider all components of the work. Although having a correctly designed workstation and appropriate tools is very important, so are work organization and work environment. Even when a workstation is well-designed, if a person is working at a rapid pace, injuries may still occur. Environmental factors, like working in a refrigerated area or on a vibrating surface, can also contribute to the development of musculoskeletal injuries. Figure 4 shows the main work components to consider when assessing a job for ergonomic risk factors. A job assessment should include the consideration of all of these factors.

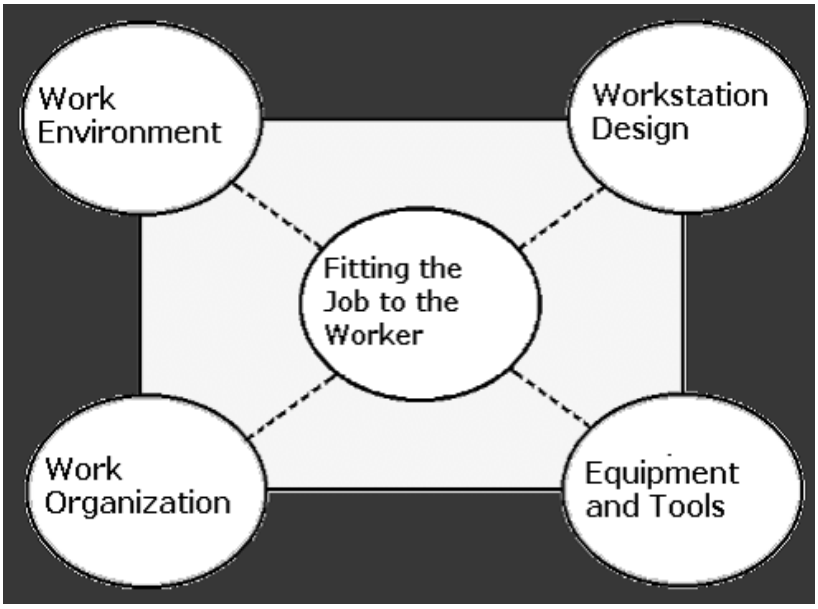

Figure 4: Fitting the job to the worker can only be done by consideration of work station design, equipment and tools, work organization, and work environment.

Will the Ergonomic Committee need equipment?

In order to objectively measure the intensity, frequency, and duration of physical functions, the following instruments should be used:

USEFUL EQUIPMENT

- A tape measure (for working heights, tool sizes, reach and carrying distances).
- A portable scale to weigh all lifted or carried items. Two bathroom scales (one foot on each) work well for heavier items.

HELPFUL EQUIPMENT

- A push-pull gage (used to measure pushing and pulling forces).
- A stopwatch (used to record cycle time and duration of task).
- A goniometer (used to measure joint angles).
- A camera (photograph workstations before and after changes are made).
- A camcorder (used to study details of tasks after the observation, and description of workplace layout, equipment, work tools etc.).

OTHER EQUIPMENT

- Torque wrench (to determine pull or turning forces on rotating parts such as steering wheels, bolts, and screws).
- A grip and pinch force gage (used to measure gripping and pinching force).
- Other measurement devices specific to the workplace (i.e. light meter, vibration instruments, thermometer, noise-measuring devices, indoor air quality measurement devices etc.).

Although these are effective tools for quantifying risk factors, quantification should not become a substitute for qualitatively communicating the magnitude of the risk factors and their significance.

How will the ergonomics committee assess jobs?

There are many widely accepted guidelines for different ergonomic hazards, such as those in Appendix B. Guidelines can be used to help prioritize areas for change. Ergonomic guidelines should be used in conjunction with worker feedback and other passive and active surveillance methods. For example, if five out of ten workers who perform the same job develop epicondylitis (tendonitis at the elbow), there may be risk factors in the job that contributed to the problem.

Ergonomic guidelines may not indicate there is a problem if:

- The used guideline is limited in its applicability to the job.
- An appropriate tool for the job has not yet been developed.
- The wrong guidelines have been applied. For example, perhaps the NIOSH equation (which was designed to prevent the risk of low back injuries) was applied to assess risk of possible elbow injuries.

Ergonomic guidelines should be used as guidelines, not to draw a black and white line between "safe" and "unsafe" work; for example, just because a recommended weight limit is 10 kg does not mean there is no risk of injury when lifting 9.9 kg. By using symptoms and health complaints of workers performing the job along with ergonomic guidelines, the ergonomics committee is less likely to miss opportunities for prevention.

Helpful hints for workspace changes:

- ☞ Take advantage of planned or expected workplace and equipment changes, shut downs, or maintenance schedules for prototype trials.
- ☞ If a new line or workstation is coming into the workplace, it is useful to conduct a job analysis using the drawing. Some risk factors may then be identified and corrected prior to building or buying the new workstation.
- ☞ Work towards having the Ergonomics Committee approve all new equipment or workstation designs, so new ergonomic problems do not **enter** the workplace.

How should ergonomic guidelines be used?

Ergonomics should never be used to justify increasing musculoskeletal injury risk factors in a job. Ergonomics involves changing the demands of the work to fit the physical abilities of the worker. Ergonomic guidelines, used along with other active and passive surveillance methods, are useful for prioritizing areas for change. A danger with applying guidelines is that results of the assessment may be used to stop potentially beneficial changes from occurring.

For example, in one workplace visited by OHCOW, ergonomic guidelines were applied to a job, and from the assessment, the job was deemed to have no risk factors. Because of the ergonomic assessment, a lifting assist which would have reduced low back and upper body strain, was not considered to be necessary even though there were health complaints from workers on the job.

Some problems with the assessment were as follows:

1. There were factors about the job that limited the applicability of the ergonomic guidelines (i.e. the load was an odd shape).
2. Health complaints of elbow pain were made, but the job was only assessed for low back and shoulder injuries.
3. The actual weight lifted was very close to values obtained from ergonomic guidelines.

