Five Steps to Improve Ergonomics in the Office
About Humantech

For over 30 years, global companies have relied on Humantech for workplace improvements. By combining the science of ergonomics and our unique 30-Inch View®, we deliver practical solutions that impact safety, quality, and productivity.

The 30-Inch View®

Within an arm’s length of every employee are the obstacles to and opportunities for workplace improvement. A fresh perspective here—where people, work, and environment intersect—can have dramatic and far-reaching effects on the entire business. People make productivity happen: This is the 30-Inch View®.
Managing office ergonomics in today's modern and dynamic work environments can seem complex. It doesn’t have to be!

Developed by Humantech’s board-certified ergonomists and trainers, Ergopoint® Office Suite provides everything you need to educate and empower your people to make instant improvements and achieve a healthy and productive workplace, all while allowing you to manage the process.

- Completed in 30 minutes or less
- Includes knowledge checks for learning verification
- Teaches your employees how to set up their workstations

- Completed in 10 minutes or less
- Addresses traditional or home office settings, or both!
- Provides immediate feedback and recommendations

- Shows you who needs individual assessments or follow-up
- Helps you with equipment needs and purchase planning
- Stores and shares follow-up assessment results and notes

Visit www.ergopoint.com to take a quick tour and view a sample of the online training.
Introduction

Today’s office is a complex and dynamic collection of elements. It is constantly evolving in response to emerging technology and employee and customer needs. Even the very definition of an office is changing; today’s office can be in the home, at a customer’s site, in a café, or at 36,000 feet in an airplane.

With all the changes and complexities to consider, managing the modern office workplace is indeed a challenge. At the center of the challenge is the need for organizations to maintain a stimulating and healthy environment for their employees. The workforce is made up of bright, creative, and dedicated people. Supporting this world-class workforce requires a world-class work environment—an office environment that is comfortable, productive, healthy, and safe. As the physical office and work tasks continue to evolve, we must also continue to evaluate the office environment and the way we do our work to make sure we’re keeping pace—and adjust it accordingly to make sure that those world-class employees continue to be willing and able to come to work every day.

How this e-book can help

The office workplace has unique challenges resulting from the use of common office tools including computers, laptops, and phones (and now tablets and smartphones too!). Increasing your awareness of existing and potential ergonomic issues in the office, knowing how to adjust the office workstation to fit the office worker, using proper work practices, and following a proven ergonomic improvement process within your organization can improve overall comfort and productivity at work. And it’s no coincidence that, in addition to reaping the benefits of these improvements, you and your fellow office employees will be at a lower risk for a work-related injury.

What’s inside

This e-book introduces tools and provides guidance to help you make your office a productive, comfortable, and safe place to work by applying ergonomics principles. Whether tasks in your office include programming, data entry, call center work, e-mail correspondence, maintaining spreadsheets, or creating graphics, this book will help you

- identify poor ergonomic conditions at your office workstation.
- improve on-the-job comfort and productivity.
- identify signs and symptoms of musculoskeletal injuries.
- perform work in a safe manner.
- reduce work-related injuries and illnesses and the associated costs.
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Understand Office Ergonomics

What is ergonomics?

The U.S. National Institute of Occupational Safety and Health (NIOSH) defines ergonomics as designing the workplace and tasks to fit the capabilities of the working population. It is a relentless pursuit and continuous effort to design the workplace for what people do well, and design against what people do not do well, thereby fitting the job to the person to enhance human performance.

Ergonomics = Fitting the job to the person

Why should I care about ergonomics?

If people perform well, your company will perform well. If people perform poorly, long-term company success is difficult to achieve. Consider these interesting facts about office workers:

- In the U.S. in 2010, musculoskeletal disorders (MSDs) accounted for 29% of all workplace injuries and illnesses requiring time away from work (Bureau of Labor Statistics (BLS), 2010).
- The average number of days away from work due to work-related musculoskeletal disorders (WMSDs) is 16.75 days per incident for general office clerks (BLS, November 2011).
- In 2011, the incidence rate for MSD cases with days away from work increased 4% to 34 cases per 10,000 full-time workers (BLS, 2011).
- The average lifetime cost of carpal tunnel syndrome, including medical bills and lost time from work, is estimated to be about $30,000 for each injured worker (National Institute of Neurological Disorders and Stroke (NINDS), July 2012).
Goals of good ergonomics

The goals of ergonomics are to provide a positive working environment in which

- the design of equipment, work layouts, and work environments matches the capabilities of people so they can lead healthy and productive lives.
- differences in job tasks and body sizes among employees are accommodated.
- job hassle, soreness, and potential injury can be avoided.
Regulatory requirements

Currently, over 45 countries, provinces, or states have regulations affecting ergonomics in the workplace. Within the United States, there are two regulations to note: the OSHA General Duty Clause and the California Repetitive Motion Injury Standard.

