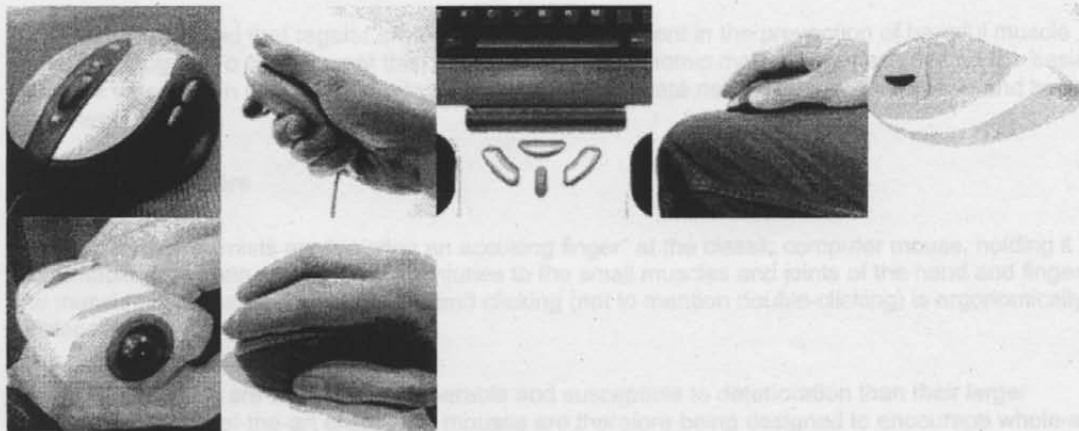


What makes a mouse ergonomic? (Sourced from www.ergonomicmouse.com)

Conventional mice can be made more ergonomic in a variety of ways: by being shaped to fit your hand, through including additional buttons to avoid double-clicking, by responding better to movement, etc.

Nowadays an ergonomic mouse can be designed in many unconventional ways - and probably should, if it is to be significantly better than a classic mouse or touch-pad. It can be a tool you hold in your hand or be constructed so you "greet" it as through a handshake. The mouse can also consist of a rod right beneath the spacebar which can be rolled and moved left-right, or even be worn to encourage variation in body posture!

Choosing the ergonomic mouse that is best for you, and then using it in an ergonomic way, can be difficult - especially without thorough knowledge of what is demanded to make a mouse ergonomic.



Convenience and Comfort – Key Concepts in Ergonomic Mouses

Comfort is a primary consideration in the design of new and unconventional ergonomic mouses. Computer users, particularly those suffering from RSI or other repetitive motion disorders, are always keen to find a comfortable mouse that answers their own particular health needs.

Comfort perception is highly subjective. No single ergonomic mouse design has been proven to be the ultimate solution that will suit everyone. Some prefer the comfort of having their mouse readily available at their fingertips below the space bar on the keyboard while others cannot function without firm arm support when mousing. There are still others who need the freedom to move from their desk with their pet mouse cupped in the palm of their hand. One thing is certain, there is no comfort in constantly having to lift and reposition a mouse to gain control of an elusive cursor or in having to overreach for a poorly placed mouse somewhere off yonder on your desk.

In addition to correct ergonomic positioning of the mouse, size is also a key comfort factor. It is essential that the design encourages good mouse posture, in other words a relaxed hand, without any cramped bending or extending of the wrist from its straight, natural position. For a loose and comfortable grip, a handheld ergonomic mouse should ideally be symmetrically contoured to fit into the palm and just wide enough to permit a slight spreading of the fingers.

Another key consideration in comfortable mouse design is the amount of pressure required to activate the buttons. If unintentional commands are caused by barely touching the buttons, users will inevitably tend to keep their fingers stiffly poised for action. In order to avoid the static muscle tension this entails, the buttons on an ergonomically well-designed, comfortable mouse should ideally be somewhat recessed (to avoid accidental activation) and respond to light finger pressure, without being overly sensitive to the touch.

Variation and Versatility – Vital Ergonomic Sense

Variety is generally considered to be the spice of life, and likewise variation in body and muscle movements is without doubt the very essence of good ergonomics. Versatility in the way a state-of-the-art ergonomic mouse can be held or operated is a key concept in occupational health promotion.

Basic common sense tells us that it is not conducive to good health to remain in the same position for too long. Overloading of any individual muscle or group of muscles increases the risk of the repetitive stress injuries (RSI) or cumulative muscle trauma that can ultimately be so debilitating.

One way to come to terms with this potential problem has been to design ergonomic mice that can comfortably be operated from various positions, such as while sitting upright at the desk, leaning back into the chair or even while standing a short distance away from the computer. Ideally, it should be possible to operate the mouse with the hands hanging loosely from a relaxed shoulder in front of the body or resting naturally in the lap. A symmetrically contoured ergonomic mouse that can be easily switched to the non-dominant hand is another comfort feature.