When assessing a job, health effects must be considered along with results of an ergonomic assessment.

What legislation exists in regards to ergonomics?

There is no legislation in Ontario that specifically defines ergonomic standards. However, a General Duty clause exists in the Occupational Health and Safety Act. Section 25(2)(h) states the following:

"An employer shall take every precaution reasonable in the circumstances for the protection of a worker."

The Regulations for Industrial Establishments (Reg. 851) requires that any lifting task should "not endanger the safety of any worker" (Section 45 (a)). No legislation in Ontario sets limits for repetition.

The Occupational Health and Safety Act states that a minimum standard of protection for workers. Contract language may increase, but not decrease the level of protection. Therefore, if ergonomics is a concern at your workplace and a negotiated contract is in place, consider including ergonomic language in the next contract.

Helpful hints for ergonomics language and content:

- ☞ Examples of contract language can be taken from other companies and unions (e.g. CAW and Ford, General Motors, and Daimler Chrysler).
- ☞ Examples of legislation language and content can be found in the ergonomics regulations of both Canadian provinces (British Columbia and Saskatchewan) and American states (Washington and California).

Chapter

3

Solutions to Risks

Once the ergonomic job assessment procedure identifies potentially hazardous jobs, the next step is to apply appropriate measures to prevent and control ergonomic risk factors.

One way of exploring options to reduce the risk of injury is through a brainstorming session. The initial brainstorming session should include members of the ergonomics committee as well as some or all of the workers from the area of concern. If it is not possible to have all workers from the area of concern together, consider giving them a form like the one in Appendix D. This way the workers have a chance to provide input into changes that are made at their workstations. During the brainstorming session, every idea should be recorded, and no idea should be criticized. Sometimes an idea that seems impossible can be modified to become a workable solution during a brainstorming session.

Helpful hints for running an effective brainstorming session:

- ☞ All ideas from the brainstorming session should be recorded on a flipchart, so they are visible to everyone present.
- ☞ The brainstorming session is **not** the time to determine if ideas are feasible. Put every idea on the flipchart and evaluate them after.
- ☞ It is also important to involve the workers from the area being focused on.

What types of interventions are there?

There are several approaches that can be used to control risk factors for work-related musculoskeletal injuries. Generally, approaches to preventing musculoskeletal injuries can be divided into two groups: engineering controls and administrative controls. The preferred approach to solve ergonomic problems is to find engineering solutions. If an engineering solution is not feasible, administrative controls become the next order for

implementation. Some risk factors and possible solutions are presented in Appendices E-H. Examples of tables are divided into the main components of work: workstation design, equipment and tools, work organization, and work environment. Note: there are many other risk factors and recommendations that have not been listed.

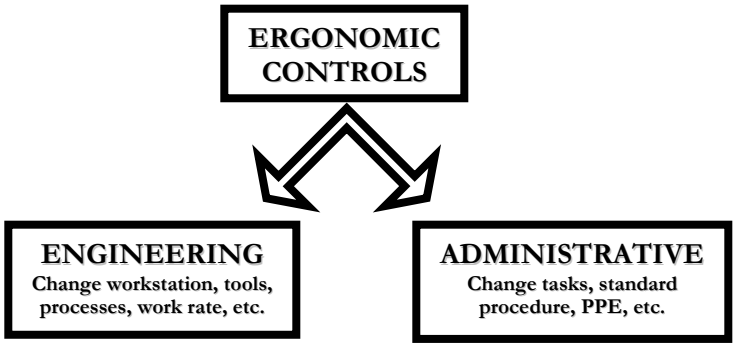

Figure 5: Two types of ergonomic controls for workplace changes: engineering and administrative

ENGINEERING CONTROLS (CONTROL AT THE SOURCE)

The preferred approach to prevent and control work-related musculoskeletal disorders is to design the job to take into account the capabilities and limitations of the workforce. When using engineering controls, the fundamental principle of ergonomics is to fit the work to the person, as opposed to fitting the person to the work. A good match between the worker and the workplace helps to ensure that the job demands do not lead to undue stress and strain to workers. The tables in Appendices E and F discuss some changes that can be made to the workstation and tools.

After recommendations are made during the brainstorming session, the ergonomics committee must decide which short-term and long-term recommendations may be feasible. Recommendations should be presented in an Action Form that can be used to keep the committee on track (see example in Appendix I). The Action Form can be used to assign priority levels, target dates, and persons responsible. By assigning responsibilities to individuals, there will be more accountability on the Committee.

Helpful hints on gaining credibility in the workplace:

- ☞ During your initial training session, select one or two areas in the workplace that are high priorities for your committee. Make improvements to these areas soon after your training session.
- ☞ Start with easier projects, to build your experience and your confidence.

ADMINISTRATIVE CONTROLS (CONTROL ALONG THE PATH)

When engineering controls are not immediately available or feasible, administrative controls should be used. Administrative controls are work practices and policies that limit or prevent exposure to ergonomic risk factors. Administrative controls do not eliminate hazards.

Helpful hints about work organization:

- ☞ Organizational factors, such as lack of task variety, are very important.
- ☞ Remember that correction of physical problems may not entirely solve the problem! For example, an office worker may still get injured even though he has a perfectly designed workstation because he sits at his desk for ten hours per day with too few breaks!

OTHER FACTORS TO CONSIDER

Environmental factors can also contribute to the development of musculoskeletal injuries. For example, working in low light levels may lead to awkward postures in order to see the work piece. A draft blowing on a worker from an overhead vent may contribute to shoulder pain. The Ergonomics Committee should be aware of environmental factors when identifying ergonomic risk factors.

How do you prioritize areas for change?