OSHA General Duty Clause
The General Duty Clause of the OSH Act applies to all states in the U.S. It regulates poor workplace ergonomic conditions to protect employees from serious physical harm or death resulting from the work environment or work tasks. In the absence of a specific written ergonomics standard, an OSHA inspector, by way of the General Duty Clause, may cite a company for non-compliance due to an “observation/opinion concerning an event that is not covered under any other written standard.”

California Repetitive Motion Injury Standard
In effect since 1997, this standard applies to all jobs within which more than one work-related repetitive motion injury (RMI) has occurred. It states that an ergonomics program must be implemented for all jobs with more than one RMI, and that the program must include work site evaluation, controlling exposures that have caused RMIs, and employee training.

Standards and guidelines
Numerous voluntary standards and guidelines have been developed in both the United States and abroad that pertain to specific aspects of office ergonomics. Here are some of the major ones:

- ANSI/HFES 100-2007: Human factors engineering of computer workstations
- BIFMA G1-2002: Ergonomics guideline For VDT (Visual Display Terminal) furniture used in office work spaces
- CSA-Z412-00: Guideline on office ergonomics from the Canadian Standards Association (CSA)
- Directive 90/270/EEC: European Union directive on minimum safety and health requirements for work with display screen equipment
- HSE DSE Regulations: Standards for work with display screen equipment in Great Britain
- ISO 9241: International ergonomic requirements for office work with visual display terminals (VDTs)

Standards and guidelines aside, proper office ergonomics simply makes good business sense. The healthier and more productive that employees can be, the better off your organization will be.
Understand Ergonomic Injuries

Ergonomic injuries, also known as musculoskeletal disorders (MSDs) or soft tissue injuries, are disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, blood vessels, or spinal discs. MSD is a class of illness that is the result of months or years of overuse of human joints and connective tissues such that they become sore and sometimes unusable.

Common signs and symptoms of MSDs include:

- Swelling
- Numbness
- Tingling
- Discomfort
- Burning sensation
- Irritation
- Insomnia
- Stiffness

Early diagnosis and treatment of these symptoms is critical to successful recovery from an MSD illness. Therefore, encourage everyone in your office to immediately report signs and symptoms of MSDs as soon as they occur.
Ergonomic injuries don’t happen overnight. MSDs result from gradual exposure over a long period to low-level harmful agents called risk factors. A brief exposure to these risk factors would generally not cause harm, but prolonged exposure to risk factors exceeding the body’s ability to heal can result in its reduced ability to function.

**Ergonomic risk factors**

The three primary ergonomic risk factors that cause MSDs are awkward posture, high force, and high or long frequency. Combinations of postures, forces, and frequencies increase the chance of developing an MSD.

As individual risk factors, posture, force, and frequency are all significant. But when combined, these risk factors become much more important and contribute to wear and tear injuries at a greater rate.

**Posture**

In neutral postures, the joints can absorb force more easily than in others. Phrased another way, awkward and extreme postures increase susceptibility to injury, as they may stress joint components and reduce or block blood flow. Consequently, we attempt to maintain a neutral joint posture while performing our work.

**Force**

Gripping, pinching, pushing, pulling, and lifting objects place additional force on the body’s joint structures. Increasing these forces requires additional muscle exertion, and places greater loads on joints and connective tissues. Prolonged or repeated exertions of this type can cause fatigue, and may contribute to musculoskeletal problems when there is inadequate time for rest or recovery.

**Frequency**

Higher frequency of awkward postures and/or forces increases the potential for damage to a joint. An aluminum can is a good example of how low forces can damage the underlying structure when applied repeatedly. Lightly squeezing the can will cause the sides to bend inward, but it will regain its shape. However, if we apply this same force repeatedly, say 100 or 200 times, a break may occur in the aluminum sides.
What are physical stressors?
Certain physical stressors can magnify the three main risk factors we just described. The most common physical stressors in the office workplace include:

- **Contact stress** – pressure from objects on soft tissue
- **Environmental issues** – lighting, temperature, noise
- **Psychosocial issues** – fast work pace/increased workload, little task variety, high degree of supervision/monitoring, few breaks, lack of control over work, high stress
Identify Your Ergonomic Challenges

How do I know I have ergonomic problems?
A simple three-step process will help you identify and address ergonomic challenges at a workstation:

1. Observe the office environment and tasks to identify potential ergonomic issues.
2. If necessary, conduct formal ergonomic risk assessments to identify and document sources of risk.
3. Find potential solutions.

