WORKING WITH COMPUTERS

A BRIEF INTRODUCTION TO THE ERGONOMIC ISSUES

WORKING SPACE

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We provide ergonomic furniture solutions which minimise the postural strain associated with sitting to work. This may involve an individual client working in a home office or multiple users in an orthodox office space.

We offer outstanding chairs and adjustable workstation furniture and we guide our clients in getting the best from them.

This document provides a guide to the ergonomic issues which affect us all when we use computers. It is based on extensive experience of working with people to minimise postural strain.

We don't deal here with specific solutions. For information about our work chairs and adjustable workstation furniture, or our consultancy and training services, please contact us.

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INTRODUCTION

Our intention here is to provide a brief introduction to the ergonomic issues which affect those of us who use computers in our work. Ergonomics is really a matter of common sense – unfortunately it's an aspect of common sense which we are effectively taught to ignore.

Having the right tools – work chairs, adjustable work tables – is important. So is awareness: we can't change habit without understanding it and having some idea of how to use the body naturally and efficiently.

These notes are worth careful attention: your body and your wellbeing deserve care.

SUMMARY

- Your body wasn't designed for long periods of seated work.
- Your body is designed to function through balance and easy, natural, coordination.
- To achieve balance and ease when sitting to work at a computer, you need a proper work chair (there are relatively few that even come close to justifying that description) and to use it with reasonable awareness.
- To support and maintain that balance and avoid postural distortions which will damage your body, you need keyboard and screen heights which are appropriate for your height and proportions.
- Standard desk height works very well for a Standard Human Being.
- Laptop computers present a particular ergonomic problem and their use requires special care.
- The keyboard and pointing device you choose can reduce strain, or increase it.
- Movement and variety are important. Your chair should allow you to sit back to think or converse and then to return easily to an active sitting balance. Don't get stuck.
- The ideal workstation is one which not only allows you to adjust your working height quickly and easily, but also allows you to move between sitting and standing positions.

HABIT

We human beings find it quite easy to function from habit. By the time we emerge from the education system, most of us have spent many thousands of hours sitting badly. We sit too much; we use classroom furniture which actually encourages us to use our bodies inefficiently; we are effectively taught to ignore our natural postural awareness and coordination.

And so to work

Because we have been taught to stop listening to our bodies, we tend not to question the physical context in which we work. We sit down and get on with it. We ignore our physical experience until pain reminds us that we have a body.

We don't notice that we are often more tired than necessary.

Let's explore what is involved in giving ourselves the space to be creative.

THE ESSENCE

Most people experience sitting to work as uncomfortable, tiring or even painful. Think about driving from London to Birmingham at a fairly high average speed but in low gear – you'll get there, but you'll use a lot more energy than necessary and you'll subject the car to a lot of unnecessary strain and shorten its useful life. That's what we do with our own body – we use far more effort than necessary and waste our energy.

Using the body efficiently, minimising postural strain, is largely a matter of balance and space. It is important to understand that "posture" is *process* rather than *position* – it isn't holding the body in a fixed place or shape, but allowing a natural, dynamic and flowing balance.

We acquire patterns of fixing through habit, and also because we often misunderstand the subtlety of natural body use. We often hear "sit up straight"; "pull your shoulders back";"lift your chest"; "pull your low back in" – none of which is at all helpful.

Using conscious effort to achieve a different position merely introduces further layers of unhelpful tension. If we want to achieve real ease in using the body, we must let go of fixing and effort and instead allow our natural balances to operate.

THE PROBLEM OF CHAIR DESIGN

Sitting to work demands an active sitting posture but a typical work chair makes this difficult to achieve – it is designed on the assumption that we will sit passively and so makes it very difficult to do anything else.

A proper work chair allows us to adjust its height so that our legs are correctly supported on the ground. It allows us to adjust the seat *angle* into a forward slope, which creates a more natural angle at the hip joint and allows the trunk to balance naturally.

Note: the chair's seat angle adjustment should pivot at the front of the seat rather than the centre.

The backrest is now used for occasional changes of position, and when we want to sit back more passively to think or converse.

