We have the technology!

Whether you need specialised hardware or would just like to get the best out of standard equipment, everyone with an upper limb deficiency needs to pay special attention to the way they use computers. Liz Bleach explains

For many people, the first indication of a problem with their computer keyboard is when they experience Repetitive Strain Injury (RSI). This is difficult to treat, can be very painful and is caused by performing a task repetitively in an unnatural position.

Treatment of RSI is largely dependant on resting the affected limb, so if you have a limb deficiency and are unable to rest (ie. you don't have a spare hand) RSI poses a significant problem. To avoid any instances of RSI it is very important to ensure that you learn to type correctly, have your equipment arranged properly and sit in the correct position in a supportive chair.

The QWERTY keyboard layout was designed to prevent the hammers of old fashioned typewriters from jamming up when typing at speed. It was very effective for that purpose but has no bearing whatsoever on a modern electronic keyboard. It has become the standard on most computers because users are familiar with it and are unaware of the many alternatives.

When you stop to think, it makes very little sense that although it is not a good system, people make do because it's easier than learning a new keyboard layout. However, if you have an upper limb deficiency you need to take good care of your hand(s), so you have a very good reason to look for some alternatives.

Typing techniques for one hand

Those learning to type for the first time may do well with Dvorak. This (two-handed) system was invented in 1936 by August Dvorak, a professor of statistics at the University of Washington. This design places the most frequently used keys on the home row, and makes the strongest fingers do the most work. Although invented to prevent RSI for two-handed typists, it is also available in a single-hand version, either for the left or right hand.

If you would like to try the Dvorak layout then you will be pleased to learn that not only is it free, but it is already installed on most computers (look in the control panel options). If you need more help then visit www.mwbrooks.com/dvorak.

There are two other techniques for touch-typing on a standard keyboard. Both use QWERTY key positions but are adapted for users with one hand. *Five Finger Typist* is a typing tutor which recommends positioning the hand in the centre of the keyboard so the home keys are FGHJ. More information on this tuition software is available from Inclusive Technology and you can even try before you buy, download a free demonstration from http://members.ozemail.com.au/~softdawn. The advantage of learning to touch type in this way is that your skills are 100% portable and mainstream. You do not need to make any adjustments at all to either hardware or software.

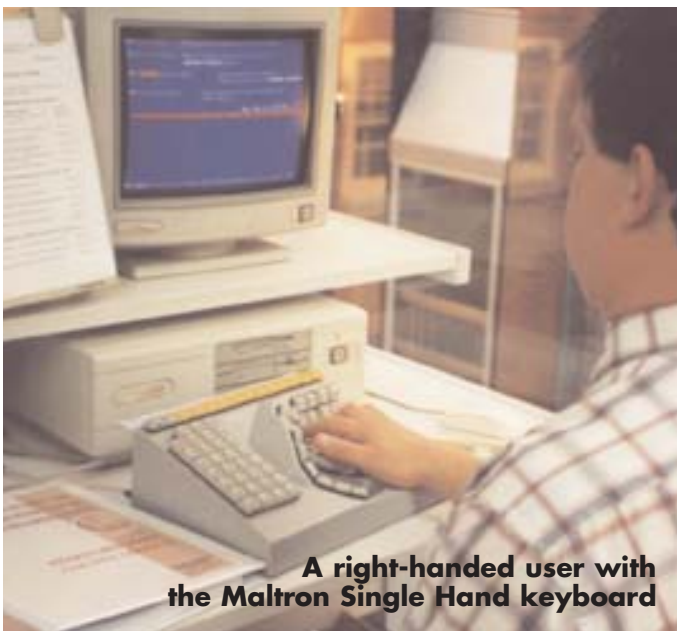
Lilly Walters set up a website for one-handed typists and suggests a similar approach for positioning the hand on a QWERTY keyboard. She has written her own typing tutor and gives excellent practical advice on setting up a workstation. I highly recommend www.aboutonehandtyping.com which has a wealth of practical information on typing with one hand, a free trial of her typing tutor, plus many useful links.

If you have lost a hand but have touch typed previously (two-handed) on a QWERTY keyboard then the ideal solution could be the half-QWERTY. This software splits your keyboard into two virtual halves, with the spacebar acting as a modifier key to access the letters on the missing half, making it ideal for anyone who was previously highly skilled on full QWERTY and is trying to adapt. Apparently you will be able to touch-type again in minutes. If you like this software package you could go a step further as there is a new half-QWERTY keyboard available (see above left) but this is currently only available for the left hand.

Keyboards

The majority of input devices (a keyboard, trackball, mouse or joystick) described in this article are compatible with a switch system which means you can have a standard keyboard (for the rest of the family or for work colleagues) connected to the computer even when not in use and switch when you want to change over. No need to re-boot! The Y-Key allows two keyboards to be connected simultaneously and can even be daisy-chained to allow more than two. The Co-Pilot Adaptor can allow connection to two keyboards to be used simultaneously, aiding teaching.

