



# Personal Ergonomics Guide

## Repetitive Tasks in Manufacturing

By Lauren Andrew Hebert, DPT, OCS



# Personal Ergonomics Guide

## Repetitive Tasks in Manufacturing

*By Lauren Andrew Hebert, DPT, OCS*

Published by

**IMPACC USA**

Seven Washington Street  
Greenville, Maine USA 04441

207.695.3354 800.762.7720

[www.impaccusa.com](http://www.impaccusa.com)

**IMPACC USA ©**

**All Rights Reserved**

Images Provided by PhotoDisc © 2011

Images Provided by LifeArt & MediClip Image Collections

© 2011 by Williams & Wilkins

Images Provided by Rubberball Productions © 2011

# This Is My Body...

## This Is My Job

You work hard and go home tired, often too tired to enjoy your family and your leisure time. You may see fellow workers with pain problems and lost time injuries.

We all would like to get through a day's work with more comfort and energy and be able to enjoy our leisure time. You don't want a work injury to get in the way of your life. There is more to life than work!

This Personal Ergonomics Guide shows you how to work smart, how to use your body properly and how to take proper care of your working body. You are a Professional WorkPlace Athlete, even if you sit at a workstation all day. Manufacturing work is very demanding on your body. Your body earns you and your family a living. You must take care of it!



## WorkSmart!

It is your responsibility to your job,  
your family and yourself.

# Today's Work Injury Problem



Work injuries to the neck, arms and lower back are very common in today's manufacturing environment. They are called Musculo Skeletal Disorders (MSD'S) or Cumulative Trauma Disorders (CTD's) and account for more than half of all worker compensation claims today. The

suffering from MSD/CTD can be enormous, with many workers suffering serious pain and disability which can create great stress within the family. Epidemics of these problems have caused some companies to eliminate jobs in order to reduce costs.

MSD/CTD problems include Tendinitis, Carpal Tunnel Syndrome and various other neck and back problems. Tendinitis is a destructive inflammation of tendons in the wrist, elbow or shoulder. Carpal Tunnel Syndrome is a pinched nerve in the wrist that can produce pain, paralysis, numbness and other serious problems in the hand. Neck pain and low back problems include damage or inflammation of the muscles that move the spine, the joints between the vertebra bones, the ligaments that hold the spine together or the discs that cushion between the vertebrae.

These problems are very real and can cause great suffering. They can be very difficult to diagnose and treat and sometimes end up as permanent, painful disabilities. The good news is that they are very preventable. It requires only a small investment on your part in education, attitude and commitment. Attention to correcting your work habits, job design and self-care of your working body will result in reduced injury risks as well as increased levels of comfort and productivity.

# What is Personal Ergonomics?

## What Does It Mean To Me?

Ergonomics is the science of work design. Using ergonomics, engineers try to design jobs to have minimum physical demands on the working body. Personal Ergonomics is the science of working smart: learning to move and position your working body to reduce stress on muscles, tendons, ligaments and joints. The objective is to avoid fatigue and damage to your body.

It is the responsibility of management to provide a safe work place. **HOWEVER**, it is your responsibility to properly use and care for your working body! In this new handbook we will show you what you can do to improve your work postures and learn efficient work methods and effective self-care techniques for your working body.



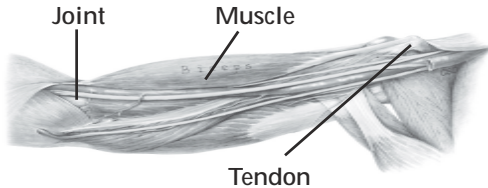
A professional workplace athlete is an expert on working smart to avoid pain problems: to minimize daily work fatigue and slow the aging process. Let us show you WorkSmart strategies to reduce your fatigue and boost your work comfort.

## WorkSmart!

It is your responsibility to your job,  
your family and yourself.