Adjustable and configurable are two other key concepts intended to promote variation in the small muscle movements used in mousing. Buttons that can be adjusted to the exact clicking force desired by the user is one good example while another is software or hardware that can be configured for different functions, such as double-clicking.

It is widely recognized that regular breaks are a vital component in the prevention of harmful muscle stress and fatigue. To complement this, state-of-the-art ergonomic mice are designed on the basic criteria of versatility in usage and mode of operation to stimulate natural variation in muscle and body movement.

In Defence of Fingers

Professional ergonomists are "pointing an accusing finger" at the classic computer mouse, holding it accountable for certain repetitive strain injuries to the small muscles and joints of the hand and fingers. The muscle abuse caused by clenching and clicking (not to mention double-clicking) is ergonomically indefensible.

Small body muscles are much more vulnerable and susceptible to deterioration than their larger counterparts. State-of-the-art ergonomic mice are therefore being designed to encourage whole-arm rather than wrist and extended thumb/finger movements. It has been found, for example, that smoothly pivoting the elbow close to the body is preferable to flicking the wrist in order to gain cursor control.

In this context, it is important to keep in mind that even the most optimally designed ergonomic mouse cannot overcome the pitfalls of sinking into a squishy mouse wrist rest or softly padded chair arm. While creating a false sense of comfort, this hampers full arm movement, forcing the user to wield the mouse in a "windscreen wiper" fashion and run the risk of developing carpal tunnel syndrome.

It is generally recommended that the wrist joint be straight and relaxed for good mouse posture. This recommendation is now being enhanced through the concept of "greeting" rather than "gripping" the mouse. This revolutionary "handshake" style of mousing means that the thumb will naturally point loosely forward (in its anatomically neutral position).

The human thumb deserves special attention as it is particularly susceptible to cumulative trauma injury. Modern ergonomic mouse design therefore aims in part at minimizing compulsory thumb joint loading (as caused for example by "kicking" a conventional trackball). Good progress is being made through ergonomic mouse designs that enable cursor control through subtle, stroking thumb movements and flexible finger usage to relieve the strain on small, peripheral muscles.

Ergonomic Mouse Position – A Central Issue

Integral to modern developments in ergonomic mouse design and alternative pointing devices is a radically new approach to the traditional position of the mouse within the computer workspace. Instead of being relegated off to the sidelines at the right or left of the keyboard, ergonomic mice are now assuming their rightful central position.

For quite some time, ergonomic consultants have been pointing out the health benefits gained through operating the mouse closer to the body. But it is now becoming increasingly apparent that placing the mouse immediately adjacent to the keyboard may just not be close enough. State-of-the-art ergonomic mouse design is moving the mouse position towards the very centre of the body, more precisely, into the space between the shoulders. Some revolutionary solutions are designed to have the hands resting naturally in the lap, both when actively mousing and otherwise.

One major advantage to solutions that position an ergonomic mouse centrally on the keyboard is that either hand can be used for mousing. This potential for variation promotes muscle load-sharing and a balanced use of arm, shoulder, neck and back muscles

along both sides of the spine. Symmetry and equilibrium are also conducive to good ergonomic mouse posture.

Reaching to grip an elusive mouse out in the periphery destroys this equilibrium, and is considered to be the major culprit behind many of the mouse-related musculoskeletal injuries that are so commonplace today. An essential standard for good ergonomic design is a comfortable mouse position that eliminates overreaching once and for all.

Minimum Muscle Activity – Pure Laziness or Good Ergonomic Sense?

A prime objective in modern ergonomic mouse design is to improve the interaction between the pointing device and the human body. One aspect of this is to minimize the muscle activity required to operate the mouse, and preferably even eliminate the muscle strain inherent in some very common, but ultimately debilitating mousing postures.

Overreaching for the mouse is a classic example. The painful consequences of twisting and stretching the shoulder and upper back muscles in conjunction with undesirable wrist and elbow extension have become notorious. In response to this, solutions which position the mouse comfortably on the keyboard, along with the development of alternative handheld pointing devices are quickly reducing overreaching to a thing of the past.

State-of-the-art ergonomic mouse solutions enable easy control without necessitating forceful hand exertions. Who can deny the utter frustration involved in dragging a defenceless mouse to the edge of the pad only to find the cursor lagging behind, exasperatingly far from its intended destination? And what then? An inevitable clenching of the teeth (oh, those poor jaw muscles)

and an even tighter grip on that poor mouse as it is lifted and banged down at the opposite corner of the pad again (and again!). What a futile waste of muscle power!

