

# STRESS AND

Various recent studies have discovered that there is a link between work-related musculoskeletal disorders and stress, in that human responses to the latter can give rise to situations in which injury may be caused. **Duncan Abbott** examines the research on this issue and explains how a comprehensive ergonomics programme, focusing on both physical and psychosocial risk factors in the workplace, can minimise both problems.

**A**s verified by the latest workplace health and safety statistics from the HSC,<sup>1</sup> changes in the working environment in the 1990s have both created new problems and exacerbated existing ones in new groups. While traditional work-related ill-health conditions persist, they are primarily linked to physical risk factors in the working environment and problems in the form of pain. It is the psychosocial working environment that is becoming an increasingly significant problem.

Recent research suggests that a comprehensive ergonomics programme, focusing on both physical and psychosocial risk factors, can significantly improve working conditions, as well as save money for companies. Aptel and Cnockaert, from the Laboratory of Biomechanics and Ergonomics and the National Institute for Research and Safety in France, have compiled the most recent data regarding stress and the occurrence of work-related musculoskeletal disorders of the upper extremities (WRMSD<sub>ue</sub>).<sup>2</sup> They found that the roles of stress and work-related psychosocial factors in the development of WRMSD<sub>ue</sub> are still poorly understood and that there is no consensus on the epidemiological (studies that seek to find associations between exposure and disease or cause and effect) data. They do, however, propose that there is strong evidence

that human responses to stress can present risk factors that may cause injury.

Researchers at the Robens Centre for Health Ergonomics undertook a study to find potential interactions between physical and psychosocial risk factors in the workplace that may be associated with symptoms of musculoskeletal disorder of the neck and upper limb.<sup>3</sup> They found that workers highly exposed to both physical and psychosocial workplace risk factors were more likely to report symptoms of musculoskeletal disorders than workers highly exposed to one or the other.

In the US the National Institute for Occupational Safety and Health (NIOSH) says: "The epidemiological studies of upper extremity disorders suggest that certain psychosocial factors have a positive association with these disorders." However, NIOSH qualifies this with the assertion that "these factors, while statistically significant in some studies, generally have only modest strength".

### **Relationship between stress and WRMSD<sub>ue</sub>**

Stress is a set of physiological, behavioural and emotional responses that occurs in reaction to situations that are potentially harmful to the individual's physical and emotional health. When physical, organisational, or psychosocial changes occur in a worker's environment the body mobilises its metabolic and psychological resources to respond to the changed environment. Two situations may arise, depending on whether or not the challenge can be satisfactorily met: the person may either be energised and motivated and thrive on what has become known as 'good stress'; or the person becomes stressed because they feel that their physiological, psychological, and

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# ND STRAIN



## **“An ergonomics programme should show employees that management takes MSDs and stress seriously”**

emotional resources are unable to cope with the demands on them. The body's equilibrium is upset, the ability to respond is diminished, and its immune defences are less effective. The person is then open to suffering from physical, or psychosomatic disorders.

The body responds to stress via four systems – central nervous, autonomic nervous, endocrine, and immune – which constantly interact in a complex network. Aptel and Cnockaert find that physical reactions to stress increase the risk of injury. They note, for instance, that when a person experiences stress the body releases certain chemicals. Some of these chemicals are pro-inflammatory and can lead to tendon inflammation. Others, called corticosteroids, can lead to oedema, or swelling in the joints. Swelling and increased pressure in the joints is a risk factor for developing disorders such as carpal tunnel syndrome.

Smith and Carayon argue that stress and biomechanical strain (effort, repetitive motions and extreme joint postures) are intermediate variables between organisational, ergonomic and psychosocial risk factors.<sup>4</sup> By acting on the organisational and psychosocial factors, they find that it is possible to prevent both stress and WRMSD due at the same time.

The HSE guidance ‘Upper Limb Disorders in the Workplace’<sup>5</sup> has been revised and now considers the employee's psychological response to work to be as important as physical work design issues, in terms of influence on musculoskeletal health. Another HSE research document, ‘Work, Inequality and Musculoskeletal Health 2002’, notes that poor social support and low work status have been linked to an increased incidence of musculoskeletal disorders among working populations.<sup>6</sup> The report finds that a range of psychosocial factors within the workplace plays a

significant role in sickness absence and disability attributed to musculoskeletal disorders. Similarly, the Robens Centre found that psychosocial risk factors at work are more significant when exposure to physical risk factors is high than when physical exposure is low. This suggests that ergonomic intervention strategies that aim to minimise the risks of work-related factors should also focus on psychosocial work factors.

