Common Sense Ergonomics

If you're reading this book then most likely you have an injury, a desire to set up you're workspace, have an office full of workers or are just curious about ergonomics. This book was written with you in mind. I will be focusing on Office Ergonomics in this edition. When you are done reading these materials you should be able to set up an office workspace and adjust all of its props.

Let's start with deciding what Ergonomics is.

> Ergonomics is the science of fitting the workplace and tools to the worker.

This is a good definition except I would add that ergonomics, in the field, is an art much more than a science. We all come in different shapes and sizes. You might be 4 foot 11 inches tall with a long torso and short legs. You could be 6 foot 5 inches tall with really long legs and a fairly short torso. The uniqueness of each person means that generic guidelines might not fit YOU. Fitting you to a workstation, adjusting your work props, and developing a good work process is an art and can require lots of adjustments before finding the spot or tool that feels right.

The Past

After World War II the US Military had accumulated lots of measurements of its soldiers. This volume of information was used to produce a picture of the average American male. He was about 5' 10" tall and weighed about 170 pounds. Furniture was generally built to fit a person with these rough average proportions. Now these proportions do not describe me. They probably don't describe you either.

Over the years the problems with this one size fits all approach became more and more prominent. Shorter people found that their feet dangled off the floor in a normal chair. Thin people found themselves lost in a chair that was too big while larger people found themselves confined. From these problems a world of sizes, styles, and options have come forth in an effort to make people comfortable and more capable of doing their job.

Am I hurt?

I performed an ergonomic evaluation on a woman years ago and started, as I always do, by asking her if she was hurt. Is there anything I need to know before we start? She said,"No." As I looked at her workstation and her habits I pointed out that the way she was addressing her tools might lead to some future back pain.

She responded that she did indeed have back pain. I turned back to page one of the evaluation form. She went on to tell me that the pain had gotten so bad that she had gone to see a doctor. As a matter of fact the pain had gotten so bad she was now on medication. The pain was so bad that at times she had to take sick leave from work. The pain had even driven her to go to a physical therapist for weekly treatment.

Now, you might think a person who was taking sick leave, going to a doctor, taking medication, and attending weekly physical therapy sessions is hurt. I certainly do. But this case highlights what I have found over years of evaluating people. Almost all people, when it comes to their own health, are idiots. Me included.

A coworker comes up to you with a bad persistent cough and you'll mention that they really should take it easy, maybe even take a few days off. If you see a friend get a good cut you might tell them to go to the hospital and get some stitches. But if you get a cut or a bad persistent cough what do you do? 90% of the people I've met will keep coming to work sick or at best put a band aid on their cut.

Why don't people take their own advice? There are 3 major reasons:

1. For most people their whole life they've pushed through minor illnesses and injuries and come out basically fine. They know the odds of a serious complication are minor and therefore not paying attention to them might cause some short term discomfort but not much more than that.

This solution may work fine for them … until it doesn't. When they get an injury or illness that is bad enough that actual treatment or attention is required for it to heal. Then the delay in treatment, caused by taking ones health for granted, can have severe consequences.

2. Another reason people ignore injuries is because we don't recognize what an injury is. When we were young our parents would tell us things like "don't come to me unless it's oozing blood." They did this because they rightly didn't need to hear about every bump and bruise a child acquires. But the lesson people take from this is that some injuries are part of life; that some pain is normal and should be endured. People need to learn on their own when they are hurt to a level that they need to tell their parents, employer, or doctor.

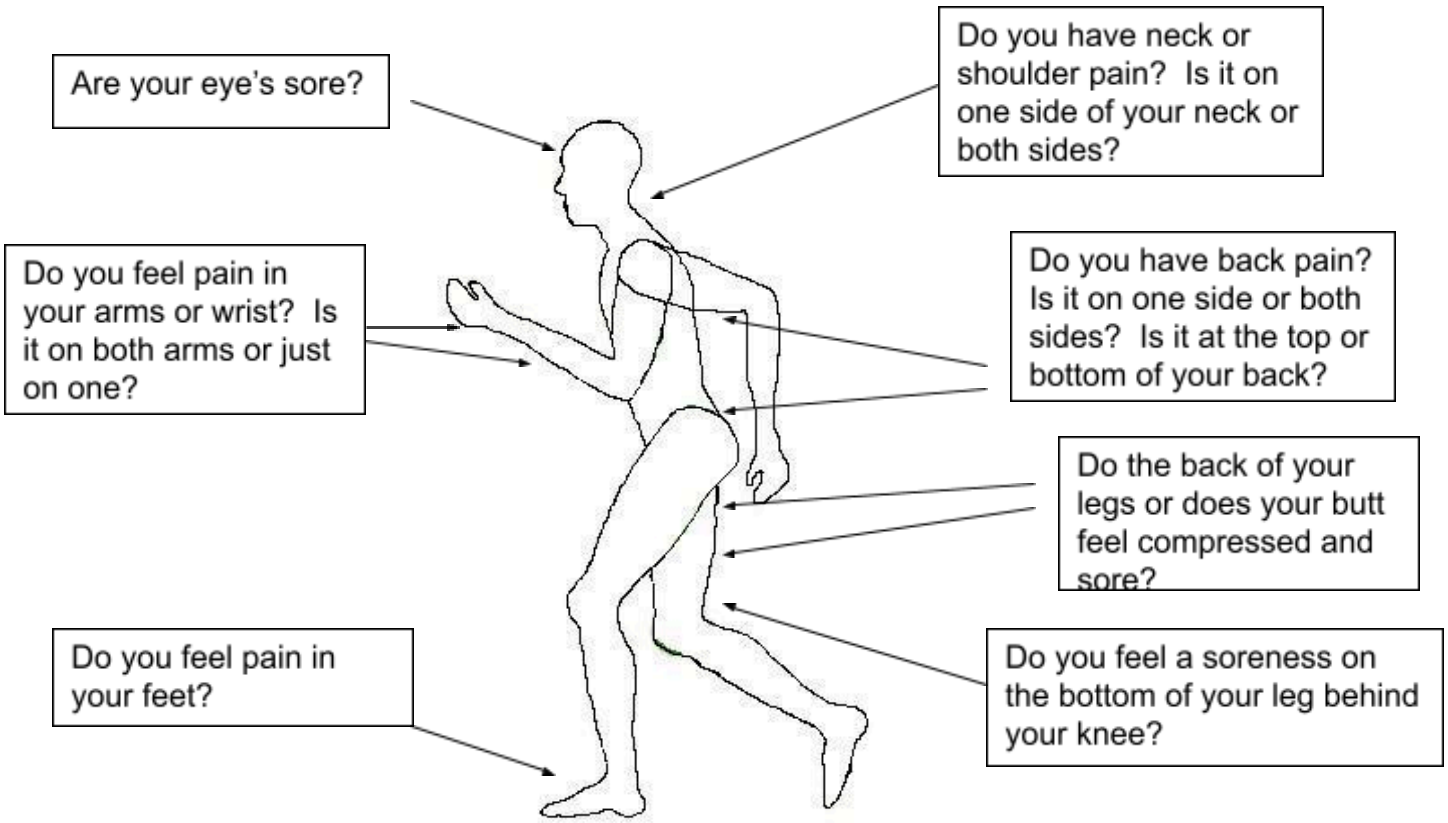
Since most injuries don't "ooze blood" people grow accustomed to ignoring and enduring their injuries. Ergonomic injuries are very easy to not recognize as they often start as a very minor feeling (neck pain on the level of a bad nights sleep for example). People legitimately wonder if it will be gone tomorrow. They give it some time to go away and instead it comes and goes. The pain may slowly get

worse enabling the person to build up a tolerance to it. Some people never admit they are hurt and live in quiet misery. They seek no treatment or help and get none. Many people go months as the pain gets worse and worse until, finally, it is so bad that they can no longer do routine things and they think "maybe I should see a doctor". This is very common and results in an injury that might have gone away in a week or two, if prompt attention were given to it, becoming an injury that may take months of rest, surgery, medication, and extensive physical therapy.

3. Finally, people let the perceived expectations of society and work affect their medical care. They may have heard belittling commentary by coworkers and supervisors in regards to another employee's injury. Or they may want to honor their commitments at all costs. I've had employees tell me they wanted to report their injury but feared being fired. I've seen people delay treatment on major illnesses because of their desire to continue working.

These people may know there is a problem but allow some line of reasoning to delay treatment. For serious illnesses and injuries this may mean much more difficult treatment or poor outcomes.

So, at the start of your journey into ergonomics ask yourself are you hurt?



Replace the word pain with coldness, hotness, tingly, numbness, or stabbing points of pain. Did any of your answers change to "Yes"? If so, or if another concern makes you think you are hurt, then … YOU MAY BE HURT.

Ask yourself some more questions:

	Write your answers here.
Did something happen to cause this feeling? (like lifting a heavy object)	
Did it slowly start and just get worse and worse?	
When did it start? How many months or years ago?	
Is it getting worse or better?	
When does it bother you? (early in the morning?, after working for a few hours?, at night?)	
What tasks cause it to bother you more?	
Has anything changed? (do you have a new job?, a new hobby?, new furniture?, a new work area?, new responsibilities?)	

Do the answers to these questions point to anything? Are you seeing a link to an activity?

Do I need to go to a Doctor?

If you've felt pain for a long period of time, it's time to stop pretending to be a doctor and to go see a real doctor. What is a long of time? How long has previous similar issues taken to get better? If colds usually go away in a week and you have it after 3 weeks, that's a very long time. If a sore shoulder usually goes away the next day and you still have it after a week, that is a long time.

Write down the answers to the above questions along with anything else you think is pertinent and take them with you to the doctor. Give the doctor your notes to read. If possible email the information ahead of time. Do not rely on your memory and that you will remember to talk about everything. That is the best way to forget the one thing you didn't want to forget.

Get an answer from your doctor.

Ask them at least the following questions:

What do they think it is? Is there medication or therapy you should be on?
Are any other tests needed? How long should it take to get better?

If you don't feel confident with your doctors answers feel free to ask for a referral to a specialist so you can get a second opinion.

Follow your doctor's directions. If the issue doesn't begin to get better within the timeline they outlined call your doctor and let them know. Perhaps a more intensive treatment regimen is necessary. Maybe the therapy needs to be changed. If things are getting worse, let your doctor know. There is no reason continuing 2 more weeks of exercise if you know after the first 2 days they are only making it worse.

How Did I Get Hurt?

It's really hard to say how a specific injury came about. If you've been typing for years and now have a wrist injury did the typing cause the injury? Or did a minor injury, like jamming your wrist on a door handle, get exacerbated by your normal workload? I had one case where we found that the cause of soreness in a workers wrist was related to a cancer drug the employee was taking. I've seen several back injuries related to pregnancies. Injuries are related to your lifestyle, your health, your degree of fitness, your hobbies, your environment, your tools and many other factors. There are just too many ways to get hurt to point to a cause for many chronic injuries.

Luckily in many cases finding out the exact cause of an injury isn't necessary for a person to heal. Ideally we just need to give the injury rest and, as it gets better, some strengthening exercises. If you were a professional sports athlete it would be just that simple. You could sit back on your huge salary and get better. Unfortunately that doesn't apply to most of us. Most likely you are going to try to do some level of work while your body tries to heal.

Which leads us to …

So Now What Do I Do?

1. First and foremost follow the advice of your doctor. All too often I've gotten complaints from people complaining about an injury that won't heal only to find that they aren't doing what they need to do to heal. If you're doctor has given you exercises to perform, are you doing them? If you're doctor has given you work restrictions, are you following them? Follow those directions and if they are not working or you have questions bring those up with your doctor.

2. Second, try and find out if there are tasks that cause the issue more than others. Did those questions in the injury worksheet bring anything to mind? If they did, if you know some of the tasks that cause pain, then you can try to fix the problem. You will want to limit your exposure to tasks that are causing problems so that your body can rest and heal. This means the things you do on your own time and the things you do while working.

If you're shoulder bothers you from using the phone, the mouse, or some other activity you work on for 8 hours at work then you're shoulder will need a break. Going out and bowling, pitching a softball game, working on 2 hours worth of cooking, or any other prolonged or intense activity is not going to give your injury the time it needs to recover and heal. Remember, the goal is to heal. To be able to get back to having the freedom to work or play as you want.

If you have a repetitive task try to minimize the repetition. Can you load a cart to carry items instead of taking lots of trips. If you have to move information around your computer learn keyboard shortcuts. I use "ctrl C" and "ctrl X" to cut and paste text over and over again instead of retyping the material. To look for a computer shortcut find the command under the drop down menu with the mouse and see if the shortcut is listed beside the command.

For work tasks, you need to tell your employer. All states have some form of Workers Compensation system where workers injured on the job can have their injury costs covered. Find out about your states system and what help it can provide you. In some cases the Workers Compensation coverage will pay for new equipment and software in addition to covering the medical costs of the injury.

After you have told your supervisor about the injury and the tasks that are problematic help them come up with possible solutions. Be creative. Don't expect them to find the solution without your help or you might get a solution you don't like or that doesn't work. Is there a way to work out a swap of tasks for a period of time? Don't be timid, if you have a supervisor tell them you're problem and suggest the temporary change you have in mind. Consider your equipment and processes. Can you change them to ease the stressful tasks or remove them altogether?

> **Real World Example 1:** A receptionist was tasked with opening the mail, sorting it, and stapling materials together. She had issues with her right palm and both arms. We found that that the repeated hitting of the stapler and the repetition of opening large volumes of mail were significantly adding to her discomfort. With the purchase of an automatic mail opener and an automatic stapler we were able to remove these tasks from causing her pain and actually speeded up the tasks.

3. Take task breaks. The best thing you can do right now to ease the pain is to take a task break. What is a task break? Anything you do to break up a task over the course of your day. Many tasks seem to present a certain order to them. You get the mail, you open the mail, you sort the mail, and then deliver the mail. If any of these sub-tasks are causing a problem doing it all at once will cause the muscles involved in it to reach their maximum fatigue before they get a break. Your good working posture will begin to fail and you'll start performing the task in a manner that places your body in a position of even more stress.

I call this the Yoda effect. A person starts their day sitting in a chair in fairly good posture. But after an hour the muscles in their back and sides begin to fatigue. They begin to change their posture without even realizing it. They may hunch over, they may recline back, slide down the seat of their chair, or start leaning to one side. They shrink to a small pitiful Yoda like critter. From this bizarre posture they reach out to their mouse and then wonder why their shoulder is bothering them.

A task break will stop this chain of events. Try rotating tasks instead of bunching similar activities all together. Don't do an hour of photocopying all at once. Try four 15 minute sessions spread through out the day. For the mail, open the stuff that looks high priority first. Sort and distribute it. Then later in the day you can open the unwanted solicitations. If you have a bunch of computer work to do, break it up with other things you need to do (go check your mail, get a drink of water, ask a coworker a question, etc.).

