



ELSEVIER

International Journal of Industrial Ergonomics 26 (2000) 367–379

International Journal of

**Industrial  
Ergonomics**

www.elsevier.nl/locate/ergon

# The effect of ergonomic intervention on discomfort in computer users with tension neck syndrome

K. Mekhora<sup>a,b,\*</sup>, C.B. Liston<sup>c</sup>, S. Nanthavanij<sup>d</sup>, J.H. Cole<sup>b</sup>

<sup>a</sup>*School of Physiotherapy, Mahidol University, Bangkok, Thailand*

<sup>b</sup>*School of Physiotherapy, Curtin University, Selby Str., Shenton Park, Perth, WA 6008, Australia*

<sup>c</sup>*Vice-Chancellor, Curtin University, Perth, Australia*

<sup>d</sup>*Department of Industrial Engineering, Sirindhorn International Institute of Technology, Thammasat University, Pathumthani, Thailand*

Received 16 April 1999; received in revised form 9 November 1999; accepted 9 December 1999

## Abstract

To investigate the long-term effects of ergonomic intervention on neck and shoulder discomfort among computer users who have symptoms of tension neck syndrome, using simple materials and protocols, 80 Thai volunteers with symptoms of tension neck syndrome were identified through administration of a questionnaire to 470 computer users. Two pre-tests were conducted to determine subjects' level of discomfort before the planned intervention commenced. Half of the subjects' work stations were immediately adjusted according to ergonomic recommendations for individual anthropometry. The other half received the intervention 3 months later. Discomfort evaluations (head, neck, shoulders, arms, and back) were conducted eight times within 6 months for both groups. The same patterns of decrease in the levels of discomfort of all body parts were present in both groups. Substantial variation in the level of discomfort over time for each body part in each subject was noted after the intervention. However, the mean level of discomfort ratings before and after receiving intervention were significantly different. It was concluded that ergonomic intervention can help reduce the discomfort level of subjects with tension neck syndrome. In addition, the study supports the use of simple materials which can be used by individuals to adjust their own workstations according to ergonomic recommendations.

## Relevance to industry

Tension neck syndrome is a common disorder found in visual display terminal (VDT) users. Ergonomic intervention can help prevent and decrease the symptoms resulting in less absenteeism and higher productivity and efficiency. Using simple materials for intervention makes it feasible for workers to modify their own workstations to gain the benefit from basic ergonomic recommendations. © 2000 Elsevier Science B.V. All rights reserved.

*Keywords:* Tension neck syndrome; Intervention; Discomfort; Video display terminals

## 1. Introduction

It has been proposed that the most important negative consequence of computers is the relation-

ship between musculoskeletal disorders (MSDs) and their usage (McIntosh, 1994; Ong, 1994). The presence of MSD has been confirmed by Bergqvist et al. (1995) and Knave et al. (1985). They found that there was a connection between working with VDTs and the incidence of various MSDs. Among the MSDs in computer users, tension neck

\* Corresponding author. School of Physiotherapy, Curtin University, Selby str., Shenton Park, Perth, WA 6008, Australia.

syndrome (TNS) is commonly found (Kroemer, 1992).

Prevention programs structured around ergonomically based recommendations have been introduced to help reduce the negative consequences of computer use and have been reported to be successful by some authors. Aarås (1994a) introduced ergonomic intervention in a group of assembly workers and VDT users and found a reduction in the static load of trapezius muscle and decreases of pain intensity in various areas. Interestingly, the survey reports for 1992–1995 from the Bureau of Labour Statistics (BLS) of the US Department of Labour indicated that repetitive strain injuries declined from 11.8 cases per 10 000 workers in 1992 to 10.1 cases in 1995 (Bernard, 1997). This decline may partially be the result of efforts to publicise the success of intensive efforts to decrease the number of disorders through prevention and treatment programs, and may provide motivation for researchers to continue to investigate ways to help reduce or prevent disorders.

However, recommendations for ergonomic prevention which have appeared in the literature have not been consistent in the way they are described and may be hard for novice users to understand causing confusion. Such confusion may occur because the reported recommendations are often specific to a single work task and a particular individual. For example, recommendations for the monitor position for computer-aided design users is much higher (middle of the monitor is at eye level; Wall et al., 1992) than those for general computer users, such as data enters and word processors. These have been debated between moderate monitor height (the top of monitor being around eye level or the centre of monitor being at 15° downward of from the eye level; Grandjean, 1988; Standards Australia, 1990) and lower monitor height (the top of screen being at 15° downward from eye level; Ankrum and Nemeth, 1995). Furthermore, most studies have concentrated on the effects of particular features of the workstation such as seat height and inclination (Bridger, 1988; Mandal, 1981), seat and desk height and inclination (Bendix, 1984), monitor height (Burgess-Limerick et al., 1999; Turville et al., 1998), and keyboard use (Fernström et al., 1994). Most recommendations have

been based upon the finding of experimental studies (Burgess-Limerick et al., 1999; Lie and Foster-vold, 1995) or from preferences of subjects using their own set-up (Grandjean et al., 1984). It could be argued that one recommendation used in isolation may not be totally effective when interactions between the body part and workstation are needed. Therefore, recommendations for workstation set-up should include every aspect of the workstation.

In the commercial world, most workplaces already have computers and workstations installed, and financial constraints mitigate against wholesale replacement of old equipment and the installation of new workstations. Furthermore, in most developing countries, replacement of computers and use of ergonomically adjustable workstations is not feasible because of the costs involved. Moreover, employees in such working environments may not be protected by 'duty of care' and occupational health and safety laws. Therefore, it is necessary to assist employers to use ergonomic principles, which do not require expensive alternatives and can ensure an increase in profitability and a decrease in symptoms of work-related disorders among their workers. Instructions for such intervention must be clear and readily understandable to ensure successful application.

### *1.1. Tension neck syndrome*

Tension neck syndrome (TNS) is one type of occupational cervicobrachial syndrome, a term used to refer to those disorders of the neck and shoulder which are (or can be) related to occupational factors. Thus, TNS can be categorised as one of a group of 'work-related' neck and shoulder disorders. There are some closely related terminologies which may be used in similar studies, for example, repetitive strain injuries (RSI), cumulative trauma disorder (CTD), and cervicobrachial disorder (Winkel and Westgaard, 1992). These terms are broad and sometimes may be conflicting. TNS can be differentiated from the other terms in that it is used in cases of non-articular and non-neurological pain in the neck and shoulder areas. Some papers refer to TNS as tension myalgia fibrositis, fibromyositis, or myofascial syndrome (Waris, 1980).

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات