

# How ergonomics can prevent injuries

Ergonomics – and stronger liaison between therapists and employers – can help to overcome challenges posed by work-related conditions, says Duncan Abbott



**Before and after: the left-hand picture shows poor ergonomics requiring a long reach for the telephone and keyboard. Right, small changes can help to prevent occupational injuries.**



One are the days when people retired because of ill health or were marginalised by workplaces unable to cope with a disabling condition. Legislation on health and safety and laws that fight disability discrimination means that the needs of workers with varying abilities now have to be accommodated.

However, a steadily ageing workforce and occupational injuries like repetitive upper extremity disorders and back pain, will ensure that disability remains a common concern. As a result, there is a need for stronger liaison between therapists and employers.

What is the best way to overcome the challenges to the workplace posed by the limitations of disability? Pain management, exercises, and a list of “dos” and “don’ts” may not be enough to solve problems, although they do have some effect.

Ergonomics – the science of dealing with people and their workplace – is one answer. This multidisciplinary field is becoming more important as work processes shift dramatically, placing new demands on the human body.

It integrates knowledge derived

from human sciences – anatomy, physiology and psychology – to match jobs, systems, products and environments to workers’ abilities and limitations. It has a proven track record in reducing work-related ailments.

There’s a tendency to think of ergonomics as being just about seating or office environments, but it is more than this. Ergonomists use a vast reservoir of research to formulate good practice guidelines for people in all fields of work.

Can ergonomics ensure a successful return to work? Yes, but this would require either a visit to the workplace or a framework for extraction of tasks. A workplace assessment may result in a task redesign, whereas the framework would impose limitations on the worker. A mixture of the two is best.

Ergonomists use tools to assess the workplace – checklists drawn against standards, or guidelines based on good practice and research. For example, a standard detailing postural requirements can be used to assess furniture and equipment for sitting or standing work.

However, checklists and standards will only help so far when dealing with workers with a disabling condition, as invariably the data is drawn from a non-disabled population.

An effective ergonomic investigation requires a knowledge of biomechanics, physiology, medical conditions and work design, and should consider procedures, equipment and task characteristics.

If force and repetition are of particular concern consideration should be given to mechanise or automate the task. Tools and handles could be made lighter or even redesigned, using damping (absorbing) devices to minimise

impact loading. They should also match the worker’s capacities.

Appropriate workspaces such as height-adjustable tables will help to minimise deviated wrist postures and prevent the need to stoop or stretch.

For complicated assessments – specifically those involving multiple impairment – an ergonomist’s help should be sought to consider all the worker’s relevant aspects. These, depending on disability, include:

- physiological – range of limb movement, strength, vision, hearing;

- psychological – cognitive, reaction time, memory; and
- anthropometric data – size and shape range of the worker.

Aspects of the built environment should also be considered. These include:

- physical aspects of design – stairs and ramps and, in particular, accessibility;

- hygrothermal conditions – cold, damp, heat; and security; and
- sensory aspects – acoustics, lighting, comfort, communication systems, signage and navigation.

As a first step, the ergonomist should ask what, if anything, is different for the worker, and then see if it is possible to redesign the task. A task analysis would ensure that no vital points have been missed.

Workers may no longer be able to cope with task demands due to fatigue or lack of stamina; for example they may, because of upper or lower extremity disorder, be unable to keep up with the speed of an assembly line.

This problem may be resolved by finding the worker’s limit, and suggesting a job rotation to allow the muscles used in one task to recuperate.

Task rotation can also stimulate

interest and reduce fatigue.

Some employers find that job rotation not only helps injured and older employees return to work but also leads to improved quality and productivity.

Tool selection is critical for user safety, comfort and health, but even the best tool on the market will not transform a poorly-designed workstation into a safe and comfortable one.

If the workplace design does not meet the worker’s physical needs, it can create discomfort, aches and pains, fatigue and musculoskeletal disorders.

On the other hand, however, a well-designed workplace, which offers the choice of a variety of well-balanced positions, allows work to be carried out safely and free of injury.

**“A skilled ergonomist will help companies to understand when, how and why most workplace injuries occur.”**

Disabled workers need to be kept up to date to ensure that their skills match the operating requirements of new equipment.

They must also be made aware of changes to procedures and given refresher training on carrying out certain tasks, particularly where risk is a key issue.

To minimise risk factors, guidelines should be drafted for management. The ergonomic programme must demonstrate that problems can be managed through participation with all groups involved in health promotion.

The ergonomist should find an optimal fit for the worker, task and environment, and suggest ways to mitigate the functional decline linked to a disabling condition. He or she will also recommend changes that need to be made in the workplace.

If the ergonomic programme is to succeed, management must monitor and review the changes, perhaps through asking the worker to fill out a self-report questionnaire.

Many companies have found that ergonomics has not only helped to improve their products and productivity, but that it has also reduced compensation costs.

A skilled ergonomist will help companies to understand when, how and why most workplace injuries occur.

Job accommodation planning must be co-ordinated through a specialist (usually an ergonomist), and ideally with the help of an occupational therapist. Guidelines based on a universal workplace model have been developed to assist this process.

Today, the high costs resulting from non-application of ergonomic principles in workplaces are causing policy-makers, employers and workers to broaden their perspectives.

They know that job and workplace design for workers with disabilities is here to stay, and that an ergonomic design approach will help to cut down on injuries and disabilities.

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## CLINICAL UPDATE



By David Potterton

### PT helps terminally ill to control breathing

A combination of physiotherapy and nursing has improved the care of terminally ill patients with breathlessness.

Of 470 patients cared for by the St Christopher’s Hospice Homecare team in London 43 per cent complained of breathlessness.

Knowing that both nurses and physiotherapists each have skills to offer these patients, researchers aimed to integrate and consolidate their approach to enhance best practice.

The main aims were to reduce patient anxiety, maximise respiratory function and provide information to help patients understand, adapt and regain breathing control.

Positive feedback on the initiative – which included physiotherapy sessions and a patient leaflet on breathlessness – has been received from patients and healthcare professionals. *Int J Palliat Nursing*, 2003, 9[4] 150.

### Brain-injured need long-term therapy

A follow-up study of patients who suffered traumatic brain injury shows that satisfaction with occupational therapy, although high, is generally unrelated to outcome.

In telephone interviews 21 months post-injury, 25 adult patients provided information on disability measures, community participation, quality of life, and satisfaction with occupational therapy.

The OT researchers from Eastern Kentucky University, in the United States, found that participants were often unemployed, depressed and withdrawn, and experienced limitations in decision-making, hand use, bladder control, and community integration.

Although less disability and more community participation were related to a higher quality of life, the research group concluded that people with brain injury were significantly in need of long-term therapy. *American Journal of Occupational Therapy*, 2003, 57[2] 177.

### The most successful ergonomic solution is:

- Effective – it enables the disabled person to do his/her job productively and safely.
- Transparent – it either has no effect on co-workers, customers and other aspects of the business, or improves productivity and/or safety.
- Timely – it can be implemented within a reasonable time frame.
- Durable – it is useful and flexible enough to remain effective throughout the employee’s service.