Once you’ve identified what needs fixing, you can adjust or change the workplace to reduce or eliminate exposures to the risk factors.

Get involved in ergonomics and encourage participation
You can most effectively identify MSD risks by encouraging employees, ergonomics team members, and safety department personnel to participate in the process. Employees should receive training in using observation tools to screen for risk factors, and should know how to make adjustments in the workplace to reduce the identified risk.

Know which tools to use and when to use them
Depending upon how your office environment is structured and what resources you have available, you may decide to have each employee workstation professionally evaluated in terms of ergonomics. However, this can be costly and time consuming. Many organizations are now moving toward online solutions to support basic awareness training and management of the office ergonomics process. These types of solutions are cost-effective, participative, and proactive. But keep in mind, software is not (and should not be) a replacement for the one-on-one assessment.

Look for similar ergonomic challenges
In many cases, there are predefined ways to reduce or eliminate exposure to MSD risk factors; some ergonomic challenges may have been previously identified, and effective solutions put in place elsewhere in your organization. Good communication of past experiences and access to proven solutions will help your organization get the full benefit of risk identification activities.
1. Screen the work environment and tasks
The first step in reducing ergonomic risks in the workplace is to identify potential risks and prioritize them so you can address the higher risks first. Observation is the most basic form of assessment; it involves screening for visual indicators that ergonomic risks may be present. Humantech’s Ergonomics Workstation Checklist, an observation tool, can help you identify ergonomic risks and potential solutions. You can use the Ergonomics Workstation Checklist when you need a low-tech but fast and effective initial approach to ergonomics.

2. Assess risk
A risk assessment tool, such as a self-assessment, will help you identify and prioritize potential risk factors in your work activities. This type of tool provides extremely valuable information because the people who do the job day in and day out are considered the job experts.

Humantech’s Ergopoint® Office Suite offers both an interactive online training module and a quantifiable self-assessment tool that help office workers identify ergonomic issues at their own computer workstations in a short period of time. The web-based software program begins with a 30-minute awareness training program that includes knowledge checks for learning verification. Next, a 10-minute self-assessment leads users through a series of questions to evaluate their work environment and work practices. The responses identify potential ergonomic concerns in various areas of the workstation based on Humantech’s Four Points of Contact™ methodology. With the results,

- employees can learn more about the important features of their office workstation equipment and make immediate ergonomic improvements, and
- managers can collect and analyze employee responses, allowing them to identify high-priority ergonomic issues that require further attention.

3. Find solutions
Humantech’s Office Ergonomics Problem-Solution Matrix provides a simple way to find potential solutions to problems you’ve identified through your observation or self-assessment activities. To use the Problem-Solution Matrix:

1. Go to the section devoted to the area of the body where there is discomfort.
2. Find the posture or conditions you’ve observed.
3. Choose the most appropriate solution from the right side of the table.
Set Up Your Workstation

The Four Points of Contact™

Don’t be fooled—office ergonomic adjustments need not be complex. The certified professional ergonomists at Humantech developed the Four Points of Contact model to teach individuals to identify ergonomic issues and empower them to take action to adjust their own workstations. Whether you are using a traditional desk/chair workstation, or working on your laptop at an airport terminal, these four elements should be the focus.
1. **Eyes to Source**
   - Adjust the height of the monitor so that the top of the display is at or slightly below eye height. (If you wear bifocals or transition lenses, monitor may need to be positioned slightly lower.)
   - Place the monitor at or more than an arm’s reach away. If reflected glare is a problem on the monitor screen, tilt the monitor slightly forward.

2. **Hands to Input Device**
   - Raise or lower the keyboard so that the upper arms hang comfortably and the forearms are horizontal. The elbows should be at about 90 degrees. Raising and lowering the keyboard, independent of a fixed work surface, may require an adjustable keyboard tray. Move the keyboard close to eliminate reaching.
   - Move the mouse or input device next to the keyboard and on the same level to eliminate reaches.
   - Do not extend the flip legs underneath the keyboard. Hands and arms should “float” while you type.

3. **Body to Chair**
   - Adjust the seat pan to the height of the lower leg. Feet should rest on the floor with two fingers of space between the back of the knee and the chair.
   - Tilt and move the seat back forward until it supports the entire back.
   - Raise the seat back so that the lumbar (lower) bulge fits into the lumbar curve of the back.