If you have an electronically adjustable height workstation try changing from the seated position to the standing position periodically. This will get you out of your chair and after a few minutes completely re-energize you.

Another way to take a task break is to stretch. For me getting up to do a separate task for a few minutes doesn't relieve the tension in my body. I need to stretch for relief. I try to work in different stretches throughout the day. At 8 am I'm stretching my legs, at 9 am I'm stretching my back, at 10 am I'm stretching my neck and shoulders, at 1:30 pm I'm back to stretching my legs. I put these on my computer calendar as appointments that pop up and let me know that I've been plowing through work and it's time for a change. If I have been active on that particular morning and haven't been sitting for several hours then I can skip a task break. For some sample stretches see Appendix A.

When should you take a task break? You should take one BEFORE you need one. I know this sounds odd but here is the reasoning. I don't want you to feel pain. If you take your task break before your body is overly fatigued then you won't need a long break to maintain your strength. But, if you work a muscle to the point of exhaustion, you will need a longer break to regain your strength. To figure out how long you can do a task, time how long you can do it before you start feeling fatigue. That is how long you should work before you take your task break. Realize that the fatigue your feeling after skipping a task break is your own fault. I sometimes guilt myself into getting out of my chair and stretching. When you realize that stopping work for 5 minutes, really isn't going to effect your day's production and will only make you feel better then it turns out to be only your own obstinance that keeps you from getting up. I know this feeling well.

How long should you take a task break? Well, if you take one before you need one, it shouldn't be more than a few minutes. If your body tells you it needs a longer task break though listen to it. Either give yourself more time away from stressful tasks or change your task break to give you more relief (some stretching, or maybe even a good brisk walk). If you do go for a walk around the building, up a flight of stairs, or other activity make it fun and see if a co-work will join you. There's a good chance that they need to get up just as much as you do.

4. Hopefully you now have a list of tasks that bother you and are taking task breaks. Next you should try to figure out why these tasks bother you. Are they all using the same muscle group? Are you addressing a tool in a manner that is causing problems? Are the tools setup in an improper manner? Do you have the tools you need to do the tasks you have?

I’m going to address work space design, proper tool use, and posture separately. As you reach those sections relate them to your workspace and routine. Experiment with changes and be proactive.

The Neutral Position

Before we start talking about what you need and where it goes we need to outline what we are shooting for. The posture that puts most people in a stress free, comfortable position is called the Neutral Position. The Neutral Position places most of the joints in the body at the midpoint of motion. This means that the opposing muscle groups on either side of a joint are equally contracted with neither being more stretched than the other. You'll notice this position is very close to the fetal position. If you've seen movies of astronauts sleeping you'll again see that these postures are very close.

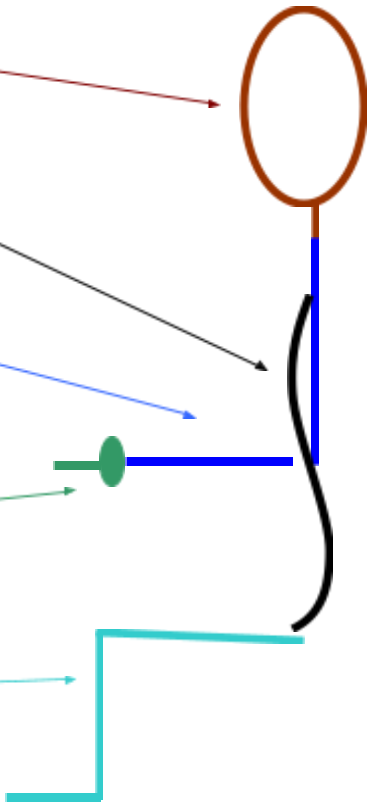
Neck/Head – Relaxed, looking straight ahead or slightly down.

Back/Trunk – Maintain natural curves while sitting or standing, not hunching, leaning forward/backward, or twisting over your body

Arms – Relaxed at the sides, at a 90º angle at the elbows; elbows close to the body.

Hands/Wrists – Straight or flat, **NOT ANGLED UP or DOWN** substantially at the wrist.

Lower Body – Feet flat on the floor or on a footrest, at 90º with enough space behind the knees so that the chair doesn't rub the back of your calves. Thighs flat not pointed up or down significantly.



Now if you just looked at how you're sitting and see that it doesn't match this model at all don't suddenly change everything. You may have a bad habit or your natural posture may be a little different. If you do not have an injury or any soreness you really don't "have to" change. You might find that trying to work to the guideline is more comfortable but you also could go your whole career with no problems. If you have a bad habit AND an injury though you have proven that your system doesn't work. If it did work you wouldn't feel pain right? To fix it

you will need to change your habits and that can be frustrating but that is the path you will need to take to feel better.

The Neutral Position is your starting point. You want to adjust your workstation to put yourself as close to the Neutral Position as you can. Give it a day or two and see how you feel. If you feel like you are sitting too high or too low then make a minor adjustment. Give your adjustment hours, if not days, to see if it's right. Remember keep fine tuning all of your adjustments until it fits you.

> **Real World Example 2:** In the late 90's my employer decided to "help". They bought new keyboard trays. This model had a mouse tray attachment that sat below the keyboard tray. This moved the height of my mouse by about an inch. From that minor change in height my shoulder began to get more and more sore. Fairly soon I told them and went to the doctor. I received treatment but until I fixed the cause of the agitation the pain continued. I began a long trial of experimenting with the height and angle of my tray. After a year of trial and error I was able to find the position where the keyboard wasn't too high and the mouse wasn't too low.
>
> My shoulder finally got better but it took that year of adjustments for it to go away. You have to be persistent. No one will do the work for you. If you want to get better you have to tell yourself that you are hurt and do the work it takes to get better.

Work Process Design

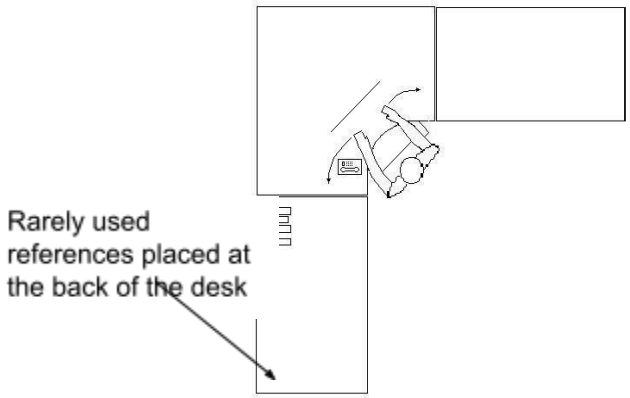
Why do you do things the way you do them? Some folks settle into a workspace and rearrange everything. Others will move nothing, as if everything was put in a location because it belongs there and nowhere else. Plus, the natural desire to get to work stops most people from adjusting much of their workstation. They'll get to it later, or it doesn't bother them that much and right now "they have work to do." All too often "later" is when the pain arises and the 5 minutes they saved when they first started is completely overshadowed by the time with the doctor, ergonomic consultant, or supervisor.

When you are introduced to your workstation think about what you are going to be doing and what you will need to get those jobs done. For most office workers you will be dealing with some paper work, some phone work, some computer work, and some data entry. The exact amount you do these activities and the exact nature of the task may change your design dramatically but what you want to do is to give yourself a space to do each of these tasks.

Sample Tasks and Needs

Task	Need
Writing with a pen or pencil.	A space to write.
Typing on a keyboard.	A place to put your keyboard.
Phone work.	A place to address your phone and take notes.
Reviewing paperwork.	A place to spread out documents.
Multitasking with a phone.	A phone headset.
Typing from copy/documents.	A copy holder.
Alphabetizing paperwork	A letter tabbed collator
Reviewing full sized plan documents	A tilting drafting table.

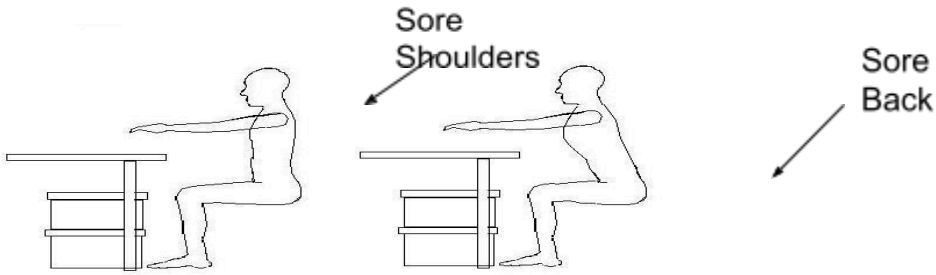
Once you know what you're going to be doing and what you will need to do those tasks you can place your tools in your office. The goal is to place the tools you use the most within arms reach and in front of you. Do not clutter up this valuable space with things you only once every few days or longer. Next leave yourself an area for any separate tasks (like filling in forms).



Many workspaces are too small to accommodate an area for everything. In these cases you will need to clear the materials out of the way when you rotate tasks. If you don't, you will be reaching over things and not addressing your desk or tools appropriately which leads to increased stress and work on your body. This will

reduce the amount of time your body will be able to hold a good posture and for you to do work.

Real World Example 3: Frequently I've seen workers who store boxes of material under their desks. In some cases they have no other place for the material but in others they just haven't moved it to storage yet or have just accumulated a bunch of "stuff." I'll hear complaints of low back pain, neck pain, and shoulder pain from these folks and the reason is pretty obvious. As they scoot their chairs up to the desk to work they get stopped early by the boxes under their desks. They can't get their legs under the table top and as a result must reach out to their work.



These situations give me real pleasure as in a few moments of moving stuff their pain is gone.

A Short Note on Multitasking

As you consider your activities also consider if you are going to have to two of them at one time. Multitasking is not a bad thing, especially if you have good equipment. A person with a good phone headset can handle a phone call and navigate through a computer quite well. But, if you don't have good tools prolonged multitasking can lead to overexertion and pain.

Real World Example 4: A worker on a corded phone who needs to use their computer will normally put it on their shoulder and pinch it to their neck. For a few minutes they feel fine. After 10 minutes though they start feeling sore. The longer the call goes on the worse their shoulder and neck feel. If they do this all day this constant muscle contraction could result in an injury.

So what could this person do? A simple solution is to use their speakerphone. Most office phones have the ability to be a speaker phone with the touch of a button. Now in some cases this is not practical because of confidential information or a noisy environment.

An imperfect solution would be to switch shoulders once in a while. They'll probably still have some discomfort but it probably won't be as bad as having one side doing all the work.

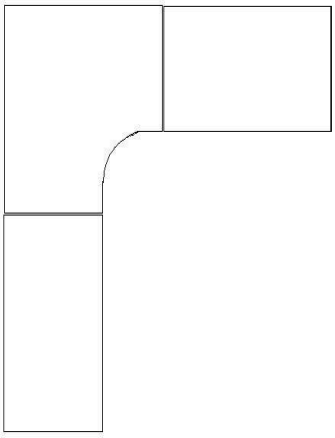
The best solution would be to get a headset. These can range from high end Blue Tooth, wireless models to low end corded earpieces that just plug into your phone. The high end versions usually have some "better" features but if you're doing a lot of phone work even a low priced model may completely get rid of your discomfort.

The Desk

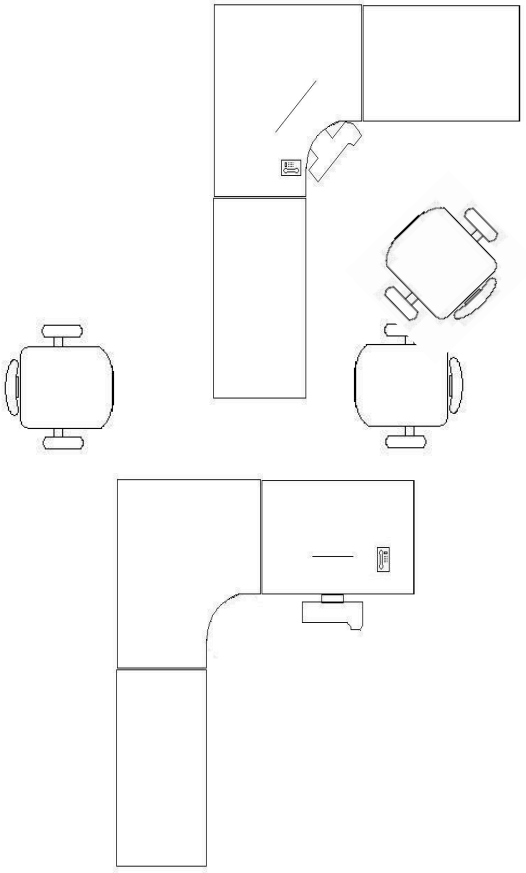
We've brainstormed about what you're going to be doing and have a rough idea of what you will need so let's start setting up your desk. There are basically 3 types of desks. Straight desks, "L" shaped desks, and "C" shaped desks.

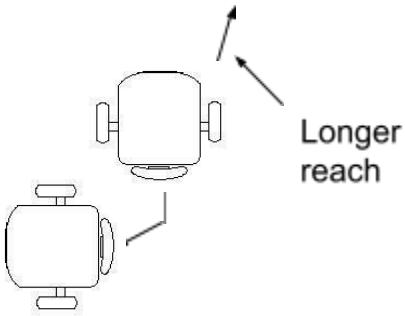
Straight desks can be 40 year old relics to modern electrically adjustable models. If you have an older straight desk you may have some difficulty. They are generally not height adjustable to lower heights and there can be a drawer in the center of the desk that gets in the way where you would mount a keyboard tray. If you have one and are comfortable then it might not be a problem. But if you need a lower desk or a keyboard tray then you probably will have to get a new desk.

"L" shaped desks offer great flexibility so you can set up the desk so it feels right to you. Generally they are height adjustable though some models are not.

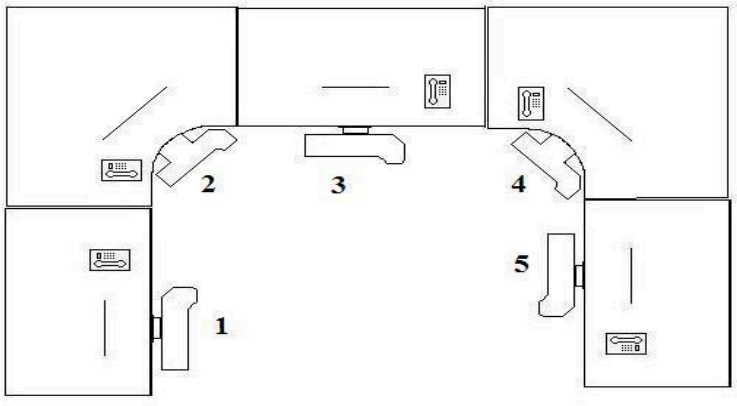


An “L” shaped desk gives you a decent amount of desk space and the ability to hold a meeting at your desk. With an “L” shaped desk you can place yourself in the corner of the desk, which places you closer to the desk and minimizes the amount of reaching required to reach your tools.