Just as there are many ways of identifying areas where there are risk factors, there are also many ways of prioritizing areas for change. The ergonomics committee should use a combination of active and passive methods for prioritizing areas for change.

Obviously, work areas where there are injuries or health complaints and/or job demands that exceed guidelines should receive a high priority level. Some other points to consider are as follows:

- How much will the proposed change decrease risk factors?
- What is the potential benefit to health?
- How many people will be affected by the change?
- Is this modification feasible?

Consider presenting a variety of recommendations ranging from short-term ones that can be implemented immediately to long-term ones that may take longer to develop. The tables in Appendix I can be used as an example of how to lay out these ideas in tabular form.

How do you get your ideas implemented?

First and foremost, it is important to develop a working problem solving relationship between the workers and the management. This will help your ergonomics committee work as a team.

Any passive or active surveillance data used to identify problem areas can also be used to make a case for ergonomic changes. As mentioned previously, if the ergonomics committee makes its recommendations through the JH&SC, the Occupational Health and Safety Act applies.

The amount of justification required to convince the employer that a change is needed will vary depending on the workplace, the anticipated benefit of the change, and the cost of the change. It will be helpful if someone from upper management with decision-making power is on your ergonomics committee. If the committee presents developed recommendations with cost-estimates, chances of having the recommendations accepted increases. Finally, it is important to develop a working relationship between the management and worker representatives on this committee.

Refer to the resources listed in section six and the Appendices if you need more help in justifying changes.

Chapter

4

Evaluation of the EC

It is essential that a committee never forgets that ergonomics is a continual process. Although a recommendation has been implemented to attempt to solve the identified problem, the committee must evaluate this intervention to ensure that it has reduced the workers risk factor exposure. When one problem is solved there is the potential for other problems to arise. This is why the process should never stop.

The overall effectiveness of the ergonomics committee is going to be determined by how well it meets the goals it has set for itself. For example, if your goal was to reduce absenteeism by 15% within a year, was this goal achieved? To evaluate whether the ergonomics committee is taking the correct actions, you must take measures before and after an action is made. The before and after measurements can be compared to determine if the intervention has improved the situation, made it worse, or made no difference at all.

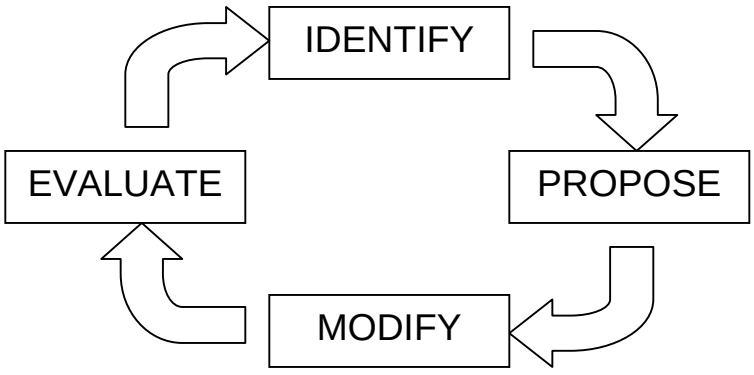

Figure 6: Ergonomic intervention model: identify a high-risk job, brainstorm and propose solutions, modify the situation, evaluate changes and continue the process.

Showing the effect of an intervention is not always simple. There may be factors going on in the workplace which also affect health outcomes, such as injury rates, absenteeism, discomfort, etc. For example, if a workstation improvement is made but overtime increases 10 hours per week on average, outcome measures like injury rates and absenteeism may remain unchanged or increase. That does not mean the intervention was not effective. Comparing the workers where the change occurred to a comparison group in the plant where no change occurred can help to explain the effect of the ergonomic change.

Figure 7 shows absenteeism plotted monthly for 2.5 years. In April, 1999, a new line was introduced to the plant. It is obvious from the graph that absenteeism increased after the introduction of the new line. Similar graphs to the one shown below can be shown for variables, such as injury rates, first aid reports, grievances, or productivity levels. It is likely going to be easiest to keep a continuous record, like the graph in Figure 7, with passively collected data, like days lost, absenteeism, etc. One thing to consider when interpreting graphs is that increases in the number of days lost, absenteeism, etc. may also be shown after an ergonomic intervention, such as a new ergonomics program. This may be due to increases in worker awareness and knowledge as well as better reporting amongst workers.

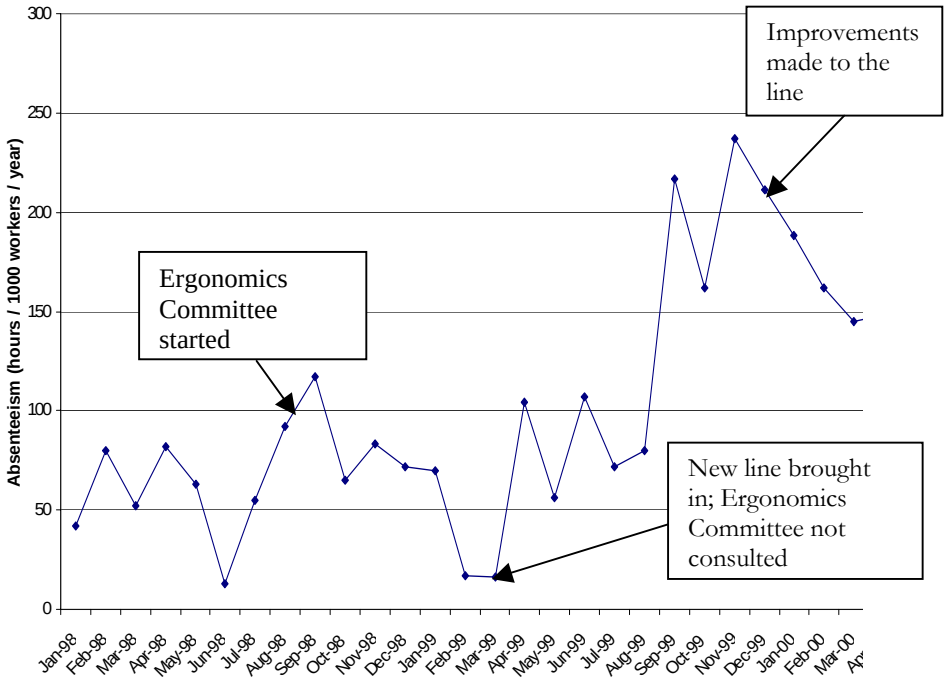

Figure 6: Absenteeism calculated based on the number of hours worked

How is the "effectiveness" of change measured?