4. **Feet to Floor**
   - Feet should be flat on the floor or on a footrest. Do not sit on your legs or prop them on chair legs.
Environmental concerns

Once you have adjusted your workstation, evaluate lighting and noise levels, which can have a daily impact on the quality of your work.

Lighting

In an office environment, light levels should be sufficient for paperwork, but not overly bright for computer work. Insufficient light can cause eyestrain, leading to awkward postures to compensate, and lighting that is too bright can cause glare and visual discomfort.

Here are some tips for lighting in the office environment:

- Use full spectrum lights rather than traditional lights because they are brighter, last longer, and can be less fatiguing to the eyes. Electric supply stores usually carry this type of lighting, or can help you order the correct type of lighting.
- Increase or decrease the amount of lighting in the office if it is too dim or too bright for the type of work (see below). To help determine the right level of lighting, ask those who work in the area for their feedback.
- Reduce the number of lights to minimize the glare. This may be as simple as removing half of the light bulbs from the fixtures. In areas of high computer use, glare can cause eye fatigue from straining to look at the monitor screen.
- Reposition office lighting to reduce or eliminate glare. Task lighting is fairly easy to move; however, it is more difficult to reposition general lighting (ceiling fixtures).

Noise

Ambient noise from printers, conversations, and break areas can be rather loud and, in some cases, cause stress and concentration difficulties. To reduce noise levels:

- Isolate noisy office equipment such as printers and copiers
- Consider higher panel heights along exterior walls that are adjacent to aisles
- Use panels or finishes with higher acoustical absorption ratings on the ceiling and walls
- Follow a regular equipment maintenance schedule
- Use earplugs!
Healthy habits

There are some additional, simple ways to reduce exposure to ergonomic risk throughout the day that do not require physical changes to the work environment. You can begin practicing these healthy habits today:

- **Vision breaks** – Change the viewing distance from very short (working with documents and computer screens) to very long, to relieve the eye muscles from holding a fixed focus. Vision breaks typically last only a few seconds and should be repeated throughout the day. Periodically look away from the monitor and focus on something in the distance. Follow the 20-20-20 rule: every 20 minutes, look approximately 20 feet away for 20 seconds.

- **Task breaks** – Change activities to provide relief from tasks with high ergonomic risk. For instance, to take a break from typing, make phone calls, file documents, make copies, etc. Break duration and frequency depend on the intensity and length of exposure to high-risk job tasks. Generally, take a five-minute task break for each hour of typing.

- **Stretch breaks** – Briefly stretch to provide relief from prolonged postures. Perform only those stretching exercises that are recommended by a reliable source (physical therapist, physician), and never stretch to the point of pain or discomfort.

- **Work practices** – Adjust work procedures and methods to minimize awkward postures, adhere to Standard Operating Procedures (SOP), and use equipment that is best suited for specific job tasks. Here are some examples of work practices:
  - Train employees to recognize WMSD risks and to take appropriate action to reduce exposure to the risks
  - Train employees in SOPs and correct use of equipment
  - Encourage immediate reporting of equipment deficiencies to maintenance and management personnel

Consider a sit-to-stand workstation

Recent studies have concluded that the more time people spend sitting each day, the more likely they are to suffer from heart disease, diabetes, obesity and other ailments. With most office workers averaging 15 hours of sitting per day, this is not good news. On the other hand, too much standing can be hard on the body as well. Adjustable sit-to-stand workstations are becoming more economical and allow workers to rotate between sitting and standing throughout the workday. Further reading on this topic is summarized here.
Select the Right Equipment

With the vast array of office products, equipment, and furniture available today (much of which is labeled “ergonomic”), how do you choose which are most appropriate for the task at hand? This section lists key features you’ll need to look for when purchasing common workstation items such as chairs, keyboards, monitors, and lighting.

Chair
Look for:
- Pneumatic seat pan height adjustment
- Backrest tilts backward and forward
- Backrest tension control
- Lumbar support
- Adjustable armrests (height and lateral movement)
- Rounded front seat pan edge
- Sufficient padding
- Five-leg base on casters

Adjustable workstation
Look for:
- Height adjustability of work surface
- Large surface with ample room to perform tasks
- Sufficient space for monitor or corner work surface, if necessary

Additional conditions
- Sit-to-stand workstations allow you to vary posture throughout the day
Keyboard / keyboard tray

Provide a keyboard with the following features:

- Lies flat
- Slope adjustability to achieve up to ± 15° slope
- Keying force a minimum of 0.2 lb to allow finger muscles to relax, and a maximum of 0.5 lb to limit required finger forces
- Low profile (30 mm)
- Keytop area at least 0.5 square inches
- Key displacement between .05" and .25"
- Tactile or auditory feedback upon key actuation