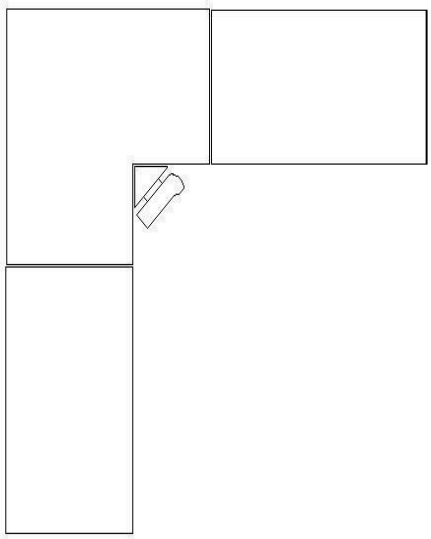




A “C” shaped desk basically gives you more or everything an “L” shaped desk offers. Here you can see 5 potential spots to mount a computer. Now a large enough “C” shaped desk can allow more than one person to work at that desk but there needs to be enough room so that each worker can scoot their chair out and about without running into their coworker.



If you are looking to buy a desk think about what it will be used for and who will be using it. If this desk may be used by more than one person then a height adjustable desk would be the best choice. If you can get an electronically height adjustable (from 24 inches to 45 inches) then you can accommodate sit/stand task breaks. Always get as much desk space as you can as duties can change and it offers more flexibility. Also, notice how the corners in my examples are rounded. This is for two reasons, one, it brings the desktop closer to the user. Second, if you have a keyboard tray it needs the extra desktop space to screw into and mount it. If you have a square corner you will need to buy a filler triangle shaped pieced if you want to install a keyboard in the corner of the workstation.



One issue you will run into when installing the desk that has a huge effect on ergonomics is privacy. Some people cannot stand having their back or side to the entrance to their office or workspace. Most people want to see when someone comes up to talk to them. Others can't stand the feeling that people might be behind them looking over their shoulder. If a desk is placed so that the worker isn't facing the entrance to their work area at least 10% of the people will try to somehow change the situation. They may slide things on their desk so they are working at an angle to the desk, they might start mounting mirrors so they can see behind them, and all sorts of really humorous jury-rigged privacy measures. Unfortunately most of these ideas are a very poor ergonomic fit. So, when you set up a workspace, try to place the desk so that it is facing the entrance of the office where possible.

Multi-user Workstations

If you have to share a workstation there are several difficulties you may run into. First, usually all the space gets taken up. If you, or your coworker needs some space kept free for certain activities, then you both should talk about where things will be stored and what you both need. This will prevent unnecessary anger from building up and working in some awkward manner because of how "they" have taken over the desk.

That is the easy problem. The bigger headache depends on the size of the two users. If both users are roughly the same height then, no problem. If they are not, however, the trouble will only grow with the difference in heights. Since most desks are fairly difficult to adjust usually the desk height is set in position between the two users needs as a compromise or at the predominant user's height. As you can guess this approach can meet with very mixed results.

If you need to have two people share a workstation try to match them up height wise. If that can't be done consider purchasing an easily height adjustable desk. There are examples that are crank operated and electronically operated. The better electronic models even have presets so that at a press of a button it will go from the height of one user to another. These desks are more expensive but they are so good that they can prevent injuries from happening and can save money in the long run. They also offer the maximum amount of office flexibility as a workstation can be set for a new user in seconds.

Regardless of which approach is taken each user that sits down will need to adjust the workstation props to fit them whenever they switch. Most of the time either the chair height, monitor, keyboard tray or some other accessory will need to be adjusted. Once you get in the habit it will take just seconds but the first few times it will feel like an obstacle that you don't really want to do. But those few seconds can save quite a bit of soreness later so it's very worth it.

> **Real World Example 5:** An office that had high employee turnover and rotated staff between various duties including a reception counter had a high number of injuries. The desk top heights were set to the height of the walk up counters which were too high for everyone. Stools with footrests were not providing enough support. The entire area was redesigned so that everything on the employee side was electronically height adjustable including their side of the reception window and pass through slot. Each user was trained on how to properly adjust the desk and their accessories to fit them. This resolved most of the issues and we stopped getting requests from those staff.

Your equipment and Your workstation

Now we're going to start talking about your equipment. If you are a business I would suggest developing a relationship with a local office supply/ergonomic vendor. There are some real advantages to doing this. First, specialist stores have a chance of knowing something about their product and can make good

suggestions. Going to a warehouse or general store to make an uninformed decision with the help of uninformed store staff gives you good odds of experiencing years of pain and dissatisfaction. Second, if you build a good relationship with a vendor they can come to your office and make suggestions. They may even help you design the workspace based on your needs. Bringing a second opinion on big purchases is usually a good idea.

A good relationship with a vendor may allow you to try out things before you buy them. Most good vendors will have loaner models in stock for you to borrow. Some vendors will even deliver loaners to your office for free. They know that you will be buying product from them and want to make you a happy customer. Now if you are thinking about chairs for the whole office getting a few loaners is especially important. You can take the time to rotate them around to the people that will be using them and see what they think. Remember, they aren't you, and the chair that fits you probably won't fit them so getting a variety of opinions will only save you trouble in the future.

That being said, don't just believe what a salesman tells you. To believe everything a salesman tells you will cause you to buy lots of things without solving your problems. One of the lines you will hear is that something is "ergonomically designed." That only means it was designed to fit people. That doesn't mean it will fit you specifically at all. Take their advice kindly but confirm everything and make sure you can return anything you buy.

Finally, there are deals to be had on ergonomic equipment if you look around. Go through your phone book and see if there is a city, county or state surplus center near you. I have bought good ergonomic chairs for $2. Now the inventory of these centers fluctuates wildly but they can save you a lot of money. Build up a relationship with the staff there and see if they will call you when they see the items you're looking for. If you can afford to wait a few weeks you might be able to outfit your whole office.

The Chair

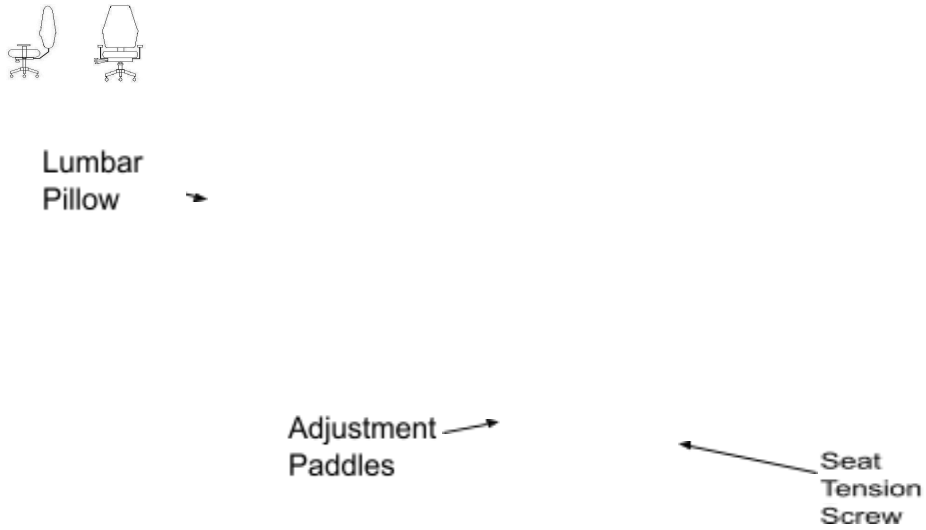
The most important piece of equipment in your office is your chair. It sets the height of everything else in the workspace and has the greatest effect over your whole body. During evaluations workers will reveal as much frustration and mystery ailments arising from their chair as they reveal how little they know about how their chair works.

I'm not kidding. I've observed many chairs with armrests higher on one side than the other and the worker doesn't even realize that they are adjustable or that they are different. I've seen lots of people with their feet dangling above the floor thinking that's normal. I've lost count of the times I've been told that someone wants to adjust their chair but hasn't looked at the owners manual dangling from

the chair. I know, I know, it's a chair, you sit on it right? For something you are going to be sitting on for 8 hours a chair NEEDS to fit. Here are just a few examples of problems that can be linked to a poorly fit chair.

Symptom	Possible Cause
Foot pain, pain on the back of your legs	Your chair may be to high, the seat pan depth could be incorrect, the seat pan angle could be incorrect
Pain in your buttocks	Seat cushion may be compressed and unable to support you
Neck / shoulder pain	Armrests may be too high or too wide, chair height or backrest angle may be incorrect
Back pain	Lumbar support height, back rest angle, back rest depth, seat pan angle, seat pan depth, rocking tension, or seat height may be incorrect
Sore elbows/forearms	Armrests may be set to high

Chairs can come with many options but a fairly standard chair is very adjustable and looks something like this:



There are other types of chairs that are not necessarily bad. They may fit you but the hot new gimmick they are pushing just might not be you at all. The key to

picking a chair is adjusting it correctly and then trying it out to see if it fits you. Just like most people try on a pair shoes you need to try out your chair. 5 minutes of sitting in a chair will not tell you enough. You need to try out the chair for 2 weeks. TWO WEEKS?? Yup. This will give you time to try adjusting it and sit it in it for long periods and really be able to see if it's the chair for you. All chairs are built with certain contours to try and fit you better but you may find that they do just the opposite after a few hours of sitting. If you have a relationship with a store or vendor already ask them if they have loaner chairs for the models you're interested in and if they will deliver them to your office.

If you can't get a loaner chair, try out chairs in the store and do your best to get a good fit. If you work in a large office try swapping chairs with coworkers and see if one of those chairs fits you and you can then buy one of those. After you buy the chair though, keep it clean. If it doesn't feel right after a week or two of adjusting it then return it. Trust me, it's worth the time and hassle to get rid of an uncomfortable chair versus suffering unnecessary discomfort for years on end.

Here are a few more things to think about before you buy a chair:

1. Make sure you get the right size (height, width, and weight capacity).

2. Check the kind of wheels it has. A chair should roll easily. If you try it in the store on linoleum or tile but you have carpet in your office you may be quite disappointed. Try asking the store if they have a surface that's close to what you have at work.

3. If this chair will be used 24 hours a day, 7 days a week you'll need to look for a chair that is rated for this kind of use. Most chairs do not have seat pads that can endure this kind of use.

4. If you have a work counter that is high and can't rebuild the workstation then a high stool could work for you. It should have all the adjustments of a normal office chair and a footrest built into the chair. Another option to the built in foot rest would be to build up a footrest under the work counter.

Have a Ball?

Have you heard of the office ball? It's a giant inflatable ball that you sit on. These came a few years ago with the promise that they would strengthen your muscles. This is because as you move a little to the left or right balancing on the ball you would have to maintain more control to keep yourself in a good posture. Also, since there are no armrests or backrests your muscles would get stronger holding you upright.

Unfortunately the office ball proves, for most people, to offer too much of what it promises. The body's muscles do get used, and then they get tired, and then your good posture fails. Users end up working in poor posture and work with overly fatigued muscles.

Some users can work solely from an office ball but, if you are considering using one, I would suggest use it in addition to a good chair. Switch it in for short periods of use. This will give you a posture break and may actually prove refreshing.

How to adjust your chair

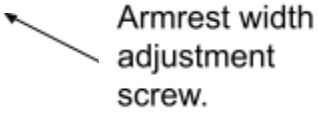
Now how do you adjust your chair? You are going to adjust your chair to start so that you are in the neutral position. That's true. It's also a bit more complicated than it sounds.

First let's set the height of the chair. Your feet should be flat on the floor. The top of your legs should also be fairly flat. For most office chairs this will be done with a paddle on the right side of the chair.

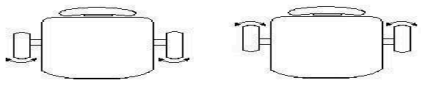
Next we'll set the height of the backrest. Adjust it so the lumbar bulge in the chair is in your lumbar area. In other words, the bulge in the lower part of the backrest should be in the hollow of the lower part of your back. You will want to play with this as a little taller or lower might make you feel much better. For most new chairs this is done by lifting the whole backrest in one inch locking increments. Most chairs will have 5 or 7 inches of adjustment. Once you reach the top of this adjustment the locking device unlocks and the backrest will drop down to the lowest setting. For some older chairs there may be a screw or lever to raise or lower the backrest. And of course some chairs are just not adjustable. Take a look and see what you have.

Now that the backrest is the right height we need to set the angle of the backrest. This will determine how much back support you feel. The angle of the back rest should be fairly upright but fine tune this to fit you over time. Most chairs adjust this by a paddle on the right hand side of the chair. Of course some chairs aren't adjustable and some have controls located in different locations. One type of chair even has a paddle that adjusts both the backrest angle and the seat pan angle at the same time.

From there we move to the armrests. The armrests should be just below your arms when they are flat and level. The armrests are for … (any guesses) … resting. They should not be in constant contact with your arms. If they are they will limit your range of motion when you address your computer, mouse, or other tools. You should be able to reach out to your tools without your arms bumping or rubbing those armrests. But when you're ready for a break you should be able to lower your arms just a little and have the full support of the armrests. Depending on your arms you may find it hard to find just the right height. The width of the armrests should be set so that they are under your arms when your arms are hanging naturally down. For most chairs raising the armrests is done with a button under each armrest. Changing the width of the armrest is normally done with a big knob under the seat below each armrest.



Some armrests can also be pointed so that the armrest matches up with your arms natural angle. For some armrests you just turn them and they will click through each setting. For others you need to lift up the armrest, then turn it, and then push it back down. This also allows you to change the length of the armrest by turning the armrest around 180 degrees.



Now if you are one of the minority that just don't like armrests many chairs allow them to be removed. Try unscrewing the armrest width adjustment screw all the way. Now try to slide the armrest out. If they don't come out, turn the chair upside down. Do you see a safety catch or extra screws holding it in? If so, you can take them out and then remove the armrest. If you do remove the armrest save all the parts in a baggie. You might want them back some day or another user might end up with your chair and they might want them back.

