

March 12, 2005

Re: Reducing Computer Related Injury and Enabling the Disabled.

Dear Prime Minister's Strategy Unit

Though located for logistical business reasons in the US I am a British Citizen. My company is at the forefront of developing new accessible technologies that not only overcome impairment (disability due to injury or work related illness) and clinical disability (those who have "non-work mediated" illness or incapacity, such as arthritis, Parkinson's, etc,) but reduce the risk of developing impairment due to computer overuse.

As it potentially affects so many our focus has been upon the impact of seemingly benign technologies that now appear not to be so, in light of their usage. This is not necessarily due to negligence on the part of their manufacturers though there should however be growing concern that as an awareness of the potential consequences of one product in particular grows, the computer mouse, "an Ostrich posture" by the industry could one day be seen as having stifled the normal innovative response that challenges to technology create out of concerns by established industry players in regards to potential downstream liability. Fear of litigation is the Catch 22 of technological consumerism and could be holding up the progress that might resolve the issues that constitute a risk in current products.

One of the issues, the politics' I'll try not to dwell upon, as I am proffering solutions not problems, relates to the "ergonomic fad" of the 90's that launched millions of pounds in sales of ergonomic keyboards, which have done nought or so it seems to stem a technology plague. Ahead of that discussion it is worth looking at the stated impact of the problem of Upper Limb Disorders (ULD's), quoting from the HSE's website <http://www.hse.gov.uk/msd/hsemsd.htm#uld> .

Upper limb disorders

HSE uses the term upper limb disorders (ULDs) instead of "repetitive strain injury" (RSI) because RSI does not cover all upper limb disorders.

It is estimated that 4.1 million working days (full-day equivalent) were lost in 2001/02 through musculoskeletal disorders mainly affecting the upper limbs or neck that were caused or made worse by work. On average, each person suffering took an estimated 17.8 days off in that 12 month period.

ULD is used as an umbrella term for a range of disorders of the hand, wrist, arm, shoulder and neck. It covers those conditions, with specific medical diagnoses (e.g. frozen shoulder, carpal tunnel syndrome), and other conditions (often called RSI) where there is pain without specific symptoms. Symptoms may include pain, swelling and difficulty moving. The worse cases can result in permanent disablement if no

action is taken. ULD cases can also mean production losses and compensation claims for employers.

End of Quote:

The companies selling “old technology mice” today are the same companies that “promoted” the “ergonomic keyboards” in the 90’s as a fix for RSI, based upon an assumption that it was “Repetition” and so typing that causes problems. This ignored the fact that people get problems first and worst in their mousing hand and that these keyboards sales have done nothing to make an impact, RSI has gotten worse and the number of people being designated as disabled has grown and the “collateral costs” have gone through the roof. Investigations into the primary causal agent of ULD’s or RSI’s are now focusing on the computer mouse, the issue being the need to maintain a constant (though seemingly small amount of) grip upon it. Therefore there is likely double corporate jeopardy by those purveyors of a “90’s keyboard fix” that didn’t take, as by announcing to the world they have produced a less RSI causing mouse it would be tacit admission to the possibility that their prior products may have contributed to that condition.

From our own desk top study we do not see the names of leading computer mice manufacturers being associated with any research into the problem and they remain quiet on the subject, bar “use at your own risk” type warnings on their products. If you consider the scale of the issue due to the extent of the use of computer mice and that a single design flaw or inappropriate use could impact the lives of billions, it is amazing that there is no legislative need or apparent industry activity in investigating the consequences of such products or even debate as to the issues in the public forum. Even journalism, the consumer’s champion, in a tight advertising budget environment seems reluctant to raise an issue that might offend the hand that feeds it. If any product sold on this scale created a problem it would have the potential to be a global technology plague, which is what we appear to have, but no one is apparently prepared to see it that way.

As the impact of the use of input devices is across the entire panorama of modern life, the entire computerized-world, there is no one-voice, lobby or regulatory body who can speak for the many. Therefore the issues are managed by their clinical consequences, the cost borne by industry and government and the reality lived by those afflicted.