If you have one hand for typing perhaps the most obvious solution in terms of hardware is a one-handed keyboard. These are either



A right-handed user with the Maltron Single Hand keyboard

for right or left-handed use in two main formats. The Maltron keyboard (available from PCD Maltron) has the letter keys arranged in such a way as to fall easily under the hand (main picture page 1). The keys are banked either to the right or left thus minimising hand movement.

The other type of keyboard is a chord keypad. This has only a few keys which the user presses in combinations to generate each letter. This means that the fingers don't need to leave the keypads at all and puts minimal stress on the hand. Two examples of this type of keyboard are the BAT Chord Keyboard from KCS and the CyKey from Bellaire Electronics (for PCs) which uses 'mnemonic Microwriting'. This is a set of key combinations that are easy to learn and remember as they correspond to the shapes of letters. The CyKey is designed to have the standard keyboard attached to it, and should be thought of as an additional input device rather than a replacement for a keyboard.

The main drawback in using special items of equipment like these is that it can be awkward if you work in more than one location (for example school and home), in terms of transferring the keyboard. You can't always plug your keyboard into any computer and expect it to work. However, the CyKey is very lightweight and compact, and the input is via an infrared device (ie. cordless) attached to the computer. This receiver is left in place but in no way interferes with other users and has no resident software.So, by having a receiver on your home computer and one at school or work, you can take your CyKey with you very easily.

If you use a computer at home then it is worth learning to use a one-handed keyboard so that most of the time you can be typing with the optimum comfort and avoiding unnecessary stress on your hand. If you are transferring your input device, arrange with your teacher that you always use the same computer at school and ask your them to load any necessary software in advance (adults, ditto for your company's network manager).

For those typing with two hands but less than the standard issue of digits (or with one hand) a compact keyboard is a good option. This reduces the area that your hand has to cover and so minimises hand movement, but still has the old fashioned QWERTY layout (some people just can't let go). The key sizes are usually the same as on standard keyboards but the space between them is reduced and function keys are positioned differently. Compact keyboards also fit between the arms of a wheelchair, and if this is a consideration then think about a cordless keyboard which gives maximum flexibility of position.

There are special keyboards for young children now available, for example the Little Tykes keyboard (below). These (as you might expect) have compact key layouts but may have a shorter lifespan in terms of appeal (ie. children won't want a 'kiddie's keyboard' for very long).

Some compact keyboards have an integral trackball, such as the Little Fingers keyboard by Datadesk (left). This may be a problem if you are using one hand only and the trackball is on the wrong side. However, consider that if you are using one hand only, the keyboard should be positioned in front of that hand (ie. to one side of you) and not centrally in front of your body as it would be for a two-handed typist.

If you use the number pad of your keyboard a lot, consider using a separate one which can be positioned to the left or right side, or left off when not required, this means that the mouse/trackball can be nearer the keyboard.

If you wish to operate a computer without using hands or arms at all, the options are to use feet, a mouth or headstick pointer, or a combination of the two. Foot typists may benefit from an expanded keyboard which has enlarged keys, such as the PC King available from Cambridge Adaptive Communications or QED. Alternatively you could try Intellikeys, a flat keyboard which is pressure sensitive. It comes with a number of overlays which define the action of areas on the surface of the board or you can even design your own to suit your needs. This is available from KCS, ECS, and Inclusive Technology. Keyboards for head or mouthstick pointers are available from PCD Maltron.

There are still more ways you can use a computer without using a keyboard at all! By using an on-screen emulated keyboard an operator can input ideas and text using as little as a single switch operated by a mouth puffer. **If you have highly specialised needs it is vital that you contact AbilityNet who can advise you further. The computer is not 'out of reach' to anyone.**

The mouse: it's upside down!

A far more logical idea is the trackball, (eg. the Expert Mouse Trackball by Kensington, pictured right) where you move the rubber ball directly instead of sliding a lump of plastic around on top of it (turn your mouse over and you'll see what I mean). Trackballs can be operated with an arm, palm, fist or foot and are widely available from most computer retailers. A good tip from Lilly Walters for those who are using one hand to type and the other arm to work the trackball, is to position it on a cushion in your lap. This puts your arm in a very relaxed position and will help prevent tension. If you have a wireless trackball you can position it anywhere you want (eg. on the floor for foot use), so experiment and find the most comfortable position for you, don't let convention dictate!