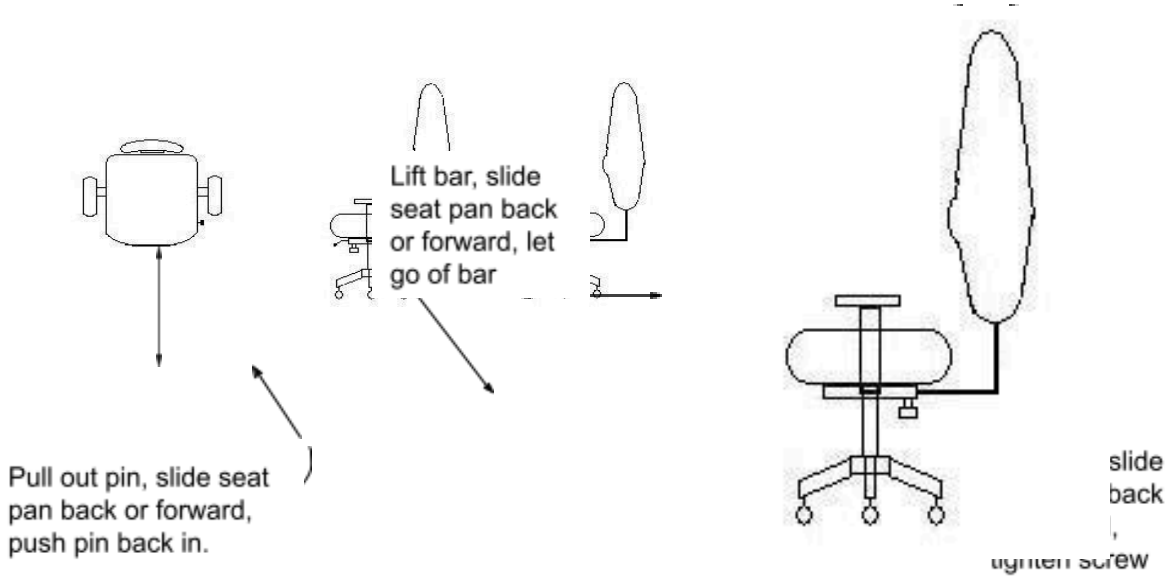
Alright, last one. Lets adjust your seat pan. It should be fairly flat. If the seat pan is tilted too much up or down the posture of your lower back is changed

which can lead to soreness. If the seat pan is tilted too far up the front of the chair can contact the legs at a point. This point force on the bottom of your legs can also cause soreness. Most chairs adjust the seat pan angle with a paddle on the right side of the chair. Some chairs have a secondary seat pan angle adjustment on the front right side. This adjustment can be a bugger to get to work. I usually don't mess with it since sometimes it's hard to undue it. To make it work you will need to lean back just a little bit and then turn it. If you can get it to turn you will till forward fairly steeply. For most folks this will not be good but I've seen a few chairs that needed this extra adjustment to really fit a person.

Most chairs are also capable of being set up to rock or be locked in an upright position. If you lock your chair in an upright position you will get the most support from your backrest but you won't have the flexibility to just rock when you feel like it. If you like to rock in your chair this is easy to set up. Usually there is a paddle on the right side to lift up or down. On some chairs a lever on the right side is also a push/pull pin to unlock the chair and allow it to rock. If you do like to rock you will need to adjust the rocking tension. This is done by turning a screw on the bottom of the chair. You may need to turn this screw a lot to get it to offer the right amount of force to support you. It should be set so the chair wants to stay up and support you but if you lean back you then begin to rock. If you unlock the rocking function and can't get it to rock check the rocking tension screw. If it is set at it's maximum force then you may just not have enough strength to move it. You'll just need to loosen the screw and you'll be able to rock.

Rocking
Tension
Adjustment
Screw

There should be a gap behind your calf to the chair of about an inch. For most people if the seat pan is touching your calf, after a while they will scoot forward a little bit to stop the agitation. This moves them away from the backrest and away from its support. There are 3 common styles to adjust the seat pan depth to fit different leg lengths on a chair. One has a push/pull pin on the left side. You pull it out to slide the seat pan back and forth and then push it in when you find the depth you like. Another has a bar under the front of the chair which you lift to slide the seat pan back and forth. And the last style leaves the seat pan alone and moves the backrest forward and back by unscrewing a screw where the backrests mounts to the chair.



There are some other adjustments your chair may have. Some have lumbar pillows that you blow up to give you more or less support. Some chairs have a zipper on the back that gives you access to straps which control the amount of support in your backrest. Manufacturers are clever and they keep making new "and better" ways to adjust things so you may run into other odd bits and you'll want to play with them to see what they do.

Does your chair fit you?

If you're really lucky you feel great right now and need no further adjustments. But most likely you will be fine tuning each one of these adjustments trying to find the spot that fits you.

Ok, now with all this in mind, do you need a new chair? Does it fit you? Do the adjustments work? If so great. If not, you may need a new chair. Now if you just found out the adjustment you want to work isn't on your chair then you'll need a new chair. If you found out that your chair is broken however all is not lost. Many chairs offer good warranties so if you still have your purchase information you may be able to get it repaired or parts for free. If it's not under warranty and you like your chair some problems can be fixed if you are mechanically inclined and parts usually aren't that expensive (when compared to the price of a new chair).

Now some of you have just played with everything and it looks like it's all where it's supposed to be and you still aren't comfortable. This could be for several reasons. First, your chair could just be worn out. That seat foam is not designed to last forever. Over time it will compress, deteriorate, and lose its ability to support you. To test this get up and push down on your seat pan. Does your hand just sink to the flat metal base below the foam? Can you feel the bolts that hold all of this together? If so, that seat pan has passed on. If you really like your chair you can take it to an upholstery shop and have it redone or maybe call the manufacturer and get a replacement. If not, it's time for a new chair.

Another reason that the chair may not fit you even if it is adjusted well is that it just isn't contoured to fit you specifically. Maybe your legs are shorter than the seat pan is designed for. Or maybe your lumbar is too high for the backrest. There could be lots of things about you that don't fit a given make and model of a chair. If this is the case the chair will never fit you. Whatever level of discomfort your feeling now will only get worse as time goes by. I'd cut my losses and get a new chair. Good chairs can be had from just a few hundred dollars to over a thousand but don't believe the price means better or worse. It must fit you to be a good chair for you.

Of course the reason a well adjusted chair still doesn't feel right could be something you're doing too. If you wear different height shoes (from sandals to

high heels for example) you may need to raise or lower your chair to maintain good posture. This can lead to more adjustments than you want to do so consider having some sandals that you can change into while you're at the computer. If you have odd seating postures they may impact your comfort the longer you maintain them. Sitting on one leg, on both legs, with crossed legs, legs up on a box, crossed legs in your chair, or anything other than the Neutral Position may cause you problems. No chair will fix that. You will need to rotate your postures more frequently so as to not overuse any part of your body.

The Desk

The type of desk you have will greatly influence the props you will need to buy and how you will feel. Hopefully you have a desk that is adjustable in height. If you are sitting in cube furnishings (an office with wall partitions) then most likely the desktop is height adjustable with brackets hung on the walls. If you have a desk with legs you will need to look below the foot of the leg and check for a bolt. Each leg will have one to allow you to raise or lower your desk.

The reason why this is important is that most desks are set up with a desktop height of 29 inches. Now if you are a shorter person or a very tall person then this height won't "feel" right. The shorter people will raise their chair height so that the desktop is close to the height of their elbow. Their feet will dangle above the floor and they may feel soreness from their legs to their back. Taller people will have problems with their legs running into low parts of the desk and may have posture issues with the height of their tools.

This is why an adjustable desktop is so critical. Ideally a person sets up their chair first so they know at what chair height they are comfortable. Then the desktop height can be changed so that it is at roughly the same height as your elbows. If the settings of the desktop don't quite match up I would start the adjustment on the high side of your elbow rather than the low side.

Some desk heights are very easy to adjust but others are a physically intensive task for one person and done best with two people. If you can't see how to adjust your desktop height and don't feel completely comfortable doing it. I would highly encourage you to seek help from someone in the office or a vendor. And yes, you will have to clear your desk off before you adjust the height for most types of desks.

If you do not have a height adjustable desk you have a more difficult path ahead. For shorter people we will adjust you to fit your desk. Raise the chair so that you feel comfortable with desk height (elbows about desktop level). How far are your feet from being flat on the floor? You will need a footrest to make up the difference. Since you will be using it as your floor to support you, and not just as a prop to change your leg placement for comfort, it will need to be sturdy (See the

section on Footrests). Once you get one look at where you will be working. Do you need two? If there is more than one place at your desk you will be working at you will either have to move your footrest every time you turn your chair (which we both know you won't do) or get an extra footrest and place it in your other work area.

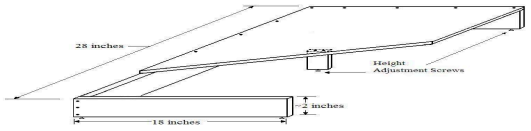
For taller people we just need to raise your desk. They do sell products that amount to discs or blocks to set under the feet of the desk and raise the desk height. But if you have any scraps of wood at home they will work just fine. Just make sure they are all the same height and they are sturdy. If you need to raise your desk more than a few inches you'll want to make sure the blocks are wide enough that they just won't roll over with the weight of the desk on them.

Footrests

There are two types of footrests. Those for people who would like one so that they can change their leg posture a few times a day and those for folks who need one for support. If you look in your office catalog or go to a store you will find several footrests. Most if not all will be plastic, cheaply made, and have a pivot so you can change the angle at which your feet rest on it. These are fine for people who just want something to put their feet on a few minutes throughout the day.

If you actually need a footrest to support you though these plastic footrests are often too cheaply built. If you have to elevate your chair to address a desk that's too tall you are in essence elevating the floor to fit your new height. You will need something that is wide enough and that can support you. A good design to look for is something like this:

If you have difficulty finding one and like a project these are very easy to build. A basic design would be something like this:



Build notes:
- Carpet the top. You may be able to get a few of the extra carpet tiles left in the building
  and be able to have it match the floor.
- The frame is built with 2"x 4"s. The top is made with 5/8" to ¾" plywood.
- The height of the unit is determined by setting the natural height of the user in their
  chair. Then raise their chair to the height it will need to be at and measure the difference. Build the total height to be less than this measurement. Add large screws to the bottom of all 4 corners of the frame and the center post and use these to adjust the final height. I've labeled the height as 2" which will fit most people but if you are custom building the unit for one person then you might as well measure their specific heights and custom fit it.

The Computer

Hopefully in the Work Process Design section you chose a place for your computer. Now we need to put it there. A computer has a monitor, a keyboard/mouse, and the unit itself. Lets talk about each.

For the computer do you need to use the cd/dvd drive? Do you need to access the USB ports or the headset jack? If not, then most likely the only thing you'll ever need it for is the On/Off switch so we can actually put it someplace out of the

way. It can go behind the monitor, in the corner of the desktop, or fairly deep under the desk. As long as you can reach the On/Off switch you'll be fine. One problem you might run into is that the cords that were shipped with the computer are too short. This is a minor problem. Ask around the office and see if anyone has alternate cords or buy some longer ones.

Now if you are going to need to use the CD/DVD drive or one of the ports then you'll need to think about how often you really will use them. If you need one just a few times a week then the computer can be put in a more remote region. If you need it frequently throughout the day though it will need to be fairly close to you.

The Monitor

Most likely you will have one of three types of monitors: an old Cathode Ray Tubes or CRTs (These are the large monitors that look like an old TV), a flat screen, or a flat screen attached to a laptop. CRT's offer a larger challenge. First, they are big and heavy. You may not be able to lift it by yourself depending on the size of the model. They also take up a lot of space making them harder to fit onto a crowded desk. And finally, CRT's can contribute to headaches and eyestrain.

CRT's "draw" a picture many times a second. This is called the refresh rate. The fewer times the picture is drawn every second the more likely it is that you can detect it. It looks like a picture being flicked off and on. Staring at this kind of image can lead to eyestrain and headaches. The good news is that you can set the refresh rate. (To change the refresh rate differs between operating systems. Search on the internet for "Change Refresh Rate" with the name of your operating system and you will find the instructions to do so.) Set the refresh rate as high as your computer will allow. For most people this will resolve the issue. A minority of people though will still see the flicker and will need to get a flat screen monitor.

Flat screens are now the standard monitor. They take up less space and are very light. Many come with built in height and angle adjustments which makes setting them up very easy.

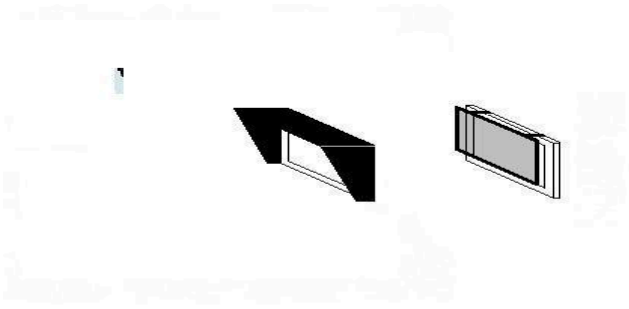
For a laptop used in an office best results will be found by plugging in a separate monitor. For most people, a laptop placed on the desk will be too low causing the user to look down all day. This non-neutral posture could lead to soreness in the neck, shoulders and back.

To place the monitor you need to be sitting in your chair at your desk after they have both been height adjusted. Once those have been adjusted look at your monitor. The top line of working text should be about eye level. If you have a

height adjustable flat screen monitor just lift it up or push it down and see if moves. If it doesn't, or you have a CRT, you will need to raise the monitor with a monitor stand. These are light plastic blocks that you insert under the monitor to raise it to a comfortable height. What you are trying to avoid is looking up or down all day. These postures can lead to soreness in the neck, shoulders, and back.

If you have bifocals monitor placement can be more difficult. If you use the bottom lens to read the computer then you might want the monitor mounted lower. Set the height so that your head is looking flat and level. You're eyes might be looking down through the lower lens at the monitor but you shouldn't have to be looking down or up with your neck.

Once you have set the height of the monitor you will want to set the angle. Adjust the angle of the monitor so that it is flat to your face. If there is no glare from a window or overhead lights you are done. If there is some glare the best answer is to change the light causing the problem (close the curtains or deal with the light source causing the glare). If you can't reduce the amount of light causing the glare your options are a light shield, a glare screen, changing the angle of the monitor, or moving your monitor so that it doesn't reflect the light at you. Light shields are shrouds and shielding devices that block the light. Glare screens are usually polarizing filters that can reduce the amount of reflection off the monitor but they also dim the appearance of the monitor. These polarizing films may also limit the angle at which the monitor can be viewed. This is a good thing if you are reading confidential information and don't want someone to accidentally see something they shouldn't but it's a bad thing if you are trying to look at the monitor from an angle instead of directly in front of the monitor.