Anything measured to identify high-risk jobs can also be measured to evaluate the effectiveness of ergonomic changes. Many organizations only record incidents and injuries that require a worker to seek medical attention. One problem with looking

only at compensated injuries or medical incidents is there may not be enough *sensitivity* to accurately evaluate the effectiveness of an ergonomic change. With smaller organizations, the number of workers may not be high enough to show a large enough change in accident numbers to detect a difference. Some jobs or workplaces may have had no accidents, but could have problems in the future. **Just because no injuries have occurred on a job does not mean that a job is completely safe**. As displayed in Figure 8, there are many more indicators of danger for every injury that occurs.

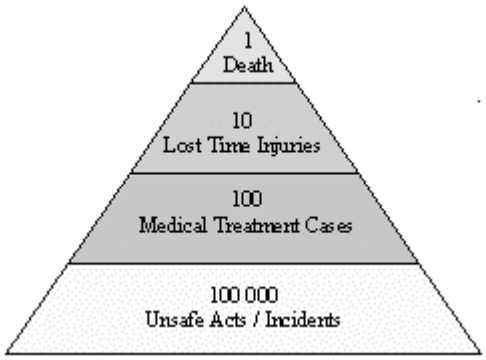

Figure 7: For every death that occurs in the workplace, there are 10 lost-time injuries, 100 medical treatment cases, and 100, 000 or more unsafe acts or incidents (Groeneweg, 1996).

By measuring something that occurs with more frequency, an ergonomic change can be evaluated more quickly, and with more accuracy.

Examples of "more sensitive" variables are as follows:

- Absenteeism
- Symptom survey results
- Worker feedback or complaints
- Productivity levels or product quality
- Work stoppages
- Product waste

If your ergonomics committee is not measuring more sensitive variables, it would be good to start soon. Careful inspection of these numbers may reveal patterns that highlight priority areas and direct your investigation of your work place. These measures allow your committee to stop accidents BEFORE they happen.

How do you keep track of your progress?

The ergonomics committee will make many changes in the workplace. Some will work exactly as intended while others will not. It is important to keep track of what changes have been tried and how the changes worked. The ergonomics committee should keep records of recommendations implemented and the effects of the recommendations. Appendix I has an example of a sheet that could be used for keeping track of your successes and your learning experiences (changes that did not work as planned). Whenever possible, include photographs before and after the change. After a change has happened, people may forget what the job was like before the change. To demonstrate the changes that have been made, try reviewing video footage of before and after the ergonomics intervention.

Helpful hints for recognizing your accomplishments:

- ☞ Keep binders documenting your success. A record of success is important for justifying future changes and for reminding the Ergonomics Committee members of what they have accomplished.
- ☞ Ergonomics is a continuous process. Often once a problem is fixed, other problems become apparent.
- ☞ Don't be surprised if there continues to be work for the committee! Try not to get discouraged-- remember what you have already accomplished.

Chapter

5

Getting Help

The Occupational Health Clinics for Ontario Worker (OHCOW) have ergonomists available at five locations to assist any organization through their JH&SC. OHCOW's services are free, although there are some limitations on what services can be provided. OHCOW's locations and phone numbers are listed in the Appendices.

Beyond OHCOW, there are some different options available to your Ergonomics Committee for professional assistance in ergonomics. The different options will vary in cost and level of support.

1. Your union or corporate office may be able to help with ergonomic problems.

2. The Workplace Safety and Insurance Board funds Health and Safety Associations. Some of the Health and Safety Associations provide ergonomic services. Contact the Health and Safety Association for your sector or the Workers Health and Safety Centre to find out what services they can offer. Training in various areas of ergonomics may be available through your sector's Health and Safety Association or the Workers' Health and Safety Centre. The locations and addresses of all of these agencies are listed in Appendix A.

3. Local ergonomic consultants can be hired to assist your committee. The level and type of assistance your Committee needs can be negotiated with the consultant. Local ergonomic consultants can be found in your yellow pages under "Ergonomics". Also, certain universities, like the University of Waterloo, offer an ergonomics consulting service. The Association of Canadian Ergonomists (ACE) provides a "Directory of Consultants" that may include qualified ergonomists in your area; ACE's phone number is in Appendix A. If you are concerned about the qualifications and credentials of a company or person offering ergonomic services, ACE can tell you if the person in question is a member of their association.

4. The Ontario Ministry of Labour and Workplace Safety and Insurance Board may be able to answer questions about ergonomic best practices for your

organization. A limited level of on-site assistance may also be available from these organizations, or they could provide referrals to qualified ergonomists in the area.

Helpful hints to ensure committee success:

- ☞ Learn from the experience and mistakes of others.
- ☞ Document what has been done.
- ☞ Emphasize making improvements over written policies and procedures.
- ☞ Use outside resources when necessary.
- ☞ Don't forget—ergonomics is a **continual process!**

With an ergonomics committee in place, you will be able to deal with most of your ergonomic problems internally. If you encounter hurdles or find you need assistance, feel free to contact an Ergonomist at the nearest OHCOW clinic.