Additional considerations:

- Use an external keyboard when using a laptop
- Use an alternative keyboard design if necessary (split keyboard, natural keyboard, detachable number pad, or ten-key cover for mousing)

Provide a keyboard tray with the following features:

- Easily height adjustable
- Sufficient space for mouse
- Rounded or cushioned edge
- Stable (locks into position)
- Proper size for keyboard
- Low profile, no sharp parts
- Allows thigh clearance of at least 7"
Input device

Look for:

- Long cord for proper placement, or wireless
- Comfortable fit for your hand
- Workable surface area
- Moves easily
- Usable for left- and right-handed users

Additional considerations:

- Learn keyboard shortcuts to minimize input device use
- Use an alternative device if necessary (trackball or RollerMouse)

Monitor

Look for:

- Adjustable brightness and contrast
- Free from flicker
- Adjustable tilt
- Anti-glare coating/filter
- Appropriate size for tasks performed

Additional considerations:

- Use monitor risers or stands only if necessary
- For standing at work, top of monitor should be 58” - 71” from floor

Monitor arm/stand

Look for:

- Height adjustable 27” to 34” above the seat pan
- Weight of monitor should match weight of stand or arm

Additional considerations:

- Arm/stand should place monitor in the range of 18” to 30” from the user’s eyes
- Consider tall pole extensions or wall mounts for use in standing workstations
Wrist rest

Look for:
- Compressible or soft material to reduce external pressure on the wrist
- Non-friction surface
- Rounded edges

Additional consideration:
- Use a wrist rest only when resting, not while typing

Headset

Look for:
- Digital, rather than analog
- Quick disconnect capability

Headsets are ideal for extensive phone use (more than 4 hours per day).

Footrest

Look for:
- Height adjustable from 11" to 18"
Task lighting

Look for:

- 75 to 140 foot-candles of adjustable lighting
- Asymmetrical to reduce shadows and glare spots

Additional considerations:

- Avoid placing light sources directly behind or directly above a computer monitor
- Overhead lighting should provide between 30 and 70 foot-candles

Document holder

Place document holders at the same distance and height as the monitor screen to minimize eye refocusing and muscle fatigue.

Laptops

- Use an external mouse and keyboard for extended periods of computer use. They will reduce hand and arm fatigue, and sometimes neck pain.
- Take regular breaks and change your posture when working for long periods of time. Getting up to stretch or repositioning your body every 20 to 30 minutes will reduce the stress and strain on your muscles and enhance blood circulation.
- Increase the viewing resolution on the computer control panel or directly through the software program. This may reduce eyestrain.
- Use a laptop bag with wheels or two shoulder straps to reduce the need to carry a heavy laptop bag on one shoulder.
Conclusion

Throughout this book, we’ve been focusing on improving ergonomics in the complex and dynamic office environment—an environment that sometimes feels like a moving target, especially when we consider the rapid advancements in technology that continue to find their way into the office.

The way we feel during our working hours can make a big difference in the quality of our work and our productivity. If we’re experiencing discomfort as we go about our job tasks in the office, there is something we can do about it; there are tools available to help us find the sources of our discomfort, and there are readily available solutions to many of these issues, most of which do not require big financial commitments or long implementation times.

While purchasing ergonomic office equipment and furniture is a big step in the right direction, we will fully benefit from it when we know

● why we need it,
● which key features to look for,
● how to set it up and use it properly, and
● how to adjust it to fit our own needs.

And when we’re able to demonstrate the financial benefits of making ergonomic improvements in our office, the sky’s the limit with regard to the support we’ll get for our efforts.

If you haven’t already, start applying the principles and guidelines in this book now to get the most out of what you’ve learned—and encourage others to do the same. Not only will you see immediate benefits, you’ll be paving the way for a long-term approach to maintaining a healthy and productive office environment for future generations.
Additional Resources

- **Ergopoints e-newsletter** – Humantech’s board-certified professional ergonomists offer quick tips and techniques to optimize your office workspace for maximum comfort and health in this free monthly e-newsletter.

- **White Paper: Is Stretching a Good Strategy to Lower the Risk of WMSDs?** – Humantech’s ergonomists examine the effectiveness of corporate stretching programs.

- **E-book: Five Mistakes Companies Make with Ergonomics** – The 16-page free publication includes key elements of a sustainable and effective ergonomics process plus links to many useful references.

- **E-book: Stand More Sit Less** – This 11-page, free e-book from Ergotron summarizes the benefits of standing while performing office work.