Now we should have a monitor that is in a nice comfortable position. Does it seem to bright or to dark? If so you need to adjust the brightness and contrast

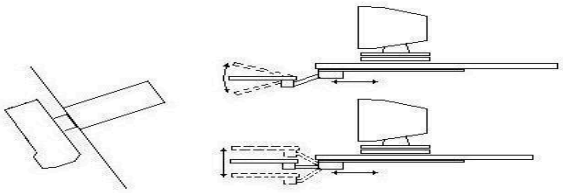
controls on the monitor itself. These will be buttons located on the front, side, or behind a hinged panel. Some of these can be a little bit confusing but play around with them and they should be able to make a pleasant screen to look at.

The Keyboard and Mouse

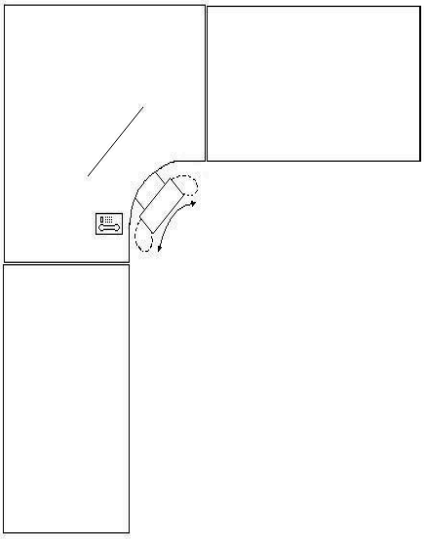
The keyboard and mouse go right in front of the monitor. I would recommend getting a keyboard tray. For most people this is the best way to find a comfortable position when addressing their keyboard and mouse. Now some people may be able to interact with the mouse and keyboard on the desk. Some people actually hate keyboard trays. But I've had at least 90% of the people I've ever helped stay with a keyboard tray once they were shown how to adjust it and then locate all their props. So, if you are one of those folks that have tried them before and didn't like them, I would highly encourage trying it again once we've talked about what a good keyboard tray is and how to adjust it correctly.

What makes a good keyboard tray? It should be made of one solid piece, be "L" shaped and big enough to hold the mouse and the keyboard. It should be able to slide out of the way under the desk. It should be able to change in height. And it the tray should be angle adjustable. Now there are other types of keyboard trays out there that may offer an advantage in certain situations but they also have compromises.

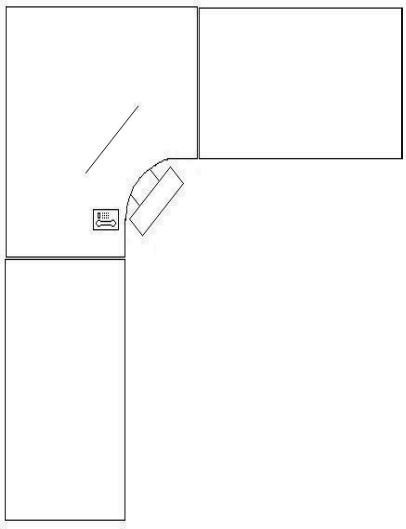
"L" shaped trays are sturdy and bring your tools as close to you as possible. This is because the tray wraps around you allowing the mouse to be right under your hand where you want it. The tray can be set up initially for left hand or right hand use but as it requires the removal of 6 screws it is not something you can do whenever you want.



Pass through trays have one board that holds the mouse which slides underneath the top board which holds the keyboard. This allows the tray to be smaller if you want to hide the mouse tray under the keyboard tray and it can be quickly set up for left hand use or right hand use. For ambidextrous people this is a great boon as you can shift the workload from one hand to the other without much effort. Pass through trays can also be "L" shaped bringing the mouse right under your hand where you want it. But pass through trays are a bit jiggly as there are two boards with no firm attachment to each other. The mouse tray will always have a certain amount of instability. Also due to the board on top of another arrangement you will have to compromise on your keyboard or mouse height. Either your mouse or keyboard will be set to low or high, or you will have to settle for a mid-point between the two heights which may not be ideal.



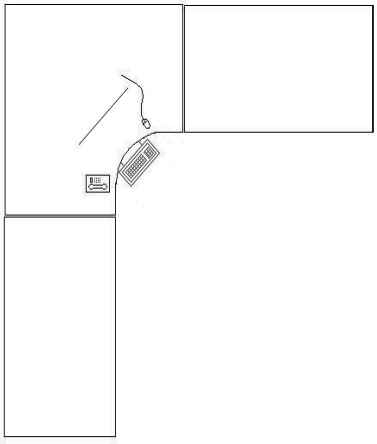
One piece straight boards are nice and sturdy but the mouse will have to be placed a little farther away than most people like. This will cause a little more of a reach which for some people can be problematic. The advantage of this style though is that it is always available for left hand or right hand use.



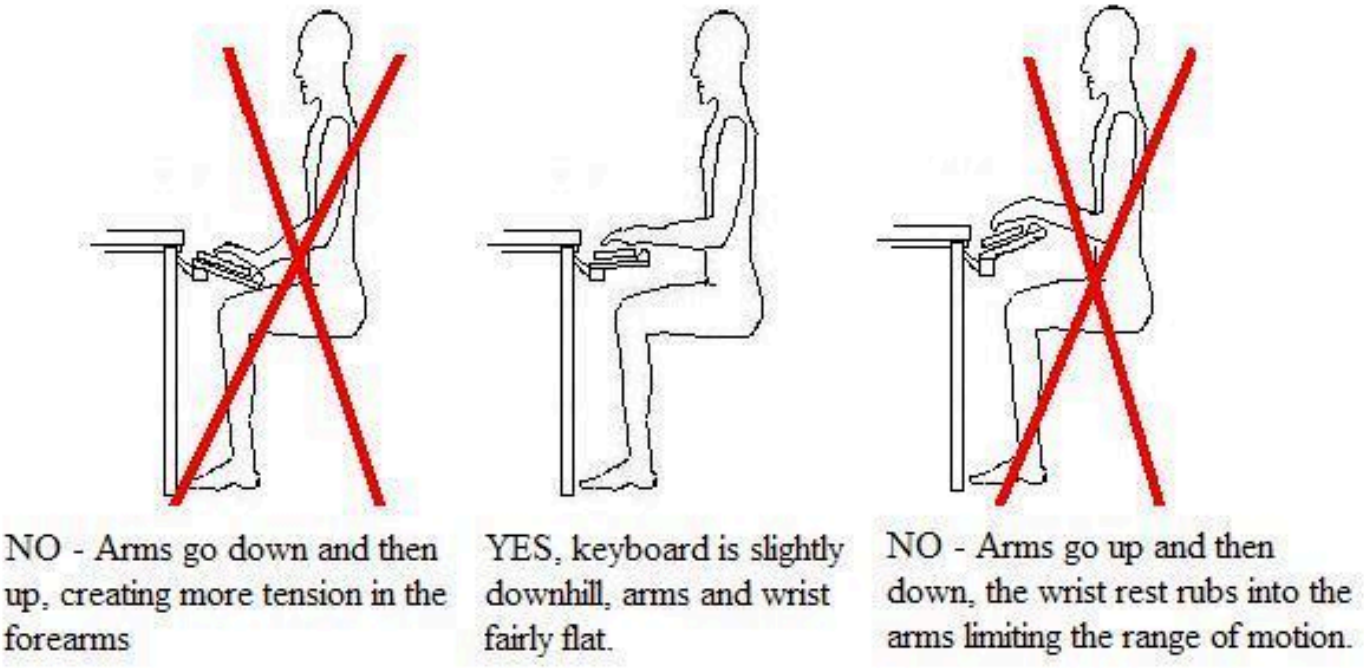
Keyboard trays with mouse platform attachments are very common. These can be set up for left hand or right hand use but require a screwdriver to do so. This

means you won't be doing this often. They have the same problem as the pass through tray in that the mouse and keyboard trays generally will be at a different height which leads to compromises in posture that can be problematic. I had one department that bought hundreds of these. The salesman must have been really good because the exact model bought was just about the worst thing we'd ever seen. It had a ball joint that let you turn the mouse platform around so you could set it in more positions. The problem was you couldn't put the weight of your hand on it or the ball joint would fail. So you had to hold your arm up and out for hours at a time. We spent the next several years replacing them all and addressing lots of workers compensation cases.

One other tray you may run into is the keyboard only tray. These trays are just big enough for a keyboard. People on these systems generally will have trouble. The keyboard tray they will be able to customize to fit them exactly but the mouse will be left on the desktop. Depending on the exact arrangement and the person this can cause great difficulties as they reach out to use the mouse tensioning their shoulder, neck, and back. I run into these usually in older offices or in offices that purchased the cheapest line item without consulting with someone to see if the specifics of the purchase were good or not.



Now that you have a good tray lets adjust it. What we're looking for is to keep your hands fairly flat. Read the instructions on the tray and get comfortable in adjusting it in height and angle. Now line it up to start as in this picture.



NO - Arms go down and then up, creating more tension in the forearms

YES, keyboard is slightly downhill, arms and wrist fairly flat.

NO - Arms go up and then down, the wrist rest rubs into the arms limiting the range of motion.

This is your starting point. Give it some time. Now if you feel like it's to low or high change it a little bit at a time. Fine tune it to fit you. Now do the same for the angle. If the tray has a wrist rest make sure it isn't pushing up into your wrist.

The Keyboard

An annoying problem that many people run into is the "free" keyboard that comes with a computer system. It's a fairly generic tool and it's functional. But it isn't necessarily designed for what you do. Most people do not use their number pad very much especially when compared to how much they use their mouse. For most people they would be more comfortable with the number pad removed completely or located on the left. This moves the mouse closer to you, minimizes the work your muscles need to perform, and makes it easier to address properly.

Now if you use your number pad a lot (like an accountant for example) then it makes sense that it sits below your dominant hand. The compromise you will pay if you're right handed is the mouse is pushed 6 inches farther to the right. This adds a little stress to your mousing activities. Now you could slide your chair

over when you mouse but you won't. Nobody does as reaching over is so easy. You could move the mouse over to your left. It will take you about a month to get used to it but after that it will feel pretty normal. Or you can type slightly off center centering yourself on the mouse and keyboard.

If you're left handed the standard keyboard already allows you to put the mouse under your dominant hand. Good for you. Unless you want the number pad under your dominant hand your set.

So what to do? If you use the mouse much more than the number pad buy a keyboard without a number pad or one with it moved to under your non-dominant hand. I would recommend getting a wireless unit if possible. If you occasionally do use your number pad you will get used it under your non-dominant hand in about a month. When you get it, leave the adjustable feet that come on the bottom of the keyboard near the back up. Your keyboard tray will provide the correct adjustment.

When you go to the store you will find two types of keyboards. The straight old standby by and one with a curve to it.

The curved "natural" style places the keys at an angle that more closely fits the natural posture of the wrist. So is it better? Not in all cases. Some folks have spent years typing perfectly well on the old square keyboards. For these folks there really is no reason to change. Now if you aren't quite happy with how your arms or wrists feel when typing then trying one of the "natural" styles isn't a bad idea. You will need at lest a few weeks to get used to the key locations. Once you get through this though you can give it an honest opinion. Keep the receipt so you can return it after a few weeks if you find it doesn't fit you.

One last thought before you buy a keyboard, I routinely find really good deals on the internet for these. If your vendor, catalog, or store doesn't have what you're looking for, or has a small selection, take a look online and you will find all sorts of prices and styles.

The Mouse

The mouse probably has the largest variety of styles. Some models come in small, medium and large. There are left handed, right handed and ambidextrous models. There are trackballs which move the onscreen pointer with a ball. There are touch screens that let you move the pointer by just moving your finger over the pad. There are units that are fairly flat while others that are pretty vertical. I've even seen models that fit as a small remote in your hand.

Each of these models might feel better to you or help with a specific injury that you may have but for most people these are all just personal preference options. If you like the mouse that came with your computer, stick with it. If you're not comfortable or have an injury then there are lots of styles to choose from. Either get a loaner from a vendor or buy one and keep the receipt in case it turns out to not be right for you. As always give it a long enough trial period so that the newness of the unit doesn't get in the way of your evaluation of it.

Most mouse's on the market today have a red laser on the bottom that tracks the movement of the mouse. These are pretty bullet proof and don't require any maintenance. If you have an older mouse you will find a ball on the bottom of the mouse that rolls as you move the mouse. These mechanical mouse's do require maintenance. Every few months you should unscrew the plastic ring on the bottom of the mouse that secures the ball. Let the ball fall out and look inside the mouse. If it's an old mouse be prepared to go "eewwwww". Some of the dust and hair that the ball has rolled over is stuck inside the mouse. There are 3 or 4 spots that will need to be cleaned. The interior wheels that the big ball moves and possibly a light sensor. Reach in there with a paper towel, tweezers, or even air dusters and clean it out. If you're old mouse seems to get sticky or not work as well as it used to this will probably fix it.

If you have pain in your fingers or wrist and think it is related to your mouse try to pick a mouse that minimizes the impact on the area that is hurt. If moving the pointer is causing the problem then a trackball with the ball mounted under the thumb or a touchpad may minimize the exertions that are causing the problem. If turning your wrist flat is a problem a vertical mouse might be the answer.

One other option if you're hand, fingers, or wrist is bothering you is to start mousing with the other hand. It will not feel right for at least two weeks. But this is one of the best ways to give your injury time to heal. If you're having problems with just a few fingers you can try reprogramming the buttons on your mouse so that you don't have to use them as much. To do this on a Windows based computer click on "Start" and then "Control Panel". You will find the mouse options screen there and can change all sorts of functions.

One last thing to think about now that I've mentioned changing your mouse options is changing your pointer speed. One thing that drives people nuts is trying to move their mouse across the screen and having to lift the mouse up to

move it again. The pointer is to slow and doesn't move very much. You can also adjust this in the mouse options menu.

Laptops

Users that rely on laptops for their computer needs must face a compromise between the portability the laptop provides and how that small design forces changes in the users posture. Laptops frequently have a compressed keyboard which requires very little movement to use. You get locked into one posture more and the muscles that are being used become fatigued faster.

Laptops also are frequently placed on the desk, your lap, or any other fairly flat spot you can find. This deviates your posture to whatever surface you now must work on. You could be working at too high an area or too low and these odd postures might leave you quite sore.

Laptops have built in monitors which makes the monitor much lower than most people would prefer. The user must look down more than normal and this can cause soreness in the users neck.

Laptops usually use a touchpad instead of a mouse to navigate around the desktop. This can be more difficult if the user needs to navigate over the whole desktop or if the touchpad sensitivity is poor. This increased difficulty may lead to more effort to navigate around and lead to soreness.

So, laptops are a compromise. If you are going to be set up for an extended period of time at one location try to set up a normal office space. Plug in a monitor, keyboard and mouse. Set the monitor height up and use a keyboard tray just like you would with a normal computer. Make it fit you and you will feel better.

If you are very mobile then the quality of your tools and the nature of your work tasks can be modified to help with your interaction between them. A better touchpad, a larger touchpad, a bigger screen size, a touch screen, new software, and other technological aides are out there. The key is to identify the activity that is causing the problem and then working with your vendors to see what you can do to reduce or eliminate that problem.