WEBSITE: www.ohcow.on.ca

HAMILTON

848 Main Street East
Hamilton, ON L8M 1L9
Tel: (905) 549-2552
Toll Free: 1-800-263-2129
Fax: (905) 549-7993
Email: Hamilton@ohcow.on.ca

TORONTO

970 Lawrence Ave. West, Main Floor,
Toronto, ON M3C 1Y8
Tel: (416) 449-0009
Toll Free: 1-888-596-3800
Fax: (416) 449-7772
Email: Toronto@ohcow.on.ca

SUDBURY

13 Paris St., Unit 4
Sudbury, ON P3E 3A3
Toll Free: 1-800-461-7120
Tel: (705) 523-2330
Fax: (705) 523-2606
E-mail: Sudbury@ohcow.on.ca

WINDSOR

3129 Marentette Ave. Unit #1
Windsor ON N8X 4G1
Toll Free: 1-800-565-3185
Tel: (519) 973-4800
Fax: (519) 973-1906
E-mail: Windsor@ohcow.on.ca

SARNIA-LAMBTON

171 Kendall Street
Point Edward, ON N7V 4G6
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Fax: (519) 337-9442
E-mail: Sarnia@ohcow.on.ca

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American Conference of Governmental Industrial Hygienists (2000). Annual Reports of the Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs), ACGIH.

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Waters, T., Putz-Anderson, V. and Garg, A. (1994). Applications Manual for the Revised NIOSH Lifting Equation. U.S. Department of Health and Human Services: Cincinnati.

Other Useful Readings

Burke, M. (1992). Applied Ergonomics Handbook.

Cohen, A., Gjessing, C., Fine, L., Bernard, B., and McGlothlin, J. (1997). Elements of Ergonomics Programs. U.W. Department of Health and Human Services.

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Appendix

A

The Occupational Health and Safety Act

The composition of the JH&SC is described in Section 9 of the Occupational Health and Safety Act.

9(7) *At least half the members of a committee shall be workers employed at the workplace who do not exercise managerial functions.*

9(8) *The members of a committee who represent workers shall be selected by the workers they are to represent or, if a trade union or unions represent the workers, by the trade union or unions.*

9(9) *The constructor or employer shall select the remaining members of a committee from among persons who exercise managerial functions for the constructor or employer and, to the extent possible, who do so at the workplace.*

9(11) *Two of the members of a committee shall co-chair the committee, one of whom shall be selected by the members who represent workers and the other of whom shall be selected by the members who exercise managerial functions.*

The Occupational Health and Safety Act specifies there should be at least two people on a JH&SC if the workplace has less than 50 workers. For workplaces with more than 50 workers, at least four people must be on the JH&SC.

The same ideas that apply to the composition of the JH&SC, should apply to the ergonomics committee.

- At least half of the members of the ergonomics committee should be workers.
- Worker members should be selected by the workers or the union.
- The employer should select management members of the committee.
- The ergonomics committee should have two co-chairs with one worker and one employer representative.

Appendix

B

Operating Objectives Example

Table 2: Examples of operating objectives for an ergonomics committee.

Operating Objective	**People Responsible**	**Due Date**
Review the compensation and first aid databases to prioritize areas for improvement.	Helen	April
Assess every job in a certain line or department.	Craig	Year end
Complete a discomfort/exposure survey.	Trevor	September
Ensure every computer keyboard is on a height adjustable tray that is wide enough for the mouse.	Brenda	October