# How Does My Body Work?

Sitting or standing in one position at a manufacturing workstation requires very stressful muscle work. Your muscles contract, pulling on tendons to move or hold joints. This is how your body works to produce movement and maintain upright posture. Your muscles, tendons and joints require a good blood supply to deliver nutrients



for work and repair and to remove the acid waste products produced from using those nutrients. This is very hard work, burning lots of fuel and producing lots of

acid waste products. These acids can be very irritating to your working tissues, eventually leading to inflammation and pain.

Sitting or standing at your work station in the same position requires your muscles and tendons to be contracted all day. Muscle contractions increase the pressure inside your working tissues, reducing the blood supply that would normally remove the acid waste products of that work. The acids build up, causing fatigue, discomfort and pain, and your tissues become stiff, weak and easily injured.

Constant shoulder, elbow, wrist and hand movements cause friction wear damage to moving parts and slow needed blood supply to the parts working the hardest. This is also a source of fatigue, pain and injury. Your working upper body must be kept flexible, strong and healthy.



# Causes of Fatigue And Pain

## Sustained Posture

Sitting or standing all day at your work station reduces the blood supply to working structures in your neck and back, creating fatigue and tension that can cause neck, back and shoulder problems. This posture will fatigue and tighten the muscles that hold your head upright, leading to a more round-shoulders, forward head posture. This can cause muscle problems in your neck and upper back, such as neck joint irritation and chronic headache.



## Forward Head Posture

Blood Vessels



Forward head posture also causes your neck muscles to tighten. The blood vessels that nourish your working arms pass through these muscles. As the muscles become tight, they compress your blood vessels and reduce circulation to your working arms. This reduced blood supply can lead to problems

in the muscles, tendons and nerves of your arms and hands, possibly contributing to Tendinitis and Carpal Tunnel Syndrome.

## Prolonged Sitting

Prolonged sitting can also stress your lower back. Your lower back needs movement to keep blood flowing to weight-bearing parts. Sitting all day can damage parts of the lower back due to loss of blood supply and nutrition. This weakens back muscles, damages

spinal discs and wears on joints and ligaments. The result can be just gradual deterioration or a sudden back injury on or off the job.

## Repetitive Motions

Repetitive motions are repeated muscle contractions that pull on your tendons and cause friction wear damage and a buildup of irritating waste products in your tissues. Repeated motions of the wrist can also irritate nerves passing through the wrist into the hand. Repeated use of the hand and wrist can lead to Tennis Elbow, a form of Tendinitis of the wrist muscles where they originate near the elbow. Shoulder work, particularly reaching away from your body, can stress shoulder tendons, leading to Tendinitis problems in the shoulder.



## Excessive Loads

Forceful efforts such as heavy lifting, pushing or pulling can cause sprains and strains by placing too much force on your working tissues. Your back may be weak from sitting, creating a risk for back strain when you have to lift or move something. The injury may be due to too much effort (such as too heavy a load), too sudden an action or body parts that are too weak or stiff to handle the load. An injury may also be caused by improperly designed jobs, or by a worker not working properly or a body that has not been kept strong and flexible.

**The leading risks for fatigue, pain and injury are poor physical fitness, lack of flexibility and the health of the worker.** Your health habits, posture habits and self-care of your working body usually determine if you will suffer an MSD/CTD problem. It is the worker who works smart and takes care of the working body who will avoid these problems. Decide today to increase your fitness level, monitor your posture and take care of the only body you have. It is your responsibility. It is worth it!!!

# WorkSmart Techniques For Manufacturing/Repetitive Tasks

## Work Posture

Sustained sitting or standing is very stressful to your lower back, neck and shoulders. One solution is to frequently switch between sitting and standing wherever possible while doing repetitive work tasks. The idea is to give your body a variety of work postures. Many stand-up jobs can be done using a tall chair or stool that allows you to switch between sitting and standing without significantly changing work height. Many sitting jobs can be done while standing, even if only for a few minutes each hour. This is called a sit-stand option.