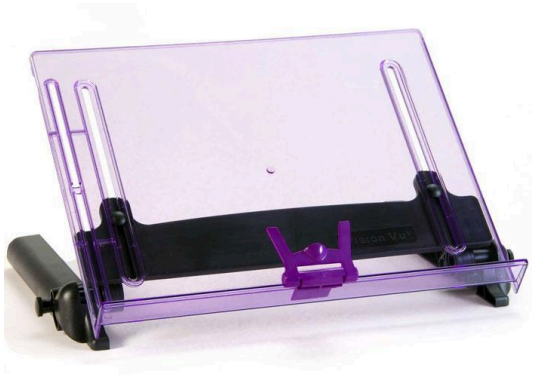
> **Real World Example # 6** One office had workers that had to go into the field, fill in forms, put that information into their computer, print the report and then sign it in the field. This was slowing work down and problematic for staff. They bought a whole new software suite and equipment. The tablet computer had a touchscreen which allowed the forms to be filled in on the computer. The computer wirelessly connected to the small

printer so all they had to do was pull it out and hit print.
Productivity increased and the level of effort required decreased.
Staff moral went up.

Document Holders

Do you type from copy? If you do much of this then you probably need a document holder. Something to lift the paper up off the desk so that it is closer and easier to read. Now the type of document holder you need depends on what you are typing from and how much you do it. For someone who only types up some notes once in awhile a small document holder is probably all you need or want since a big unit takes up that valuable desk space. But if you are typing from larger documents, binders or just lots of material then a more substantial unit is needed.

The document holder I recommend is from a company called VuRyte. To me it is the best unit available. It sits right in front of the user so there is no looking to the right or the left, adding tension to your neck and shoulders. It flows in line with the monitor which allows the user to go back and forth between the two very easily. They come in wide and narrow sizes so they can occupy just the space needed for your task. They are substantial and can even support binder sized documents. They are height and angle adjustable so you can make it fit you. And they can be ordered as part of a monitor raising system with stackable sections if you need to raise your monitor.



Now there are lots of other types of document holders and you might like one of these other styles. There are models that cost as low as 25 cents that sit on the table top, models that mount on the side of you monitor, and lots of models that have arms that can be adjusted to where you want them to be. Be careful though as some of these models are very cheap and break quickly. Whatever you get, keep the receipt and if it doesn't adjust to fit you or your duties then return it. Also, read the instructions that come with it. Some of these models can have up to 8 screws that need to be loosened to adjust it and the only way to know if the unit is worth what you paid for it is to fully adjust it. Adjust it so that you don't need to move your head much. Try to get the document and monitor as close together as possible.

Your Phone

The phone you need depends on how much phone work you do. If you rarely use the phone (maybe just a few times a day) then the corded model with no options is probably just fine. But if you need to handle lots of calls or have long conversations the shortcomings of a bare bones model quickly becomes apparent. Now how are you supposed to use a phone? I ask this because people do weird things. To use a phone with good posture you should be holding the handle in your hand and hold it to your ear. Most users who get the occasional long call do one of two things: they switch hands when they get tired or they pinch the phone with their head and shoulder. Switching hands is a good solution that usually doesn't stress the user to much. The neck crimp however quickly becomes tiresome and sore. Do not go buy one of those pads that fit on a phone to make it easier to crimp down. You will still feel sore. Lets fix the problem, not just make it not quite as bad.

An easy option to handle the rare call that goes long on most office phones is the speakerphone. People don't like using the speakerphone. They feel it's rude, they don't like the reception quality, and they don't want to be heard by anyone else. These feelings can end up causing real physical pain. If you have a call that goes long once in a while that doesn't discuss confidential information you can give your muscles a nice break for a few minutes by switching to a speaker phone. I would however let the caller know and set the volume to the lowest level practicable. Once you've had a few minutes of rest you can go back to the handset if that is your preference.

Now if your work does involve lots of phone work I would recommend a wireless headset. These allow so much freedom of movement and enhanced functionality that they are worth the hundred plus dollar price tag. A good unit will let you walk around your whole suite to get the information the person on the phone needs or to multitask without missing a beat. It will also let you answer the phone away from your desk which is handy if you have to help out at different desks or do jobs that pull you away from your desk. The lower priced headsets that have a cord are not bad. They just have the drawbacks of a cord that will pull on you to a certain extent and can be heavier than the wireless models.

Now if you are going to buy a headset, as I've said several times, get a loaner or keep the receipt. Headset models can be a one size fits all or come with lots of accessories that you will have to customize to fit you. Do you want to wear it over your head or on your ear? Do the accessories that come with your model make it fit you? If not, you don't have the right one. One of the models out there will fit you but it may require a bit of searching to find out which one it is. One more note to look out for is whether the headset you bought will work with your phone. There are a few models that will not work with certain models of phone. No amount of playing with it will help. Read the directions, call the help number for the manufacturer and hopefully you will get it all set up correctly and find out if this is the model for you.

Other Accessories

Some tasks may require other tools to make the workload on your body tolerable. If you do a repetitive task consider getting an automated accessory to make it easier. Do you staple a lot? Open letters? Stamp incoming mail? Bind documents? Hole punch documents? Look at what you do. If you do any task a lot then see what you can do to automate it. Ask a vendor what tools are out there to make things easier on your body.

If you do a task that is physically difficult you will want to streamline it so that you can handle it. Do you need to move boxes or equipment? Do you need to load shelving or a vehicle? Do you have to access a high storage area? All these problems can be reduced with some good equipment and planning. For moving boxes a hand truck will do most of the work for you. For lots of small items or larger items a large flat cart or a multilevel cart may be more appropriate. For accessing high areas you might need a tall ladder or a moveable stair system depending on what you are going to be doing at that height.

Equally important for forceful work as good equipment is good planning. If you have to take several boxes out to a car in the parking lot the shear length of the job opens up a greater possibility of injury. Moving the car close to the building or to a matching height loading platform will make the job much easier. If you have to move a heavy box to the top of a shelving unit you'll probably be better off moving the contents of the box one at a time up the ladder versus trying to carrying a heavy box up the ladder. Any time you have a job that requires some tough physical exertion think about it before you do it. Your back will always thank you.

If you are going to buy a cart or hand truck do think about where you will be using it. If you are using them on a hard smooth surface then hard wheels will roll the best. If you are going to use it on asphalt, dirt, gravel, or any other uneven surface try to get pneumatic tires (tires you have to blow up with air). Pneumatic tires are much easier to move and control on uneven surfaces. They will occasionally require repair but they are worth it.

Some tasks require prolonged standing. If you are required to stand in one spot on a hard surface for more than 30 minutes consider getting a cushioned mat to stand on. This will ease the strain you feel from your feet to your back.

If you need to write with a pen or pencil consider the wide gripped models. Smaller tools are harder to use than big tools. Consider trying to use one of those small eyeglass screwdrivers versus a big screwdriver. The smaller tool requires greater concentration and muscle control. The bigger tool is easier to hold and use. 10 years ago it was quite a bit more expensive to get a good cushioned comfort grip pen or mechanical pencil but today you can buy them for basically

the same price as an old wood pencil or cheap pen. A good pen can make your wrist and forearms feel much better.

Voice Recognition Software

There are occasions where an injury becomes so serious the doctor requires the user to stop long typing sessions. Also, some users have medical conditions that don't allow them to type. In these instances you may want to look into getting some voice recognition software. This type of software allows the user to talk to their computer and have their commands performed and their input typed up. No software is perfect in this function but after it learns your voice they can do a very good job producing about the same amount of errors a typist might on their own. So proofreading won't go away just yet. Some offices will be hesitant to make this purchase as the need for it might be gone in a few months when the employee gets better but most see that keeping the employee's production turns out to be the more important factor.

Texting

Texting is the typing of messages on small wireless devices much like an email. The only real difference is that the devices used have miniature keyboards or multifunction keys that may require extra effort to get to the letters you want. Texting messages is not inherently a bad thing. It does involve quite a bit of fine motor control though and this may cause muscles to fatigue faster. As long as you have a sufficient break and are not texting messages as a major activity though you are not likely to suffer any health effects.

If you are doing a lot of texting though and start to feel problems in your hands and arms you will need to treat this ergonomic problem just as we have treated others. Talk to a doctor, take task breaks, stretch, change your work process (maybe call and leave a voice mail or save lots of small messages for one long phone call later), and consider other equipment to see if a different texting device fits you better.

Your Environment

There are many things in a person's working environment that can cause people to do something really silly. Usually these moments of comedy come from a minor annoyance that a person doesn't want to take the time to deal with or hasn't had success getting addressed. So they get creative and think of a solution. Now this solution might literally cause problems for the rest of the building but as those problems don't obviously point to the act that caused them the rest of the staff suffer. Now if you have an environmental problem I encourage you to seek resolution but with the proper solution.

Adjusting light Problems

Lighting issues can cause glare on your screen and eye strain from too much or too little light. When there is too much light what we want to do is reduce the amount of light or reorient the workstation so that the light doesn't present a problem. So where is the excess lighting coming from? Is it coming from an overhead light fixture or a window? Now before we address a lighting issue we want to ask any surrounding co-workers how they feel. Do they feel there is too much light? Or do they want more light?

Now what you need to do depends on how the light is affecting you with consideration as to how it is affecting your coworkers. Depending on the exact problem the solution could require some effort and a moderate amount of money to being as easy as putting on a hat. The important thing though is to fix how the light is affecting you without ruining all the good ergonomic work we've already done.

Possible solutions include:

Using the blinds/curtains.
Tint the windows.
Remove a bulb from the light fixture.
Sleeve some bulbs (for fluorescent fixtures you can by tubes that fit over a bulb made of window tinting material to reduce the amount of light it produces)
Put on a hat with a brim.
Turn off some lights.
Switch work stations with a coworker.
Use a glare screen on your monitor
Use a monitor light shield.
Rotate your workstation.

Air Conditioning

Another environmental factor that could be affecting you is your air conditioning. Now staff will always fight on what is a comfortable temperature. One worker will swear it's freezing while the next is happy in shorts. In general the

temperature that most people will be comfortable in is around 72^{o} F. If you feel hot or cold around these temperatures then you really should consider changing your attire. Dress in layers so you can be warmer or cooler as needed. Do not sneak over to the thermostat and change it. This will only cause other folks to start over adjusting it in the other direction to make it right for them.

There is a chance that the air conditioner is not running correctly so if several people do not feel comfortable with the quality of the air in the building get the system serviced. Make sure to ask the service company to check the outside air damper setting. This controls how much fresh outside air enters the building. Ideally you want at least 10% fresh outside air entering the building. If everything is working one other thing the service company can check is if the system is balanced. An air balance assures that the right amount of air is coming out of each air duct.

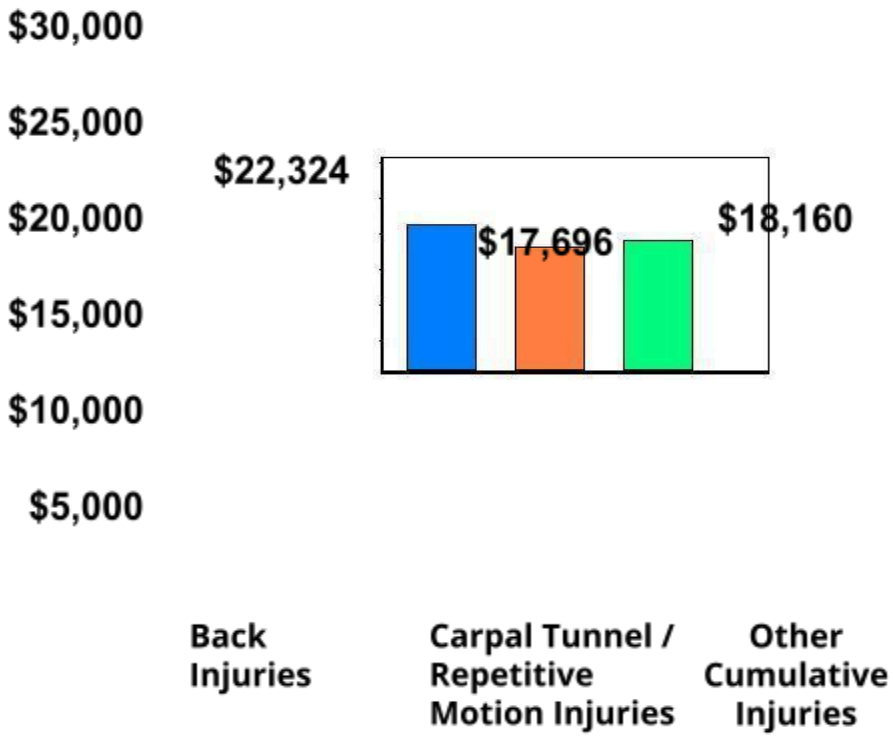
The other problem people run into is an air conditioning duct that blows right on them. Everyone else in the building feels fine but you freeze or boil every time the air conditioner comes on. First lets see if the system is working properly. Ask for an air balance to see the duct has the correct amount of flow. If it is ask the vendor to reduce or redirect the air flow from your duct. They will do this with consideration to how it could affect the rest of the building. Do not just tape over the duct. Another possible solution would be to rearrange your workstation so that the duct isn't blowing on you.

Ergonomic Evaluations

If you are a supervisor or a business owner with office staff you need to perform an ergonomic evaluation on them. That's right you NEED to perform an ergonomic evaluation on them. In the case of ergonomic injuries the costs of setting up an employee's work area correctly are much smaller than the cost of an ergonomic injury.

Average Medical Costs For Permanent Disability Claim Cost 2006 –

Workers' Compensation Insurance Rating Bureau of California **2008 California Workers' Compensation Losses and Expenses**



These costs dwarf the cost of even buying a whole new office's worth of top of the line equipment. Heck, for the cost of one carpal tunnel injury you could probably set up all the offices for most small businesses. So financially, I'd argue that it just makes good sense to perform an ergonomic evaluation on office staff.

But there are more than just cost savings to performing an ergonomic evaluation. If you perform an evaluation on a new employee you get a chance to spend some time with them on the first day. This will help build a good report between staff and management. It makes you human and someone they feel like they can talk to. It will build staff moral as you spend valuable time to make sure they are ok. From this demonstration of concern staff are more likely to report their injuries when they happen which will usually result in less of a health impact for them and less of a business impact for you. This few minutes of time will also keep you in touch with what's really happening in the office so you can address issues more quickly.

I'd also consider at least checking in with staff a few times a year to be sure they are still doing ok. On occasion walk through the office and ask people individually how they are doing and if their workstation still feels fine. You can ask everyone in a meeting but some people just don't like to talk publicly and you might not ever hear from them.