“We have reached an Evolutionary Limit!” Sounds cataclysmic, but it isn’t. But we are finally at an end stop for the design of this model of man and nature isn’t keeping up. The issues, while complex, multifaceted and across many disciplines of science and human interaction, are quite simple and relate to the engine of life, our biochemistry, which is an equilibrium; a plateau with slippery slopes on all sides. Until now human endeavor has been primarily physical and so aerobic; we were designed to swing through tress, not hang from them. Ostensibly, this (hanging on or Static Posture) is the behavior that technology and working practices create in the office computer environment, constant muscular tension that takes our biochemistry to the limits of it’s equilibrium and keeps it there. Consequently small muscles being used when large muscles are idle results in the body not noticing and so not reacting to the need for more oxygen, which is the marker for aerobic activity. It also means

nutrients are low and toxins are elevated, the latter contributing to the slow demise of individuals cells, a few cells at a time, in those muscles worked under these conditions. We postulate that due to something called Cognitive Distraction, the brains ability to suppress warning signals when we are busy doing thinking work, another primeval attribute and a part of the fight or flight mechanism, we do not notice the aches while we work. The reality is that if you do not ache, you do not go on to injure. It is ironic that if someone else's chemicals injure us we can seek recompense, if we use something that causes our own chemicals to turn on ourselves then there is no remedy. If passive RSI was found to occur then many tools and practices would go the way of the office ashtray!

Aches are warnings of muscles being out of biochemical equilibrium, if you stop that activity after a while the ache stops as our biochemistry gets back to normal. But if we are busy doing thinking work we can miss the ache signs, which is why when you look around an office at the end of the day you see the "subliminal wrist massagers", as once they stop work they at last and usually without realizing, try to stimulate the circulation to their hands.

Pain is as a result of injury, which does not stop even if you stop doing that which caused the injury. So what are the options? How do we help millions of people and save billions of pounds? Some perspective is provided by a recent EU press release.

"Commission asks workers and employers what action should be taken to combat musculoskeletal disorders"...12/11/04.

<http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/04/1358&f>

I am sure that anyone reading this finds it incredulous that such consequences and an E.U. press release are being cited in response to the argument for a better design of a computer mouse. But then when Bubonic Plague was rife no one new about bacteria let alone that a rat could carry it, so the first hurdle is finding a body that will be "skeptically receptive". Then to have those who can review opine upon the data we have amassed, review our designs and try them out.

Our opinions are based upon our interpolation of available data and the using it to develop products that respond to the conclusions drawn. The feedback we get from real "computer world" users as to the result of using products so designed is "that they work". We even have Doctors calling to compliment us on the success that their patients are now having in therapy, as a result of not having to return to work to use the same tool that put them into therapy in the first place. The Dept of Labor in Washington State now provides our products under their State Medical Insurance Scheme. They are also provided under other State's worker rehabilitation schemes.

I can present much cohesive evidence in support of the principal that gripping computer mice can be the precipitating agent in ULD's and can also explain why, by "normal body" mechanisms, the injury that creates can then propagate, causing injury to migrate up the arm and into the shoulder and neck; it is called Postural Compensation, though I won't take up your time with explanation of that now. The upshot is that we have sound evidence for "the how" and also for "the why", in the work environment, mouse related ULD's can and do happen.

Our view and solution to the problem is better tools that eliminate grip and other “in grip” tasks such as clicking mouse buttons. We have the technology already and it is working. In addition a regime of work management “IntraTasking” if you will, which one day might mean that the daily task load for an individual is identified, classified and tasks scheduled on the basis of their physical activity and biochemical consequence. So that, for instance, if 2 hour segments are allocated to computer work then scheduled breaks are taken during that time and alternative work is performed during other task periods. The reality is that if small and frequent computer breaks were taken, wherein people stopped working small limb extremity muscles while under sedentary conditions, it need only take a short period of time to purge fatigued muscles and so replenish them. It is much like filling a car with petrol, it takes a few minutes to fill up and then you can be off on your way again for many hours or miles. But then it is also very much like running a car, as the faster your drive (your hand muscles, though when not using the body’s larger muscles in this case) the sooner you have to stop to fill up again.