### **Programme for prevention**

These findings make it essential that those responsible for health and safety at work are aware of the risk factors in their organisation that can contribute to both stress and musculoskeletal disorders. Intervention strategies for the future must be prioritised in order to improve organisational cost-effectiveness and reduce the risks of expensive legal claims that may otherwise arise. A comprehensive ergonomics programme that looks at minimising physical and psychosocial risk factors is, therefore, a good idea.

But can the symptoms of musculoskeletal disorders be prevented? Based on scientific literature the answer is yes, but there is no ‘one size fits all’ that every business can adopt, or which would apply to every worker. The Occupational Health and Safety Authority (OSHA) in the US suggests that a successful ergonomic

**Physical reactions to stress increase the risk of musculoskeletal injury**



programme should encompass the following:

- Management leadership – assign responsibility for ergonomics to designated managers, who must communicate policies and practices to employees;
- Employee participation – ensure that employees are aware of ergonomics requirements and have ways to report musculoskeletal disorder (MSD) symptoms and hazards;
- MSD management – talk to employees carrying out tasks suspected of causing MSDs, and observe employees performing those tasks, to uncover risk factors;
- Job-hazard reduction measures – if a task is found to cause MSDs, employers must control or reduce the risk.

When examining psychosocial and physical risk factors for MSDs among sales workers who had reported neck, shoulder, and lower back pain Skov *et al* asked the workers to fill out a questionnaire.<sup>7</sup> The data, when analysed, revealed that both psychosocial and physical factors were associated with MSDs. High job demands and lack of social support were particularly linked to neck and shoulder symptoms. A study by King *et al* looked at the impact of ergonomic training methods in manufacturing.<sup>8</sup> The researchers found that presentations, supplemented by ergonomic job redesign and participatory training, were effective in altering worker behaviour. This training had a significant effect on ergonomics knowledge and job satisfaction, and therefore led to a reduction in MSDs.

Another study by Camerino *et al* examined psychosocial factors and manual handling risks for hospital nurses.<sup>9</sup> By using observation and questionnaires, as well as a cross-sectional study of past history of back pain among the workers, the researchers found that episodes of acute low back pain in the previous year were associated with low discretion at work.

A more recent study, by Baker *et al*,<sup>10</sup> undertook a cross-sectional study of 155 customer service representatives. The researchers examined background factors, work practices, psychosocial variables, and musculoskeletal discomfort. They found that 93 per cent reported musculoskeletal discomfort in some part of the body, the majority being in the back, upper limbs, and neck. The levels of social support, job variety and skill utilisation in the job were the psychosocial variables most often associated with musculoskeletal discomfort.

An ergonomics programme can be successfully implemented in a variety of job settings as long as it takes into account procedures, equipment, and

characteristics specific to the organisation. For example, it could include exercise programmes for employees and rehabilitation programmes for injured workers; ergonomically designed office equipment, e.g. orthopaedic chairs, ergonomic keyboards, voice-activated software, or retooling procedures to reduce repetition through automation. For such changes to be successful they must be tailored to the individual workplace, and a high level of commitment is needed from both employers and employees to make them work. An ergonomics programme should show employees that management takes MSDs *and* stress seriously. Management should also ensure that staff have up-to-date skills to operate new equipment, that they are properly resourced, and are given the necessary training to carry out the task.

It may be beneficial to carry out a task analysis to ensure no steps or vital parts are overlooked. There should also be scope for job rotation, varying working conditions, and flexibility. This is not just a matter of moving from one desk to another to carry out a similar task, or to work on another computer. Proper job rotation should allow muscles used in carrying out one task to recuperate while carrying out another, which uses a different set of muscles. Job rotation should also stimulate interest and reduce boredom and fatigue that can arise from undertaking one type of task continuously. Some employers have found job rotation helps injured employees return to work, as well as leading to improvements in quality and productivity.

An ergonomics programme should make sure that workplace hazards are properly controlled in order to decrease risk. It should understand the hazards and risks to employees and contain measures to control them. Both physical work risk factors – for example, high force and awkward postures – and workplace stress should be minimised. For a programme to succeed it must be backed by a management monitoring and review process, which can take the form of regular self-report questionnaires.

### Conclusion

There are many complexities surrounding WRMSD, yet scientific evidence plainly indicates that particular jobs and working conditions involving repetitive and forceful movements and stressful work environments are high risk for such disorders, although the relationship is complicated. Despite wide-ranging research, further studies of the links between factors at work and the incidence of WRMSD are required. The main issue is to determine the intensity and duration required for

exposure to lead to injury. Psychosocial factors and the way these interact with exposure also need to be studied in more detail, as should circumstances outside of work. **SHP**

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Duncan Abbott is an ergonomist and works with a wide range of companies, including banks, government agencies, local authorities, manufacturers and retail companies. He has extensive experience of assessing employees with disabling conditions for their return to work.