There are a few specific times when you should ask someone if an ergonomic evaluation or some other help is needed. When someone complains of pain or a task it is a good idea to ask if their workstation needs to be looked at. I recommend this even if the pain is initially not alleged to be work related as sometimes personal medical conditions end up getting exacerbated by a work process. So it's a good idea to get ahead of these potential impacts by letting the employee know that you can help if the issue is being impacted by work. A few months after a new work process is established it is a good idea to check with staff and see if the design is working as anticipated. When a worker gets pregnant you should periodically check in with them to make sure they are ok. Very frequently pregnancy induces back pain that can be greatly reduced by readjusting their chair or adding a lumbar pillow for a few weeks. And finally, you should check in with employees who have had significant ergonomic work done to their workstation after 3 to 6 weeks so you can find out if the adjustments worked or further changes are needed.

Before the Ergonomic Evaluation

When you schedule an ergonomic evaluation let the employee know you are coming and that you will be there to look at how they fit in with their workstation. Tell them a few days ahead of time for established employees and ask that they write down any issues they notice so they can discuss them during the evaluation. This can help you zero in on some of the problems more quickly. Also, letting them know ahead of time will ease possible tension they may feel when their boss tells them that they will be meeting.

Performing An Ergonomic Evaluation

When you arrive to perform an ergonomic evaluation you need to evaluate the person, their tasks, and their equipment. I've attached an ergonomic evaluation form that I've used to evaluate these issues (see Appendix D). It is very thorough and if just asked every question on it you won't miss much. That being said, after you do a few of these you will be able to gather this information just by observation much more quickly than asking each question individually. Still it's good to keep the form in front of you as a reminder of what you are looking for if nothing else.

The Person

When you start your ergonomic evaluation you need to find a way to get a clear picture of what the employee is really feeling, capable of and what they need. This can be a difficult proposition for a couple of reasons:

1. Pain thresholds – While one person frequently talks about the pain of what turns out to be a very minor injury another might be feeling severe pain but never mention it. Through your conversations with people you need to learn how to find out if someone is officially reporting a work related injury requiring the filling out of workers compensation paperwork or is just shooting the breeze about the normal ups and downs people feel throughout any given day. It's probably the best practice to just ask them if they are reporting an injury every time you hear them say anything about pain at work but that's not what I've seen in most offices.

2. Workers frequently don't tell their boss the truth. Maybe they keep something secret. Maybe they are shy. Maybe they exaggerate an issues importance. Maybe they are ashamed of something. Maybe they are using this forum to push a different agenda. Or just maybe they just are afraid of saying anything to their boss.

If you feel they are holding something back you should gently probe the issue but do not force the point. Don't threaten the employee but politely state your concern and tell them you just want to make sure that you are not missing anything. If a workers compensation claim arises make sure that the examiner handling the case hears whatever concerns you have so that they can be investigated properly.

Part 1 and 2 of the ergonomic evaluation form asks some pretty personal questions and they need to be handled carefully. I never ask how much someone weighs but it's important information to make sure they have the right size and weight capacity chair. Instead I make a mental guess. I don't have to be accurate to the pound I just need to have an idea that they are under 200 pounds, under 500 pounds, or over 500 pounds. For height, I can usually get guess pretty well. I know my height and when they stand to greet me I just compare. If they are about 4 inches shorter then I can make a good guess. From these two questions you'll have a good idea about what size chair they will need.

In part 2 of the evaluation for we discuss injuries. Now most of the time they don't have any and you get to skip this section. But if they do have an injury this section will help point to problem activities, work impacts, severity of the injury, and time sensitivity of your response. To start I always ask," Is there any injury that affects you at work that you want to tell me about?" They don't have to answer that question or any related question though. Injury information is confidential even if it's affecting them at work. They don't have to tell us and we can't demand to know. Obviously, if they do have one we want to get them the Workers Compensation forms and fill out any paperwork that's required. This isn't a big deal for most staff as they know we're trying to help them and will start talking about what's bothering them on their own. The injury details they can give us will help us try to find out what activities we can change to help them with the problem. I would add that individual state Workers Compensation laws vary and you should ask your Workers Compensation vendor if there are any other requirements regarding injuries and records you should know about.

Their Tasks

In the Part 3 of the form you ask what types of work they do and how long they do each task. I'll ask "About what percentage of the day do you type? 10%? 40%? 80%?" And then I follow this with each category of work. Some staff will want to spend time trying to get the exact amount of time down but, really, we don't care. We'll never get it exactly right and we just want to get a rough idea if a task is fairly minor in their day, takes up a good portion of their day, or takes all day. For tasks someone performs a few minutes a day or even week we'd expect to see very little health impact unless it's very strenuous. And the tasks that take more of their work day to present more stress to someone's body.

With this information we can focus our efforts on the activities that need them the most.

After you get a feel for how they spend their day you'll want to watch them doing these tasks. You need to see how they are interacting with their tools, what their work process is, and if they have any bad habits. For some people they can ignore your presence and you can get a good idea in just a few minutes. For other folks it might take longer for them to forget that someone is staring at them and relax back into their normal habits. Sit back, watch them, take notes, ask questions as they come to mind until you feel like you have a good idea of how they are interacting with their workstation.

You may be tempted as you watch them to jump in and start fixing things but I recommend you hold off with recommendations and adjustments until you really have a good feel for the whole situation. Many times early adjustments sometimes sidetrack the evaluation and other issues can get missed.

Another thing to look for while you watch them are for trigger tasks Trigger tasks place a stress on the body which can contribute to an injury. If you were to inventory the trigger tasks a person performs you can probably tell what is bothering an injured worker.

a. <u>Repetitive Motion Tasks:</u> Tasks that an employee performs over and over again without rest for the affected muscles. Things like:

- Typing
- Loading materials
- Photocopying
- Opening mail
- Filing
- Collating

b. <u>Tasks with Awkward Posture/Positions:</u> Working in stressful, weight baring, or non- neutral body postures. Things like:

- working with bent or flexed wrists
- performing tasks with outstretched arms
- prolonged holding of a single posture or position
- frequent or prolonged extended reaches for materials, especially above the shoulder
- frequent stooping or squatting

c. <u>Forceful Exertions:</u> Work that requires "hard" effort. Things like:

- using small or narrow tool handles that require more force
- lifting, loading or lowering objects
- pulling objects
- pushing objects

d. <u>Contact Stresses:</u> Whenever something touches the body it creates a contact stress. Contact stresses can burn, reduce blood flow, and

compress tissues. The longer the contact the greater the health impact. Things like:

- pressing forearms or wrists against sharp/hard desk edges when typing or writing
- using tools that press into the base of the palm
- using the palm of the hand as a hammer
- sitting down in a chair all day

e. <u>Vibration:</u> Vibration is rapid bouncing of a part of or the whole body. This vibration can cause injury over time. Things like:

<u>Localized</u>	<u>Whole Body</u>
• Hand Tools	• Jackhammers
• Electric tools	• Driving heavy equipment

Training

After you have a good feel for what they are doing and why, how they are feeling, and what you think needs to be done (if anything) it is time to do some training. I give each person a short (less than 5 minutes) class on the Neutral Position. If their current posture differs from the neutral position I will tell them what's different and how that might affect them.

Non-Neutral Position	Possible affect
Chair to high	Legs are pointed down. Lumbar curve tightens. This results in the front of the chair pressing on the bottom of the legs more causing a contact stress there and possible circulation issues with their feet. Also when the legs point down the lower part of your back rotates up tightening up the Lumbar curve. This can cause tightness in the lower back.
Chair to low	Legs point up. Lower part of the back flattens out. May result in back pain.
Looks up, down, or significantly to the side	Muscles in the neck fatigue with resulting pain.
Hands rest on the corner of the desk	Creates a contact stress on the wrist which may result in pain.
Extensive reaching for far away objects	Arms are extended which results in more muscle fatigue in the shoulders and back. This may result in pain.
Hunches over	May change how they interact with all their tools. Physical impact varies with

	the interaction. Ex. Hand not resting on the mouse properly may cause pain in the wrist or forearm.
Arm bends down and then sharply up at the wrist	Muscles in the hands and forearms are in contraction and will fatigue faster which may result in pain.
Shoulders are "shrugging" up to their ears	Muscles in the shoulders are in contraction and will fatigue faster which may result in pain.

If they aren't feeling any of these effects from a non-neutral posture then great. Then this training serves to warn them of what they might feel in the future if they continue and if they do that they need to come tell you. If they do feel one of these issues and didn't mention it this is often the time where an issue comes up. You might hear "yeah, I do feel that."

Train them on task breaks. Show them how to set up recurring appointments in their computer's calendar or discuss other methods for setting up reminders (bring in a timer, an hour glass, drink lots of water so you have to go the bathroom frequently, whatever works for that person).

I hold off on giving them training on their equipment until I discuss my recommendations so I can link the training to actually making the change. This tends to make the training sink in better.

Recommendations

As you think through the problems and how to fix them there are several things to keep in mind. First, always try to fix the problem. Avoid enabling a bad process as you may run into unintended compromises which will just bring you back to fix the original problem. A bad chair needs to be replaced. Adding lumbar pads or putting pillows on the seat pan will only lead to continued problems.

A framework to consider for addressing these problems is Engineering Controls, Administrative Controls, and finally Personal Protective Equipment.

a. **Engineering Controls** are permanent physical fixes. These are the best controls as they remove or reduce the problem permanently. Things like:
   - redesigning or rearranging the workstation layout.
   - providing fully adjustable equipment where necessary (e.g., chairs, work tables).
   - providing ergonomic computer accessory equipment (e.g., footrests, keyboard trays, wrist rests, headsets, slantboards, task lights, copy holders, anti-glare screens, fatigue mats).

- using smaller, lighter-weight containers.
- providing handles or slotted hand holes in boxes.
- redesigning tool, equipment or vehicles.
- using tilted work surfaces.
- using mechanical assist devices (e.g, hand carts, dollies, lift tables, hoists, forklifts).

b. **Administrative Controls** use management policies or work practices to prevent or control the hazard. These are not as good as engineering controls as there is a greater human factor. Things like:
- rotating workers through several jobs with different physical demands.
- changing the work schedule.
- adjusting the work pace.
- training employees on ergonomics.
- allowing more task breaks to allow more rest.

c. **Personal Protective Equipment** are the wearable barriers that protect people from a hazard. Things like:
- anti-vibration gloves
- knee pads

Note 1: Wrist braces/splints are medical treatments for injuries which must be prescribed by a licensed physician and are not considered personal protective equipment.

Note 2: Back belts are sold as Personal Protective Equipment but studies have shown their real world use does not actually reduce injuries. Because of this we do not recommend these as personal protective equipment.

As an example, if an employee has a sore neck that bothers them when they try to read from documents placed flat on the desk we could make them feel somewhat better just by telling them to take more task breaks. If they take enough time away from that task they might even get better. But we could completely resolve the issue just by buying the appropriate document holder.

As you detail your recommendations the training you have already given should now serve to explain your recommendations. They should now know why you think they are sitting too high and then you can show them how to adjust their chair to correct that problem.

Your recommendations may just involve adjustment of their equipment or you may also need to get them new equipment. Even without the new equipment always try to fix as much as you can while you are there. If the monitor needs to be moved, take the initiative and move it. You're time is valuable and the fewer

trips you have to make the more of it you will have. Also let them know that the fine tuning of adjustments is for them to perform. They can always ask you questions or for an opinion but there is no way you will be able to tell them what is most comfortable for them. Set them up close to the neutral position and they can slowly adjust their equipment over several days to fine tune it for them.

Before leaving them ask them what they think of your recommendations and plan. Listen to any ideas or alternatives they have since they are the ones doing the work and probably have a good idea of what needs to be done. Once you have them agreeing with you all you have left are the equipment issues and those are the easiest to fix.

But That Doesn't Look Right

Now you may come up with a lot of recommendations. A given person may have a very odd posture. But if they don't have an injury or any discomfort I won't force them to change. I'll demonstrate the change (which often they will find is more comfortable and adopt), train them on the risks they may be running, and tell them to notify me if they notice a problem. But, if a person has spent the last 10 years doing something and has no problem they are doing just fine. They've found something that works for them and I'm not going to mess with success. Plus, if you try to force someone into something they don't want to do when they aren't having any problems the odds are that in a few moments after you leave they'll put things back where they used to be and bicker about you behind your back.

> **Real World Example 7:** I've run into people who sit in all sorts of fashions. Some sit with their legs criss-crossed on their chair. Some sit on both or just one leg. Some folks put their legs up on boxes. If a leg can bend that way someone is sitting that way. When you see these hold the chuckles in. For most folks all of these postures would immediately cause real discomfort but for this one person it works for them and that's ok. As long as they know the risks and know how to fix the problem after you've done your evaluation they will probably be fine.

Think outside the box

If you have an odd problem consult with another ergonomic vendor, an equipment vendor or ask a supervisor more familiar with the task and see if there is another way to do the task that gets rid of the problem.

Real World Example: I went to do an evaluation for an office that handled lots of paperwork. They typed from it, they wrote on it, and reviewed it. The employees complained that individual case folders could weigh over 5 pounds and they were having difficulty using them. Part of the problem was that the folders they bought were set up for paper to be two holed punched at the top. This means that the paper would be flipped up and over like on a clipboard. With such thick folders the paper would not stay opened up as it would just fall back down. The employees had to hold the pages up the entire time they were working from a given page. No document holder was going to solve this problem. Two solutions seemed fairly obvious. First, break up heavy folders. When a folder became too cumbersome or thick it would be split in to two. Second, to change all future folders to be a book style (three holed punched on the side).

Follow up and Follow Through

Once you have gone over your plan of action with the employee you need to follow through with it. If you are buying the equipment then get it as soon as possible. If you tell someone else to buy it then ask them how long it will take to get it. Determine who is going to install the new equipment and what their timeline will be. After you know all this tell the employee. Also check in with the employee a few times over the next few weeks to see if the new equipment is satisfactory and the adjustments are working.

Your persistence will build team moral, set a level of performance and expectation, and hopefully solve the problems. But if the plan isn't executed the opposite can occur. Employees may think that it's pointless to report issues as they don't get resolved. Or that all of this training and effort was just another program and quickly forget it.

If you hold team meetings once a year bring up ergonomics and do a mini-training session to keep the topic in their minds. Maybe even assign individual employees to do the training or use videos to keep the topic fresh. Ergonomics shouldn't take all your time but if you want this problem kept in check it will need to take some amount of time.

The catch of course is that spending this money up front to prevent large expenditures later is still spending money. In big businesses this can be a pain to get approved and in small businesses even a small expenditure can be a big deal.