In hardware terms, we have developed a “Gripless” computer mouse that gives much better mpg! In software terms we have developed “Clickless” software that means you do not have to click mouse buttons. The combination has already received a commendation by the Arthritis Foundation over here, for ease of use and we are in partnership with Microsoft on Accessible Technology and also with Hewlett Packard, who sell our products. We are also the only conventional mousing products to date that we assert meet the US Governments Section 508 Standards for accessibility and are listed on that website.

We have also developed a fatigue management tool, pretty much like a tacho on a truck. It monitors your mouse and keyboard activity (or time elapsed, you can choose) and then prompts you to take a break. It will even turn off the keyboard and mouse for you during the break, if you need the extra discipline. It will then allow you to play your favorite (legal) on computer music, look at pictures that make you feel good or listen to news or even post departmental messages or company news bulletins during the break. We are so committed to doing this (and a marketing company to boot) that we are giving this software away for free. It sounds like I am angling a pitch now; that is not the intent, it is awareness and discussion I seek to stimulate.

“Strategic Implementation” The big hurdle is always cost of implementation due to left pocket right pocket budget constraints. The kinetic of the problem though is leading to an empty pocket on both sides scenario. Swapping every mouse out is not an option. The most cost effective implementation is to introduce software on all machines (site licenses are relatively cheap compared to hardware procurement) that manages activity and risk and also starts to reduce the activity that leads to problems as is possible by the use of auto or Clickless software.

Hardware implementation can be on a “retirement program”, as replacement mice are needed or by specification of the mouse when new computer systems are procured. It could also be applied to “critical cases” in which an employee is about to be lost to disability or where it is possible to repatriate someone on disability into the workforce. By some estimates each RSI case costs (and excuse dollar figures)

\$15,000 a year and we estimate that our \$150 system will likely reduce that amount by 50% in the first year, 75% second year and down to 10% thereafter.

One last comment: in keeping with the electronics industry approach of doing things just because new technology means they can; I am extremely concerned that the upcoming generation will be unable to use their digits by the age of 30! Internet browsing, text messaging, all place an undue and often valueless strain on kids fingers. The demographic with the fastest growing incidence of RSI is the late 20 to 30 something, graduates out of school, trying to get a grip on the corporate ladder and literally losing it! The State is providing higher education that is now likely to have an expectation of a 10-15 year working lifespan (this is a white collar worker syndrome) before having to step in again to bear the financial burdens of retraining or permanent disability benefit.

By our estimates some 500,000 clicks take place on the internet every second. Clicking mouse buttons puts additional tensile load on ligaments already under strain due to gripping mice. We have invented the “Clickless Web” that could eradicate that particular source of physical load. www.theclicklessweb.com or www.theassistiveweb.com are demonstration sites where this facility can be experienced. One site will be used to provide the service free to all schools and colleges and the other for “not for profit” assistive or accessible technology sites. We can make your site more accessible with this technology if you should so wish.

I am often asked “how can you be so sure that mice are the main culprit?” The answer, based upon specific study evidence, is I can’t be, as there is none. The cornerstone statement we believe we can rely upon is: *“as we know which muscles become injured if we can design a tool that avoids their use, in the light of that knowledge and with that capability surely it must make sense that people are therefore less likely to injure”*. The feedback from thousands of users of our products, based upon this “if it hurts don’t do it” premise, suggests that this is correct. We have also allowed many, many individuals who had almost given up hope of going back to remunerative (computer) work that opportunity and with it the self respect and a value that they hold highly, an ability to make their contribution to society and their own families and with that comes a net fiscal contribution and not a loss or a wasted life.

Sincerely

Tom Large
President and CEO
Designer Appliances Inc