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Computer terminal work and the benefit of microbreaks.

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Microbreaks are scheduled rest breaks taken to prevent the onset or progression of cumulative trauma disorders in the computerized workstation environment. The authors examined the benefit of microbreaks by investigating myoelectric signal (MES) behavior, perceived discomfort, and worker productivity while individuals performed their usual keying work. Participants were randomly assigned to one of three experimental groups. Each participant provided data from working sessions where they took no breaks, and from working sessions where they took breaks according to their group assignment: microbreaks at their own discretion (control), microbreaks at 20 min intervals, and microbreaks at 40 min intervals. Four main muscle areas were studied: the cervical extensors, the lumbar erector spinae, the upper trapezius/supraspinatus, and the wrist and finger extensors. The authors have previously shown that when computer workers remained seated at their workstation, the muscles performing sustained postural contractions displayed a cyclic trend in the mean frequency (MNF) of the MES (McLean et al., J. Electrophysiol. Kinesiol. 10 (1) (2000) 33). The data provided evidence ($p < 0.05$) that all microbreak protocols were associated with a higher frequency of MNF cycling at the wrist extensors, at the neck when microbreaks were taken by the control and 40 min protocol groups, and at the back when breaks were taken by the 20 and 40 min protocol groups. No significant change in the frequency of MNF cycling was noted at the shoulder. It was determined ($p < 0.05$) that microbreaks had a positive effect on reducing discomfort in all areas studied during computer terminal work, particularly when breaks were taken at 20 min intervals. Finally, microbreaks showed no evidence of a detrimental effect on worker productivity. The underlying cause of MNF cycling, and its relationship to the development of discomfort or cumulative trauma disorders remains to be determined.

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Video display terminal workstation improvement program: I. Baseline associations between musculoskeletal discomfort and ergonomic features of workstations.

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Associations between selected sites of musculoskeletal discomfort and ergonomic characteristics of the video display terminal (VDT) workstation were assessed in analyses controlling for demographic, psychosocial stress, and VDT use factors in 273 VDT users from a large administrative department. Significant associations with wrist/hand discomfort were seen for female gender; working 7+ hours at a VDT; low job

satisfaction; poor keyboard position; use of new, adjustable furniture; and layout of the workstation. Significantly increased odds ratios for neck/shoulder discomfort were observed for 7+ hours at a VDT, less than complete job control, older age (40 to 49 years), and never/infrequent breaks. Lower back discomfort was related marginally to working 7+ hours at a VDT. These results demonstrate that some characteristics of VDT workstations, after accounting for psychosocial stress, can be correlated with musculoskeletal discomfort.

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A field study of supplementary rest breaks for data-entry operators.
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This study examined the effects of supplementary rest breaks on musculoskeletal discomfort, eyestrain, mood, and performance in data-entry workers. Two rest break schedules were compared in a within-subjects design. Workers alternated between a 'conventional' and a 'supplementary' schedule in 4-week intervals. The conventional schedule contained a 15-min break during the first half of the work shift and a 15-min break during the second half of the shift. The supplementary schedule contained the same two 15-min breaks, and a 5-min break during each hour which otherwise did not contain a break, for a total of 20 extra minutes of break time. Results are based on data from 42 workers. They indicated that discomfort in several areas of the body, and eyestrain, were significantly lower under the supplementary than under the conventional schedule. While symptoms increased from pre- to post-work periods under both schedules, the magnitude of the increases was significantly less under the supplementary schedule. In addition, increases in discomfort of the right forearm, wrist and hand over the course of the work week under the conventional schedule were eliminated under the supplementary schedule. These beneficial effects were obtained without reductions in data-entry performance.

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Frequent short rest breaks from computer work: effects on productivity and well-being at two field sites.

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Computer operators at two work sites (n = 73, n = 19) were prompted to take three 30-s and one 3-min break from computer work each hour in addition to conventional rest breaks. Some operators were asked to perform stretching exercises during the short breaks. Mood state and musculoskeletal discomfort were assessed at each work site over a 2- or 3-week baseline period and a 4- or 6-week treatment period, respectively.

Operator productivity measures were obtained from company records. Operators complied with about half of the added breaks but favoured 3-min breaks over 30-s breaks. No improvement in productivity or well-being was found at the larger work site. At the smaller work site, productivity, eye, leg and foot comfort all improved when the short breaks included stretching exercises. These results provide evidence that frequent short breaks from continuous computer-mediated work can benefit worker productivity and well-being when the breaks integrate with task demands.

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Musculoskeletal disorders among visual display terminal workers: individual, ergonomic, and work organizational factors.

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A number of individual, ergonomic, and organizational factors of presumed importance for the occurrence of musculoskeletal disorders were investigated in a group of 260 visual display terminal (VDT) workers. The cross-sectional study utilized medical and workplace investigations as well as questionnaires. The results were subjected to a multivariate analysis in order to find the major factors associated with various upper-body muscular problems. Several such factors were identified for each investigated type of musculoskeletal problem. Some were related to the individual: age, gender, woman with children at home, use of spectacles, smoking, stomach-related stress reactions, and negative affectivity. Organizational variables of importance were opportunities for flexible rest breaks, extreme peer contacts, task flexibility, and overtime. Identified ergonomic variables were static work posture, hand position, use of lower arm support, repeated work movements, and keyboard or VDT vertical position.

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The effect of different work-rest schedules on fatigue and performance of a simulated directory assistance operator's task.

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The directory assistance operators' task with a visual display terminal was simulated to determine the preferable work-rest schedule from among the three different work-rest schedules: 30 min of work followed by 5 min break (30-5); 60 min of work followed by 10 min break (60-10); and 120 min of work without any break (120-0). The total working duration was 2 h. The errors made during the work and the subjective responses before and after the working period (2 h) were recorded and analysed. The results showed that the first two work-rest schedules were preferable to the third condition (120-0) as

significantly fewer errors were made ($p > \text{or} = 0.01$) when a short break was provided. There was no significant difference ($p > \text{or} = 0.10$) in errors between (30-5) and (60-10) schemes. Fewer before and after subjective responses differed significantly for (30-5) and (60-10) schemes than for the (120-0) scheme. The overall effect of schemes on subjective responses, however, was not statistically significant at the 5% level. Since both (30-5) and (60-10) schemes were found acceptable, the (60-10) scheme is recommended since it is easy to implement, causes fewer breaks and therefore, fewer work interruptions, and leads to fewer total minutes of break.

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