Standing work can also be made more comfortable by alternating one foot on a footrest and by placing vibration absorbing materials in your shoes or on the floor.

If you operate a foot switch, you should try to become skilled at operating the switch with either foot. It is important that you not stand on the same foot all day while the other foot operates a foot pedal. Using the same foot all the time can lead to hip and back problems.

## Correct Your Posture!

Become committed to good posture habits! A constant effort to avoid round-shoulder posture can greatly reduce your work fatigue. The idea is to constantly remind yourself to sit or stand an inch taller. This is one of the simplest and most effective steps you can take to reduce your work fatigue, pain and injury risk.



## Arm Support

Posture that allows you to rest the weight of your arms on the work surface greatly reduces stress to your neck and shoulders. Arrange your work surface to provide some space to allow you to rest your arms either constantly or occasionally during work, depending on the job. Computer keyboards and machines should be pushed back, if possible, to allow your arms to rest. Resting your arms, even for a brief second, (micro pause) will provide relief.



Some work stations can have arm rests built onto them to give you upper extremity weight bearing support. This greatly reduces your work fatigue and improves work performance. Overhead suspension slings for the arms have been used successfully to reduce shoulder and upper back stresses.

## Shoulder Stress

Shoulder reaching can stress your tendons. Reducing the height, distance, time or load of shoulder reaching, even only a little, can greatly reduce shoulder stress. Do this by redesigning your work procedures, correcting how you set up your work or improving your work methods to reduce reach, distance, time, load and repetition.



## Elbow Stress

Turning or holding your forearm palm-up can stress tissues of the inside of your elbow. Try to hold materials in your hand so that you reduce moving or positioning your forearm in a palm-up direction. You can control this by how you grip your materials and tools. Repetitive lifting or pulling with your hands can stress muscles that originate from the outside of your elbow, leading to Tennis Elbow problems.



Tool grips can be padded to improve ease of grip. Almost always the best alternative is to frequently stretch the muscles and tendons involved in these tasks. We will discuss those stretches later in the book.

## Wrist and Hand Stresses

Bending or holding your wrist in a bent position can irritate tendons and nerves passing through your wrist into your hand, increasing your risk for problems. These structures are also stressed by grip or pinch that is either forceful, prolonged or repetitive. The amount of stress and wear damage is determined by how often your wrist bends, how far your wrist bends, time spent and the force used for bending-gripping-pinching. Vibrations or cold temperatures make these stresses worse.



Try arranging your work and holding your tools and materials to minimize these stresses. Think about your posture. Micro-pauses, used to release the sustained tension in your wrists and hands, work well. Frequent stretching will also reduce your risk for injury and decrease your fatigue.

Use tools designed to reduce stressful positions, effort, time, exposure, vibration or cold. There are tools on the market designed to meet many of these needs. The cost of these tools is very small compared to the costs of injuries that can be avoided.



## WorkSmart!

There is More to Life  
Than Work!

## Best and Easiest Strategies

Fatigue and damage can sometimes be reduced with improvements in job design. But there are other very effective low-cost strategies



available. One is Job Rotation, which allows the worker to switch from one job task to another every hour or two. Job rotation limits the worker from exposure to the same motion or posture all day. This greatly reduces fatigue and injury risk because it spreads the work load over

more of the body, resulting in much less fatigue to any one part.

Another highly effective fatigue reducing strategy is Preventive Stretching of over-worked muscles. Described in detail in the next section, Preventive Stretching takes only one-minute to do, and should be done hourly. Your time spent stretching will not reduce productivity. Many companies have seen significant improvements in productivity, along with dramatic reductions in injuries, due to reduced worker fatigue. The challenge is to convince management and workers to do the stretches. It is worth the effort!