In order to maintain this natural sitting balance, we must now position keyboard and screen correctly.

Achieving balance in sitting

Children often tip their chair forward in order to achieve a comfortable relationship with their work. This demonstrates awareness and natural coordination.

Adults may complain that this is dangerous and may damage the chair, but the point is that the chair should make it possible to achieve this balanced position with ease and stability.

KEYBOARD AND SCREEN POSITION

The keyboard height must permit a natural and relaxed position for the arms. With shoulders relaxed, forearms more or less horizontal, and our hands in a comfortable keying position, the position of the fingers will define our keyboard height.

There is no "Standard Person" so the concept of a standard workstation height is absurd. A computer workstation should provide height adjustment so that the keyboard can be positioned correctly.

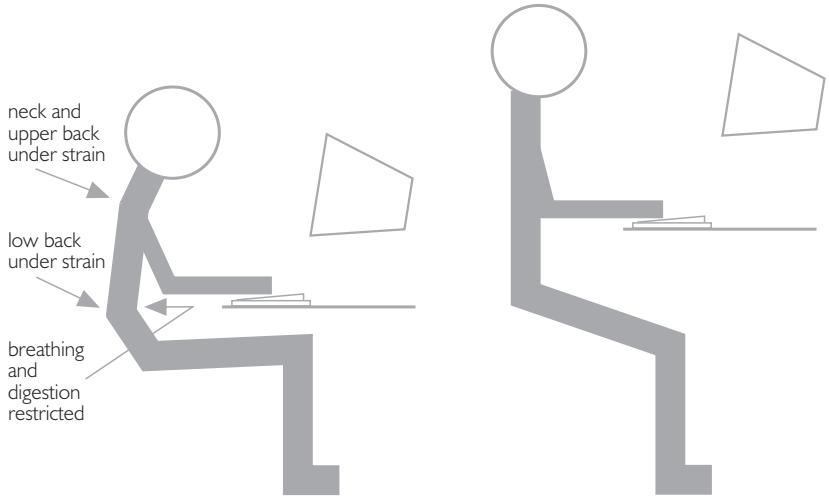
The monitor height and angle must allow the head to balance naturally on the spine, so that the neck and shoulders can be released. With the head in a comfortable and efficient position, the top line of text on the screen should be level with our eyeline. Note that the eyeline is a *descending* line: it gets lower as the distance from the eye increases. If your experience is different you're probably pulling your head back, which interferes with balance and greatly increases overall strain.

Not all computer monitors provide adequate adjustment of height and angle. It is sometimes possible to improvise correct monitor height and adjustable monitor stands and arms are available. If a flat panel monitor doesn't provide sufficient adjustability, check whether it has a VESA-compatible bracket which will allow it to be mounted on a VESA-compatible adjustable arm or stand.

THE TYPICAL AND THE IDEAL

The diagram on this page illustrates typical and ideal sitting positions for computer-based work.

The typical sitting posture involves a distortion of natural balance and a significantly greater load on the spine. The ideal posture uses balance and natural support mechanisms, minimising effort and allowing the hands and arms to work freely.



TYPICAL IDEAL

The typical sitting posture results from a standard backward-sloping seat angle and unsuitable keyboard height, screen height and angle. The ideal sitting balance is achieved with correct seat height and forward-sloping seat angle (+10 degrees), correct keyboard height, screen height and angle

KEYBOARD, SCREEN, MOUSE

Keyboard design
The QWERTY layout was designed to reduce typing speed in order to prevent jamming in the early days of manual typewriters. It's probably time to change it for something more logical and it would make sense to start with our children in school, to break the circle of habit which keeps this layout in place.

You've probably seen an "ergonomic" keyboard and the design of at least most of them is based on the way the hands and arms work naturally. They avoid the twisting and distortion created by those parallel rows of keys. This isn't the place for a detailed discussion of this issue, but traditional keyboard design is an important factor in the development of strain-related injuries to the hands, arms and neck.