And to add to the issue of spending money there's the issue of spending time away from your normal full time work duties. Most supervisors and business owners have a full plate already. The last thing they need is another set of things to do. Now I can explain how long it takes to fill out Workers Compensation paperwork (15 minutes to several hours depending on your familiarity with the process and the injury), how much time you'll have to spend trying to cover for an employee that is on restricted duty for a month, and the time you'll still have to spend to perform the same ergonomic evaluation after they get hurt. I can show how the few minutes spent at the beginning will prevent the injury from occurring, train them on their duties, build employee moral, and help build a good relationship between you and your staff. But in the end, it's you that has to find that 20 minutes to do the evaluation.

The only other bit of encouragement I can offer is this is one of the few times in your day where you can make a real difference. You can make someone happier and healthier. It's a bit of kindness that can make their day and your own. But it will take your time and maybe some money.

Appendix A

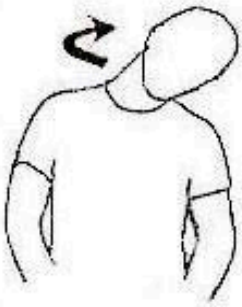
Stretching and Your Health

Now let me remind you, don't just start a giant stretching routine. Start out with little stretches and over time increase your range of motion. I've known lots of people who have decided that it's time to get into better shape. For some of them they go into their new routine too fast and too hard. They get an injury, have to ease up and sometimes don't return to their goal of getting in better shape. So remember, you HAVE THE REST OF YOUR LIFE to make any changes to your body and lifestyle you want. No matter what it won't happen overnight anyway. Take your time, grow slowly, change slowly, and you will have a lifetime of good health ahead of you.

Now before you start a new stretching program you need to think about your body and what level of stretching you are ready for. If you aren't sure, ask your doctor if they think your proposed routine is too aggressive for you at the moment.

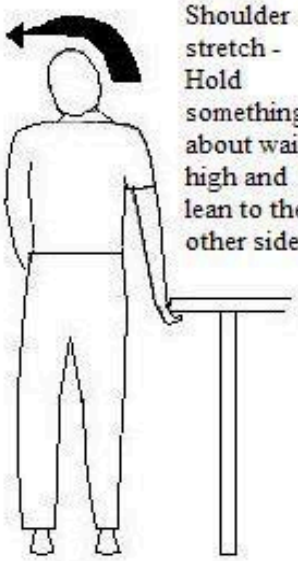
Now here are some stretches that can help take the stress out of tired, compressed muscles. This is a limited list. If you have a specific area that needs to be stretched that is not included on this list ask your doctor or a physical trainer for some advice.

Head rolls - 3 - 5 in each direction

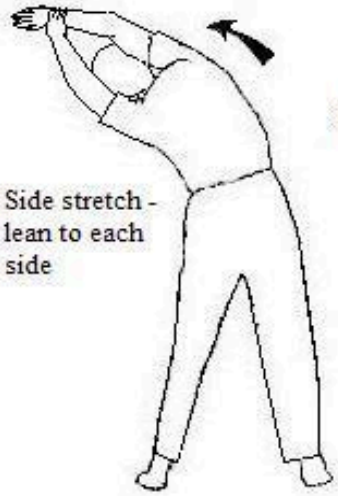


Shoulder rolls - about 10 in each direction

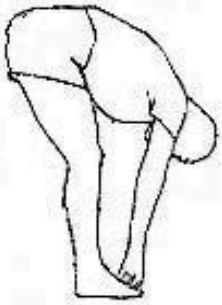
Shoulder stretch - Hold something about waist high and lean to the other side



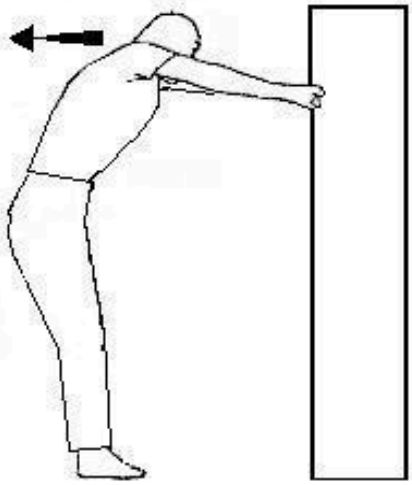
Side stretch - lean to each side



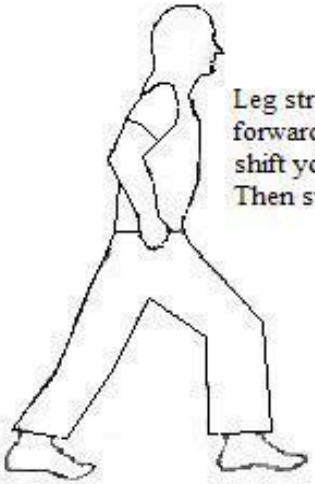
Back/Leg Stretch - reach to your toes



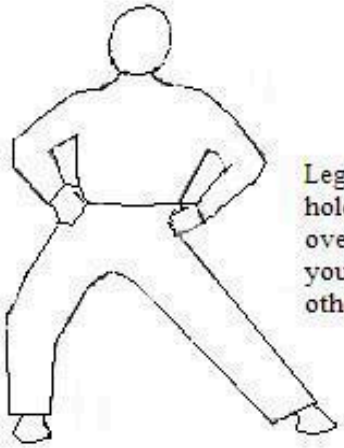
Back stretch - grab something with both hands and just lean back



Leg stretch - One foot forward, one foot back, shift your weight forward. Then switch legs.



Leg Stretch - feet far apart, hold, shift your weight over one foot, hold, shift your weight over the other foot, hold



Appendix A

Neutral Position/Workstation Layout Cheat Sheet

The Workstation Cheat Sheet

Proper posture is the key to good ergonomics. The best position to be in while using the computer is one where the body has the least stress and the most strength -- this is called the "neutral" position.

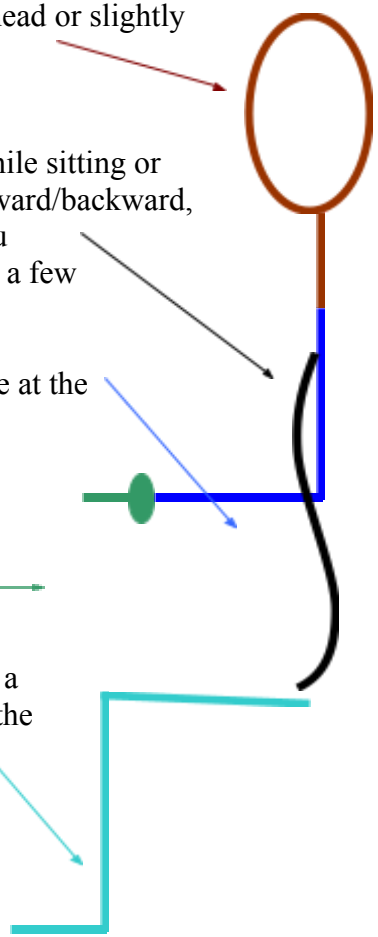
Neck/Head – Relaxed, looking straight ahead or slightly down.

Back/Trunk – Maintain natural curves while sitting or standing, if you are hunching, leaning forward/backward, or twisting over you're body is telling you it's time for a task break. Switch tasks for a few minutes. Stretch if possible.

Arms – Relaxed at the sides, at a 90º angle at the elbows; elbows close to the body.

Hands/Wrists – Straight or flat, **NOT ANGLED UP or DOWN** substantially at the wrist.

Lower Body – Feet flat on the floor or on a footrest, at 90º with enough space behind the knees so that the chair doesn't rub the back of your calves. Thighs parallel to floor.



Tips

1. Adjust your workstation props. Learn how to adjust your chair, keyboard tray, and anything else you use. **MAKE IT FIT YOU.**
2. Arrange the items you use the most within an arms reach and generally in front of you.
3. Use keyboard shortcuts to spread the workload between both hands and enhance efficiency.
4. Bifocal wearers make sure that your head is not "looking" up. Your head should be flat and level or looking slightly down.
5. Take frequent task breaks. Vary your activities throughout the day (for example if you have to type, break up the typing over the entire day instead of all at once.
6. If you need a piece of equipment (phone headset, copy stand, etc.) tell your supervisor.
7. Center yourself on your workstation. A straight line should run from your chair, to you, to the keyboard/mouse, and then to your monitor.

Appendix C

LIFTING & CARRYING

Back injuries are easily preventable if the proper approach is taken to lifting.

Before you lift:

1. Before lifting, test the weight. Try to lift one corner of the object. If it feels heavier than you are comfortable with, do not lift it. If it is to large to get a good grip don't lift it.

2. Next consider the distance and path you need to take. If it is a long path, has stairs or requires the opening of doors then a manageable weight will become heavier due to the extra time you will spend carrying it. If you have to change your grip to continue carrying the item as you walk, it is too heavy.

If either of these conditions exist then:

a. Break up the lode into manageable groups and take them individually.
b. Get a cart or dolly to move the load.
c. Get help to move the object.

How to Lift:

1. Stand as close to the weight as you can.
2. Bend your knees and not just your back.
3. Stare at the sky/ceiling.
4. Lift by straightening your knees to the upright position.

You should be able to comfortably hold the item at waste level.

Carrying:

1. Keep the load close to your body at all times.
2. Maintain an even pace.
3. Be sure you can see around the load.
4. Take a rest if you need to.
5. Do not be afraid to call for assistance mid-way through the job. Set the load down and wait for assistance to continue if necessary.

Preventing Back injury:

1. A strong back helps to minimize risk of back injury.
2. Get regular exercise in order to keep your back strong.
3. If you have a back injury, do not risk further injury by testing your limits.

If you experience back, neck or shoulder pain when lifting, immediately put down the load.

Appendix D

Ergonomic Evaluation Form

Part 1: Employee Information *DATE* _____

Name	Dept	Job Title
Hand Dominance: ☐ Right ☐ Left Height: _____ ft. _____ in.	Weight Range: ☐ under 250 lbs. ☐ 250-300 lbs. ☐ over 300 lbs.	Supervisor: Phone:

Part 2: Personal and Injury History

✔ *Check each item or write N/A if not applicable*		**Yes/No**	**Comments or Recommendations**
Medical History (If yes to injury- fill out rest of section)	Do you have any current injuries? Do you believe them to be work-related to this job? Have you filed a Workers' Comp claim with this employer? Do you have any previous history of these injuries? Are you aware of any other contributing factors to your injuries? Were these previous injuries due to work-related events? Have you recently changed workstations? Has your workstation changed in anyway or has new equipment been added? Do you have any off-work activities? After work, with rest, do you still feel discomfort? Do you feel better on weekends with rest? Has the discomfort limited any non-occupational activities? Has the discomfort limited any of your work activities?	☐ ☐	
Injury History	If you are feeling discomfort, where is it located? What movements specifically cause discomfort? When did you notice the injury? What event caused the initial onset of your condition? What has your physician diagnosed as the cause? What treatments have been prescribed for the injury? Does this treatment affect your work tasks? When is your next scheduled visit with your physician?	***COMMENTS***	

Part 3: Job Tasks

Sitting: _____% Standing: _____%	Computer Use: _____% Phone Use: _____% Writing: _____% Reading: _____%
Walking: _____%	Copying, Sorting, Filing: _____% Other: _____%

Part 4: Workstation Equipment

✔ *Check each item or write N/A if not applicable*		Yes/No	Comments or Recommendations
Work Surface Area	Height Adjustable? Adequate Height & Space for Reading/Writing Tasks? Minimal Reaching Above Shoulder Level? Commonly Used Items in Close Proximity? Adequate Space for Easy Access to Binders, Files, etc.? Calculator & Other Equipment Arranged for Neutral Postures?	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
Chair/Stool	Swivel Seat and 5-Point Base with Casters? Seat Height Adjustable 16”-21”? Seat Height Allows for Approximate 90° Bend at Knees/Hips? Adequate Leg/Foot Clearance? Feet Flat on Floor or Supported When Seated? Backrest Height Set to Provide Lumbar Support Adjustable Backrest Tilt 10°-15°? Backrest & Seat Supportive and Fits Properly? Armrest Height Allows for Approximate 90° Bend at Elbows? Armrests Set at Adequate Width Apart? Forearms Parallel to Floor?	☐ ☐	
Monitor	Centered to User? Top of Screen at or Slightly Below Eye Level? Does Employee Wear Bifocals? If Yes, Lower Monitor Position. Viewing Distance 18”-30”? Adjustable Swivel/Tilt?	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
Keyboard	Centered to User?		

	Adjustable Keyboard (Height/Slope)? Forearms/Wrists Parallel w/Floor When Seated? Elbows Close to Body & Bent at 90°? Wrist Rest Used?	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
Mouse	If Used: Placed Level/Adjacent to Keyboard? Mouse Tray Required?	☐ ☐ ☐ ☐	
Copy Holder	If Used: Located at Eye Level? Adjustable Height, Distance & Angle Adequate Space to Position?	☐ ☐ ☐ ☐ ☐ ☐	
Phone	Within Easy Reach? Neutral Neck Posture Maintained? Headset Used?	☐ ☐ ☐ ☐ ☐ ☐	

Lighting	Adequate Lighting Provided (20-50 Foot Candles)? Glare on Screen? If Yes, source: _____ Clean Screen? Adjustable Task Light(s) Used?	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	
Equipment Noise	Noise Level Makes it Difficult to Carry on Conversation? If Yes, source: _____	☐ ☐	

Part 5: Additional Comments/Recommendations ✔ *Check all applicable items*

Workstation Adjustments	***Description of Proposed Changes***

☐ Rearrange Furniture/Equipment
☐ Adjust Chair for Neutral Posture
☐Lower ☐Raise Work Surface
☐Lower ☐Raise Monitor
☐ Center Monitor to User
☐ Reposition Monitor to Reduce Glare
☐Lower ☐Raise Keyboard
☐ Center Keyboard to User
☐ Adjust Keyboard Angle
☐ Reposition Mouse/Phone/Calculator/Binders/Files
☐ Use Tilted Work Surface
☐ Other

Equipment/Ergonomic Accessories	***Description of Proposed Changes***

☐ Anti-Glare Screen
☐ Back Cushion/Support
☐ Chair
☐ Copyholder
☐ Footrest
☐ Keyboard Tray/Drawer
☐ Monitor Riser/Stand
☐ Mouse Tray
☐ Mouse
☐ Headset/Phone Cradle
☐ Slantboard/Tilted Work Surface
☐ Task Light
☐ Wristrest
☐ Writing Grips
☐ Keyboard
☐ Desk
☐ Other

Work Process Changes	***Description of Proposed Changes***

☐ Alter Work Methods (Work in "Neutral")
☐ Encourage Frequent Posture Changes/Rest Pauses
☐ Provide Training/Instruction
☐ Other

Comments: _____

Evaluated by:_____ **Date** _____