Another all too familiar scenario involves the repetitive, forceful clicking on the buttons of a conventional mouse causing static tension in the small, vulnerable muscles of the hand and fingers. The ergonomic horror of excessive dragging and clicking is now being addressed through ongoing technical developments in cursor gliding and finger touch detection.

So why expend excessive energy when an unconventional ergonomic mouse design can minimize muscle activity and make mousing almost effortless?

Neanderthal or Homo Sapiens – The Choice is Yours

Ergonomically-sound arm and wrist posture when operating a computer mouse is vital to good general body posture. It has been proven that prolonged periods of unnatural, cramped or awkward bodily positions can result in serious musculoskeletal disorders. With this in mind, state-of-the-art ergonomic mouses are being designed to take wrist posture into careful consideration.

Ergonomic studies have shown the importance of the wrist joint being in an anatomically neutral position (straight and relaxed), when using either a keyboard mouse or any of the more avant-garde handheld designs. If you find a keyboard mouse convenient and comfortable, simply check that there is a narrow tunnel of light under your wrist, with only enough space for a thin pencil. The weight of your hand must also be supported on the heel of your palm. It is very important not to compress the blood vessels in the soft, sensitive area of the wrist where the pulse is normally taken, as this restricts blood circulation to the hand.

According to ergonomics consultants, good mouse posture is achieved by sitting in a relaxed upright position, perhaps leaning slightly back into the chair if this provides comfortable support. Many also recommend a slight downward tilt of the chair seat (5 to 10 degrees) so that the knees are somewhat lower than the sit bones. The mousing arm should hang loosely from the shoulder with the elbow at about a 90 degree angle or straighter (to avoid nerve pinching) and the forearm parallel to the floor. This helps counteract any tendency towards sliding into a reclining position with your spine dangerously

bowed. Sitting with correct wrist posture also prevents you from hunching forward into the aggressive jaw-jutting posture of the stereotyped Neanderthal man.

Double-clicking – A Relic of the Past?

The concept of being able to avoid double-clicking is steadily gaining ground in state-of-the-art ergonomic mouses. This user-friendly feature is normally accomplished through a design which dedicates a specific button "to do the job" or through other user-configurable hardware or software options.

Highly coordinated fine muscle movement is required to be able to double-click a conventional mouse button AND achieve the result intended. In fact, the precision involved in this tricky manoeuvre is so difficult that special software programs have actually been developed in the past to help users become adept at this skill.

In order to avoid any misinterpretation by the computer software, a conventional mouse must be held perfectly still while double-clicking. Total immobility of the mouse is usually achieved through clenching it tightly between the thumb and little finger while simultaneously using the index finger for double-clicking. Such fingertip loading combined with the arm and shoulder muscle trauma involved in this "shocking" action increases the risk of such repetitive stress injuries as carpal tunnel syndrome.

To understand the magnitude of the problem, simply consider the enormous number of jolts to the finger that are demanded by clicking and double-clicking on conventional mouse buttons during the course of a normal working day.

By its very nature double-clicking is therefore tedious and monotonous, while also presenting a serious health hazard. It is therefore being made avoidable, and even obsolete through different options provided by a variety of state-of-the-art unconventional ergonomic mouse and alternative pointing device designs.

Be Kind to Your Muscles

Some key criteria for what constitutes a good ergonomic mouse are: comfort, positioning, correct posture, variation, versatility and flexibility. The common denominator behind all these concepts is avoidance of muscle abuse.

The human body can boast as many as 650 different muscle groups, making it a truly amazing piece of machinery. While most of these function "involuntarily", many do demand active care and consideration. The value of regular exercise to maintain good muscle tone is widely known. Equally important however, is a conscious effort to avoid the static or repetitive muscle overload associated with computer mouse usage.

Designers of state-of-the-art ergonomic mouses are keenly aware that a pointing device which can be used in different ways, promoting the use of different muscle groups is superior to a mouse that offers little or no flexibility.

There are different ways to achieve multi-muscle use. A mouse position that facilitates easy operation by either hand, or a contoured design that allows transferability between the dominant and non-dominant hand are two examples. A design whereby various fingers can comfortably be used for clicking in order to prevent injury to the small peripheral muscles of the hand is also ergonomically sound.

If, however, you have not yet found your "wonder" mouse, a combi-solution could be advisable; for instance, a handheld ergonomic mouse in combination with a pointing device located right below the space bar. Another suggestion could be to invest in an ergonomic mouse for both the right and left hands, customized to fit like the proverbial glove. Considering the cost of long-term debilitating repetitive stress injuries, such an investment could prove to be economically very wise ... all for the noble cause of being kind to your muscles!