Another useful addition to your equipment may be the Triple-Action Programmable footswitch from Kinesis. This can be used with any keyboard and can be purchased is a USB or PS/2 version. Basically, you can program the footswitch to perform keyboard functions, for example in place of the tab or shift key or any key

that is difficult to reach. You can also program the footswitch to do mouse clicks, using a program called ClikWare included with the Footswitch. Using the Contour keyboard by Kinesis, in combination with a footswitch, you can use one half of the keyboard to access all the keys. The footswitch operates a kind of shift mechanism to access the keys on the 'missing' side

Changes you can make to your mouse that will cost you nothing. There are things you can adjust on your mouse (in Windows, look in the control panel). For example you can change the rate of acceleration, force it to move only vertically and horizontally, or swap the buttons over for left-handed use. Drag lock is available on many pointing devices (mouse or trackball) which means that instead of moving the mouse while holding down the button, you can click on what you want to pick up, move it, then click again to drop it.

Top tips and helpful hints

Voice recognition and predictive software

There are lots of ways you can boost your performance and lessen the discomfort for your hand(s), without changing your hardware. For example, voice recognition software is now a realistic option for many people and with time and practice it is possible to work at the speed of a good typist. This could save wear and tear on your hands or feet (not to mention your keyboard). Voice recognition software has improved a great deal in recent years and will cope with regional accents quite easily. The software does need some time and practice before it is really effective, the more you 'train' it the more accurate it will become.

There are also a number of 'predictive' software options. After typing the first few letters of a word, predictive software offers a selection of words starting with those letters. The computer 'learns' from the user and builds up a database of the words used most frequently by a particular operator, offering these words first in the list of predictions. To complete the word the user either selects one of those offered or continues typing, while the computer refines the options. For longer words this can offer significant speed improvements.

Free and easy

Most wordprocessing software has the facility to store blocks of text against a word or keystroke. These are commonly known as '**macros**' (but may have another name). If your software has no built-in macros there are add-on packages available to give the same results.

There are also things you can change on your keyboard. Apple Mac and Windows have helpful extra software included for free. If you activate '**sticky keys**' you will be able to operate the modifier keys (shift, control and alt keys) one at a time. You will no longer need to depress more than one key simultaneously. For example, to type 'The' you would press (one at a time, in sequence) shift - t - h - e.

There are lots of options available, so make sure you are getting the most out of your computer and taking care of yourself!

If you need more detailed information on how to achieve the right combination of equipment then contact AbilityNet (see below), or email me (FAO Liz Bleach) on reach@reach.org.uk

If you need more **technical information** you should contact the relevant supplier with details of your requirements. Please check all technical specifications and prices with your supplier before buying, as Reach can take no responsibility for compatability or suitability of equipment.

Useful Contacts

• **AbilityNet** is a charitable organisation who can arrange individual assessments and even visit your home/place of work to help you decide what would best suit your needs. They have branches throughout the UK and are very experienced in tailoring computer equipment, software and training to the individual. Their website is very informative, carries a range of downloadable helpsheets and a long list of suppliers. PO Box 94, Warwick CV34 5WS Tel:0800269545 www.abilitynet.co.uk

• **British Computer Society Disabled Special Interest Group**, 56 Broad Street, Clifton, Shefford, Beds. SG17 5RJ Tel: 01245 2422950

• **Bellaire Electronics**, 4 Broadgate, Bellaire, Barnstaple, North Devon EX31 1QZ Tel:01271 324759 www.bellaire.demon.co.uk

• **Cambridge Adaptive Communications** The Mount, Toft, Cambridge CB3 7RL Tel:01223 264244 www.cameleon-web.com

• **Dvorak keyboard layout** information and background information on the development of Dvorak's system. www.mwbrooks.com/dvorak

• **Enabling Computer Supplies** 20 Rising Brook Rd, Stafford ST17 9DB Tel:01785 243111 sales@enablingtechnology.net

• **Inclusive Technology** Saddleworth Business Centre, Delph, Oldham LO3 5DF Tel:01457 819790 www.inclusive.co.uk

• **Keyboard Co.** Summer House, Rodborough Common, Stroud GL5 5BN Tel:07000 500505 www.keyboardco.com

• **Kinesis** produce ergonomically designed keyboards and other input devices including the programmable foot pedal. www.kinesis-ergo.com

• **Microsoft Accessability Page** has details of helpful tips for getting the most out of their software, including macros, sticky keys and Dvorak keyboard layouts www.microsoft.com/enable/

• **Macintosh Easy Access** is a control panel extension containing a set of keyboard utilities: mouse keys, sticky keys, slow keys and text-to-speech. It is included with Mac OS software but if you can't find it you can download it free from their website www.apple.com/disability/

• **PCD Maltron** 15 Orchard Lane, East Molesey, Surrey KT8 0BN Tel:02083 983265 www.maltron.com

• **QED 2000** Ltd, 1 Prince Albert St, Gosport, Hampshire PO12 1QH Tel:01705 718719 www.qedltd.com