The mouse trap
The pointing device you use can make a huge difference to the tension in your hand and arm. Its size, shape and surface finish should allow you to move and control it with minimum effort. Take a moment to experiment with the way you use your hand and arm – can you use less effort in holding the mouse, can you release your shoulder and arm?

A trackball device can reduce strain. It allows the arm to be used closer to the body than is possible with a mouse and one can choose a design which doesn't have to be held.

Align keyboard, screen and body
The true functional centre of your keyboard is the space between the *G* and *H* keys. Align this point with the horizontal centre of your monitor. Your feet, hips, shoulders, hands, keyboard and screen should be parallel.

LIGHTING, TELEPHONE

Natural light

The ideal position for a window is at ninety degrees to the monitor. A window directly behind the monitor presents significant problems for the eye. A window behind the computer user tends to create reflection problems.

Artificial light

Light sources should be positioned to avoid reflection problems. The standard advice is that a mixture of uplighting and task lighting is the best solution. The uplighting provides general illumination without reflections; the task light beam should be asymmetrical, so that it illuminates keyboard and immediate work area without affecting the screen.

Telephone

Holding the telephone while using a keyboard doesn't work. One inevitably resorts to holding the handset between head and shoulder. A headset will allow you to use both hands without distorting your upper body.

LAPTOP COMPUTERS — A PARTICULAR PROBLEM

It will now be obvious that keyboard and screen heights must be adjusted independently, according to the height and proportions of the user. A laptop computer's screen and keyboard positions don't work for anything more than occasional use.

If we add a separate keyboard and mouse and position the computer so that the screen height and angle are appropriate, we can avoid unnecessary strain. We can go further and use a separate monitor, but a separate keyboard and mouse should still be used in preference to the laptop's own keyboard and pointing device.

Don't underestimate the importance of this point. Laptop computers offer a number of advantages but they aren't designed to provide for our postural needs.

This image illustrates the use of an adjustable stand designed to support laptop computers.

It is used with permission from Lapvantage(www.lapvantage.com). Please note that the sitting height and angle illustrated are not ideal, and the keyboard is a little too high.

WORKSTATION DESIGN, ADJUSTABILITY

Size and shape
Workstations can have simple rectangular worksurfaces, or more complicated shapes. Your workstation must provide appropriate height and enough space for your needs.

Different tasks, different heights
Keyboard and paperwork tasks require significantly different worksurface heights. Changing your keyboard may mean adjusting your workstation height.

Adjustability
There are three types of height-adjustable workstation: simple adjustment; variable adjustment and sit-stand adjustment.

Simple height adjustment
This provides for adjustment to suit one user for one task. It is not suitable for shared workstations or for a single user who needs to change heights frequently for different tasks.

Variable height adjustment
This is usually operated via a crank handle. It provides for frequent changes of height and is suitable for shared workstation use or for a single user who wishes to use one workstation for both keyboard and paperwork tasks.

Sit-stand workstations
These provide for frequent changes of position between sitting and standing positions. There are mechanical and electric adjustment systems. Sit-stand workstations provide the ultimate in flexibility and convenience. Their use is well established in Denmark and other Scandinavian countries. The ability to move between sitting and standing positions at will is extremely beneficial in reducing postural strain.

Sit-stand working is an important subject in its own right. Our Sit-Stand Working website <www.sit-stand-working.co.uk> provides an introduction.

MOVEMENT

Your body thrives on movement: don't get stuck. Get out of your chair when you can.

Organise your routines to create the opportunity for movement.

Do some relaxed arm stretches to counteract the effects of using a keyboard.

The ultimate work table: an elegant and practical work table with sit-stand adjustment

CREATING CHANGE

You've probably understood by now that the physical context in which you work is important and that the chair and workstation furniture you choose can make a huge difference to your wellbeing. With luck, you have also understood the importance of your own awareness.

There are limits to how much we can communicate of this subject via the written word. There is no substitute for the physical experience of using a good work chair well at a workstation which has been adjusted to the correct height.

Most of our work involves the creation of effective solutions for people who want change. If you want help with creating change please contact us.

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Working Space & Alternative Sitting The Wellbeing Centre Splash Lane Huntingdon PE28 2AF