Appendix

C

The Prevention Continuum

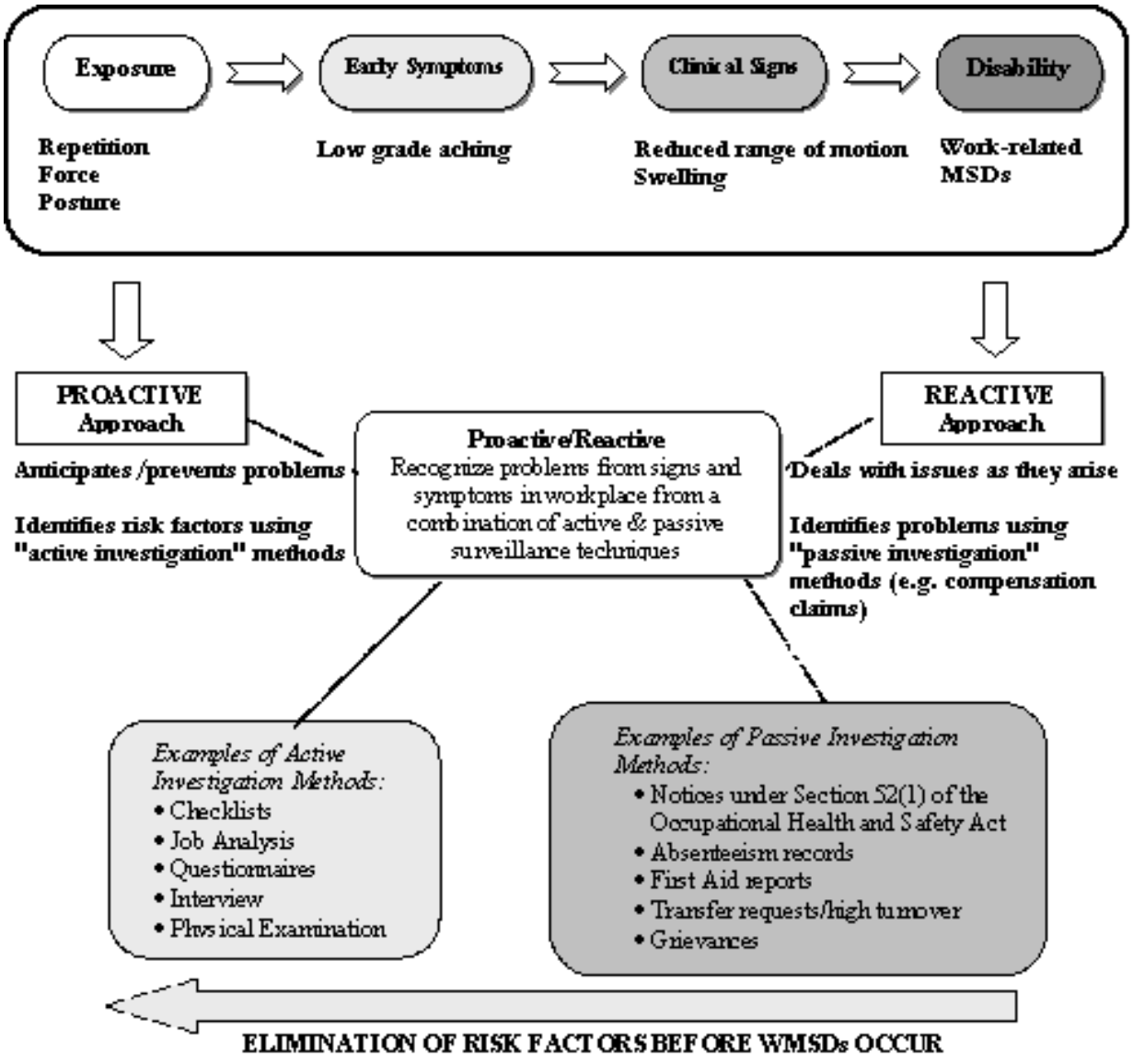


Figure 8: Progression of injury & the prevention continuum

Appendix

D

Brainstorming Guide Example

Table 3: This form can be used to guide a brainstorming session.

Risk Factors	Possible Short-term Solutions	Possible Long-term Solutions

Appendix

E

Workstation Design Examples

Table 4: Ideas for Improving Workstation Design

Risk Factors	Possible Recommendations	Feasible	Priority Level	Target Date	Person in charge
Non-adjustable chair leads to sitting in awkward postures.	• Chairs should be height and angle adjustable and support the back. • Change positions frequently.				
Twisting and bending are required due to equipment position.	• Arrange workstation so equipment, parts, and papers are close to the worker. • Store frequently used equipment and parts at waist height.				
Lifting is done above shoulder height.	• Work should be performed below shoulder height. Lower the work piece or use a platform to reduce working above shoulder height.				
Elbows are in awkward, raised position	• Work heights should allow for work with elbows close to the body; for example, ensure that light assembly work or typing is performed at elbow height.				
Work height is not adjustable.	• If people share a workstation, some height adjustment is required to suit workers of different heights.				
Sharp edges create contact pressure	• Round or pad edges of worktables and pinch points.				

Appendix

F

Hand Tool Design Examples

Table 5: Ideas for Hand Tool Design

Risk Factors	Possible Recommendations	Feasible	Priority Level	Target Date	Person in charge
Hand tools are heavy.	• Investigate lighter tools. • Tool weights can be reduced with overhead tool balancers or supports.				
Tools/ equipment vibrate.	• Investigate vibration levels when purchasing new tools. • Investigate redesigned tools with less vibration. • Choose anti-vibration gloves that have passed ISO 10819 testing.				
Awkward postures are required when using tools/ equipment.	• Choose the right tool for the job (i.e. straight tool when working on horizontal surface and pistol-grip tool when working on vertical surface). • Tools can be purchased with bent handles designed to reduce awkward postures.				
Tool puts pressure on the palm of the hand.	• Tools handles should not end in the palm of the hand. • Cushioned handgrips reduce the amount a tool digs into the hand.				
Tools do not fit all workers.	• Tools should be designed for right or left-handed workers. • Tools should suit men or women. This may require buying tools of different sizes.				
The tool handle is metal and becomes hot or cold.	• Tool handles should be insulated from cold and heat. • A textured tool is easier to grip than a smooth tool. If adding a foam covering to a tool handle, choose one that also reduces vibration.				
Tool is hard to use if blades are dull.	• Regularly maintain tools to keep them in good condition. • Replace worn bits or blades regularly.				

Appendix

G

Work Organization Examples

Table 6: Work Organization Factors to Consider

Risk Factors	Possible Recommendations	Feasible	Priority Level	Target Date	Person in charge
Tasks are done over and over.	• Consider job rotation between jobs involving different movements and muscle groups. • Consider adding a variety of tasks requiring different movements to a repetitive job (job enlargement).				
The work pace is too fast.	• Reduce the pace of work. • Take breaks that are long enough and frequent enough to allow recovery of overstressed parts. • Eliminate piecework, in which workers are paid per piece produced.				
A lot of overtime is worked.	• Overtime increases exposure to ergonomic risk factors and reduces time away from physical stressors. Ensure that overtime is on a voluntary basis.				
Workers return to full duties after a prolonged illness or absence.	• Persons returning from absence, work-related injury, or illness may require an adjustment period at reduced hours and/or reduced productivity. Consider this when scheduling work tasks or rotations.				

Appendix

H

Work Environment Examples

Table 7: Work Environment Factors to Consider

Risk Factors	Possible Recommendations	Feasible	Priority Level	Target Date	Person in charge
Poor lighting leads to awkward working postures.	• Refer to guidelines from the Illuminating Engineering Society to determine if light levels are appropriate for task being performed				
It is too cold.	• Dress in several layers of clothing. Add and remove clothing as required.				
It is too hot.	• Extra rest breaks may be required during times of extreme heat. • Beverages should be readily available.				
Work is very stressful.	• Workplace stressors like lack of control, feeling overworked, or low levels of job satisfaction can increase the risk of developing musculoskeletal injuries. Ensure that roles and responsibilities are clearly defined and that there is good communication between workplace parties, These may be starting points for reducing stress at work.				
People are complaining of poor air quality.	• Air quality and ergonomic problems can both lead to health effects like headaches, fatigue, and muscle soreness. Consider consulting an OHCOW hygienist for advice about air quality problems.				
The workplace is noisy.	• Investigate noise reduction methods (i.e. barriers/enclosures, quieter tools, etc).				