## Preventive Stretching Strategy

Certain muscles are exposed to damaging work stresses of sustained postures and repetitive motions all day. This is the cause of most MSD/CTD problems. These stresses are easily reversed with simple, brief, stretching exercises designed to restore blood flow and relax tight tissues. Increased blood flow allows for more nutrients, better repair and greater removal of irritating wastes. Stretches should be kept very gentle, well within the limits of comfort. Discontinue any stretch that causes pain.

## Chin Tuck Stretch

This is to correct the stiffness that holds you in forward head posture. The idea is to frequently over-correct your posture to stretch the tissues that became tight with bad posture. Simply tuck your chin into your neck as you bring your head upright into a position of military attention. Hold this stretch gently for ten seconds then relax to a comfortable but more upright head posture.



## Neck Stretch



Tight neck muscles can squeeze nerves and blood vessels to your arms. These muscles respond well to gentle stretching. Sit upright. Place your right hand on top of your left shoulder. Hold that shoulder down as you tip your head slightly away to the right. Keep your face pointed forward, or turned slightly to the left to stretch all the muscle fibers. Hold this stretch very gently for ten seconds. Repeat for the other side.

If you do a lot of shoulder reaching or overhead work, then you should include this stretch. Lean over at your waist, hanging one arm down loosely at the shoulder. You may wish to lean on your other hand placed on a chair or table top. Swirl the relaxed arm around in a slow, lazy circle for ten seconds. Repeat for the other shoulder.

## Shoulder Pend



## Standing Back Bend



Prolonged sitting can stress your lower back, leading to back problems. This risk is easily reduced by using back-bending stretches. Stand, feet apart. Place your hands on your low back. Gently lean backwards at the low back only as far as comfortable. Hold three seconds. Do these often when working bent over or sitting, at least every hour.

## Elbow Stretch



Holding your hands over your workstation can over-work your forearm muscles near the elbow. Stretching these muscles can reduce your risk of Tennis Elbow. Hold your arm with your elbow bent 90° and fingers closed, palm out. Tip your fist toward the palm.

Then, hold this position as you completely straighten the elbow. You should feel a pulling stretch along the top of the forearm. Hold this stretch for ten seconds, then shake your hands loosely. Repeat with the other arm.

## Wrist Stretch

Excessive hand use can tighten your forearm muscles, increasing pressures on their tendons and nerves as they pass through your wrist. Stretching these muscles can reduce the tension on those tendons. Hold your right arm in a palm-up position. Place your left hand fingers atop your right palm. Gently push your right hand backward as you stretch your elbow out straight. Hold gently for ten seconds. Repeat this stretch with your other arm.



## Relaxation Response



Constant work activity will tighten your working muscles. This tension is wasted muscle work that will tire you out. It is very easy to avoid this wasted work. Sit upright. Inhale deeply as you shrug your shoulders and clench your fists. (Do not clench your teeth!) Spend three seconds at



this tension. Then exhale and relax your upper body fully, spending five seconds in the exhale/relaxed phase. Do this twice. This will greatly relax muscles and reduce your fatigue.

## Flexion Stretch



Standing all day can cause excessive pressure on your lower back joints and tightness in their muscles. If you have to stand all day at work, do this for a few seconds every hour. Sit and bend your chest down to your thighs, stretching for ten seconds. This reduces back fatigue and stress on standing jobs.

## Upper Body Recovery



A hard day's work requires rest to repair the wear and tear. Otherwise, damage will outrun repair over the months or years of your work, possibly resulting in chronic pain or even disability.

Upper body recovery from a hard day's work requires that you rest your neck, shoulders and arms. The best position of rest for the upper body is to sit in an easy chair with a towel roll or small pillow behind your lower back. Place two pillows on your lap to cradle your arms. Rest your head back against the chair using a small towel roll behind your neck. Just a few minutes will help. Another good position of rest would be lying on the floor with your legs bent, resting on the seat of a chair or ottoman.



Treat any sore spots with ice massage by rubbing an ice cube over the painful area for two minutes. Follow this with trigger point massage. Press your thumb or fingertips firmly into the sore spot and rub hard for one minute. This is a very tender process, but may be effective at clearing out inflammation and scar tissue in tendons and muscles.

# Fit For Work

You owe it to the only body you have to keep it in shape . . . not only for the job . . . but also for a satisfying life. A personal fitness plan is vital to your successful career and life.

You would keep yourself fit for competition if you played on a professional sports team. There is little difference between professional sports and your job: You must keep fit for your job or you will suffer needlessly. You will not perform well. You will go home exhausted and sore from the day's work. You may eventually suffer an injury.

Fitness refers to your heart-lung endurance. This is your ability to sustain work output all day. It is how well your heart and circulation can deliver blood and oxygen to your working muscles. Your level of fitness determines how well you get through a day's work and how much energy you have left over after work.



Fitness training is any physical activity that pushes your heart rate to a moderately high level and keeps it there 20-30 minutes, done at least three times per week. The activity must be light-weight but sustained. Examples include fast walking, running, biking, swimming, rope skipping, rowing and cross-country skiing. The list goes on: karate, aerobics classes, dance. You will enjoy finding the activity that is right for you and it does not necessarily require outdoor exercise. A treadmill, stationary bike or cross country ski machine set up in front of the TV is a very efficient approach to excellent fitness training at home.

There are some precautions. You can safely start on this if you are young and otherwise healthy. But if you are overweight, a smoker, over age forty or have any history of possible heart or lung problems, then you need the approval of your doctor. A good way to start is to get a fitness assessment available from some YMCA's, YWCA's, sports physical therapists or qualified fitness professional.

You know it is worth the effort! Just ask anyone who is involved in such a program. You will have much more energy, improved sleep, reduced stress, improved sex life, happier moods and many other benefits. Exercise also makes dieting and quitting smoking much easier. Your health is everything!!



**There is more to life than work!**

**The WorkSmart Team. . .**

**The new American work ethic!**

The workplace will provide comfortable, successful jobs only if everyone works together to improve work design and work habits. Constantly remind yourself and others to use these work-smart tactics every day, all day. Everyone should be open to suggestions on how to make this happen better every day. You protect your body, your family's security and your job. Productivity and quality will improve. Costs stay down. Everyone wins! This is the new American work ethic.

# Personal Ergonomics Guides

By Lauren Andrew Hebert, DPT, OCS

Personal Ergonomics is the science of working smart: learning to position and move the working body to avoid fatigue, damage and injury. The **Personal Ergonomics Guide Series** shows patients and workers, in easy to understand language, how to apply personal ergonomics on their jobs to work more comfortably and efficiently, be more productive and have more energy left over after work. Each guide discusses personal ergonomics information related to specific tasks: **Material Handling, Computer Workstations, and Repetitive Tasks in Manufacturing.**



Repetitive Tasks in Manufacturing describes WorkSmart Techniques for anyone who must stand or sit in a manufacturing environment. Personal ergonomics, anatomy, causes of fatigue and pain are discussed. This guide explains work posture, arm support, shoulder, elbow, wrist and hand stresses plus WorkSmart techniques to minimize fatigue, pain and injury. A section on stretching and exercise challenges workers to become fit for their jobs and their lives. Readers are urged to improve work design and work habits, to join the WorkSmart Team; the new American work ethic!

Readers are urged to improve work design and work habits, to join the WorkSmart Team; the new American work ethic!

Order at [www.impactusa.com](http://www.impactusa.com) or call 800-762-7720

## Value Pricing

Number	Description	Qty	Price
IMP 164	Material Handling 10/Pk	1-9 Pks	\$19.50 pk
IMP 154	Computer Workstations 10/PK	10-29 Pks	18.50 pk
IMP 144	Repetitive Tasks 10/PK	30+ Pks	17.50 pk