Appendix

I

Progress Table Example

Table 8: Possible Progress Table

Suggestions Implemented	Project Start Date	Since implementation, the situation has:	What measures can be taken to determine if implementation was successful?
		❒ Declined? ❒ Improved? ❒ Not changed? ❒ Too early to tell?	
		❒ Declined? ❒ Improved? ❒ Not changed? ❒ Too early to tell?	
		❒ Declined? ❒ Improved? ❒ Not changed? ❒ Too early to tell?	
		❒ Declined? ❒ Improved? ❒ Not changed? ❒ Too early to tell?	
		❒ Declined? ❒ Improved? ❒ Not changed? ❒ Too early to tell?	
		❒ Declined? ❒ Improved? ❒ Not changed? ❒ Too early to tell?	

Appendix

J

UW Ergonomics Program Blueprint

Ergonomics Program Implementation Blueprint

The purpose of this document is to lay out a "Blueprint" for starting and maintaining an effective ergonomics program to address poor ergonomic quality of work from viewpoints including injury, comfort, quality and production. This document was developed from the authors experiences in companies over the previous decade. The information has been peer reviewed through the scientific literature and within the respective institutions.

The blueprint begins by reviewing what ergonomic is, and discussing its objective and scope. It then goes on to review the start-up process where establishing support, team formation and the initial training topics are covered. After the introductory and preparatory information is discussed, two ergonomic processes for the committees are explained in detail, the reactive approach and the proactive approach.

The following figure is a graphic representation of this program, which has been dubbed the "mousepad" approach.

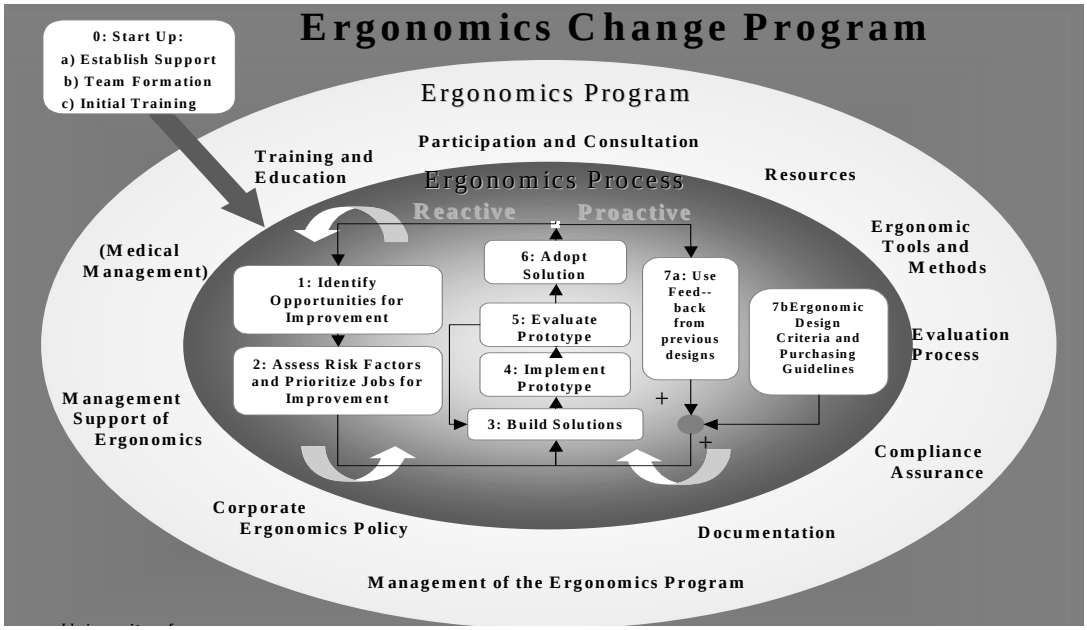


Figure 9: UW Ergonomic Change Process Model

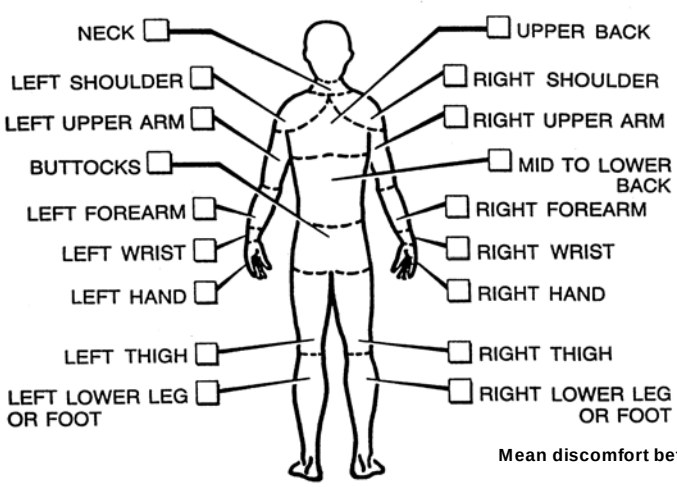
Appendix

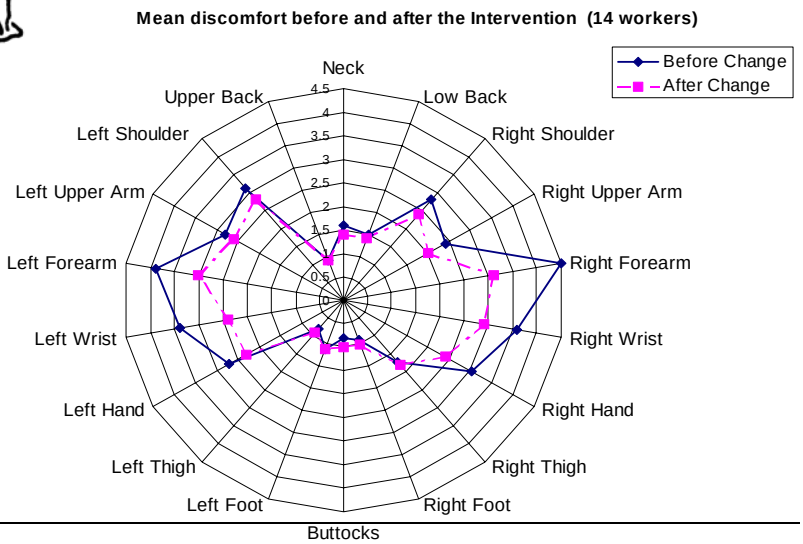
K

Discomfort Surveys & Body Mapping Examples

Severity and frequency of discomfort are indicators of potential future health problems. Symptom surveys are useful for getting an understanding of ergonomic problems at your workplace. Figure 3 shows a body map that OHCOW has used in some workplaces. Changes in discomfort severity are a good way of showing the effectiveness of an ergonomic change.

Figure 10: Examples of Discomfort Surveys and Body Mapping





Appendix

L

Discomfort Surveys & Body Mapping Examples

Table 9: Possible Ergonomic Standard and Guidelines to be Used As References for Ergonomic Intervention

Ergonomic Hazard	Recognized and Accepted Ergonomic Tool Used for Measurement
Manual Materials Handling (Lifting, Pushing, Pulling, Carrying)	- National Institute for Occupational Safety and Health (NIOSH) Lifting Equation (1981, 1994) - Snook Tables (1991) - Mital Tables (1997) - Waterloo's 4D WATBAK - Michigan's 3D Static Strength Prediction
Office Ergonomics	- Canadian Standards Association (1989)
Hand-Arm Vibration	- International Standards Organization (ISO) - American Conference of International Governmental Hygienists (ACGIH) - American National Standards Institute (ANSI)
Whole-Body Vibration	- ISO - ACGIH
Physical Energy Demands	- Michigan's Energy Prediction Program
Repetition	- ACGIH Hand Activity Level TLV - Various scientific articles: Silverstein, et al. (1986); Kilbom (1994); Latko et al. (1999)

(This chart does not represent an all-inclusive list)

* It should be noted that the Ontario government does mandate limits for noise and for minimum workplace temperatures. These can be found in the Regulations for Industrial Establishments (Reg. 851).

Appendix

M

WSIB Safe Work Associations

Table 10: WSIB Safe Work Association Resources

Sector	H & S Association	Phone	Fax	Internet
Agriculture	Farm Safety Association Incorporated	(519) 823-5600 1-800-361-8855	(519) 823-8880	www.fsai.on.ca
Automotive	Industrial Accident Prevention Association	(416) 506-8888 1-800-387-1210	(416) 506-8880	www.iapa.on.ca
Chemical	Industrial Accident Prevention Association	(416) 506-8888 1-800-387-1210	(416) 506-8880	www.iapa.on.ca
Construction	Construction Safety Association of Ontario	(416) 674-2726 1-800-781-2726	(416) 674-8866	www.csao.org
Education	Education Safety Association of Ontario	(416) 250-8005 1-877-732-3726	(416) 250-9190	www.esao.on.ca
Electrical	Electrical & Utilities Safety Association	(905) 890-1011 1-800-263-5024	(905) 890-9249	www.eusa.on.ca
Forestry	Ontario Forestry Safe Workplace Association	(705) 474-7233	(705) 472-0207	www.ofswa.on.ca
Health Care	Health Care Health and Safety Association	(416) 250-7444 1-877-250-7444	(416) 250-9190	www.hchsa.on.ca
Manufacturing	Industrial Accident Prevention Association	(416) 506-8888 1-800-387-1210	(416) 506-8880	www.iapa.on.ca
Mining	Mines and Aggregates Safety and Health Association	(705) 474-7233	(705) 472-5800	www.masha.on.ca
Municipal	Municipal Health and Safety Association	(905) 507-1882	(905) 890-9249	www.mhsao.com
Steel	Industrial Accident Prevention Association	(416) 506-8888 1-800-387-1210	(416) 506-8880	www.iapa.on.ca
Pulp and Paper	Pulp & Paper Health and Safety Association	(705) 474-7233	(705) 472-5800	www.pphsa.on.ca
Services	Ontario Service Safety Alliance	(416) 250-9111 1-888-478-0772 1-888-478-6772	(416) 250-9500	www.ossa.com
Transportation	Transportation Health & Safety Association of Ontario	(416) 242-4771 1-800-263-5016	(416) 242-4714	www.thsao.on.ca

Appendix

N

Other Association Resources

Table 11: Other Resources to Consider

Title	Phone	Internet
Occupational Health Clinics for Ontario Workers Inc.	Hamilton (905) 549-2552 Sarnia (519) 337-4627 Sudbury (705) 523-2330 Toronto (416) 449-0009 Windsor (519) 973-4800	www.ohcow.on.ca
Workers Health and Safety Centre	(416) 441-1939	www.whsc.on.ca
WSIB Prevention Services	(416) 344-1016	www.wsib.on.ca
WSIB Best Practices	(416) 344-3454	www.wsib.on.ca
Ministry of Labour	(416) 326-7400	www.gov.on.ca
Canadian Center for Occupational Health and Safety	(905) 572-2981	www.ccohs.ca
Association of Canadian Ergonomists	1-888-432-2232	www.ace-ergocanada.ca
University of Waterloo, Ergonomics and Safety Consulting Services.	(519) 888-4567 ext. 5513	ergonomics.uwaterloo.ca