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Computer Related Symptoms: A Major Problem for College Students

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This survey investigated the frequency of discomfort associated with computer use. 95 students (23 males, 71 females, mean age 25.5, S.D 6.33, range 19-55) enrolled in upper division classes at San Francisco State University filled out a two-page symptom questionnaire which included 1) demographics, 2) computer usage, 3) rating and discription of discomfort, and 4) strategies used to prevent computer related discomfort and ergonomic work setting. The results showed that 92 out of 95 subjects (96.8 %) reported some discomfort while only 3 subjects reported no discomfort. Students reported working an average of 2.9 hours (S.D.= 2.16) per day on the computer and used the mouse 45.1 % (S.D.=29.98) of the time. **There was no correlation between hours worked and experience of discomfort** even though 81% reported doing something to reduce their discomfort while working at the computer. However, this was not correlated with a reduction of discomfort. They utilized many practices to reduce discomfort (e.g., taking breaks, stretching and limiting the time at the computer). Only 14 subjects (15 %) reported using special ergonomic equipment. The use of ergonomic adaptations correlated 0.37 with the hours worked. There were no significant differences in male and female responses for computer and mouse use, age, sex, hours worked at the computer,

percentage of mouse use, and reports of discomfort. To prevent illness, learning how to stay healthy at the computer should be the first lesson and an integral part of every computer class -- from grade school to university.

Computer Related Symptoms: A Major Problem for College Students

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My neck and shoulders become tense from typing and working the mouse.
--student comments

Computer use among students has increased dramatically in the last few years. Many universities now require a computer for enrollment. When questioned about computer use most students report discomfort ranging from dry eyes to back pain. This survey investigated the occurrence of discomfort associated with computer use.

Method: 95 students (23 males, 71 females, and 1 not identified; mean age 25.5, S.D 6.33, range 19-55) enrolled in upper division classes at San Francisco State University filled out a two-page demographic and symptom questionnaire. It included questions about: 1) the subjects (age, sex, height and weight); 2) computer usage (number of hours, percentage of mouse use); 3) a linear self-rating scale indicating the level of discomfort during and after computer use (0=none to 9=extreme) and description of the subjective experience of discomfort in each body area; and 4) strategies used to prevent computer related discomfort and ergonomic work setting.

Results: 92 out of 95 subjects (96.8 %) experienced some discomfort while only 3 subjects reported no discomfort. The responses on the self-rating discomfort scale (0=none to 9=extreme) for each body location were grouped into three categories according to the responses: low (1,2,3), medium (4,5,6) and high (7,8,9) (see Figure 1).

Students reported working an average of 2.9 hours (S.D.= 2.16) per day on the computer and used the mouse 45.1 % (S.D.=29.98) of the time. Even though 81% reported doing something to reduce the discomfort while working at the computer, it did not correlated with a reduction of discomfort. They utilized many practices to reduce discomfort (e.g., taking breaks, stretching and limiting the time at the computer). Their practices were combined in common categories and listed in table 1.

Only 14 subjects (15 %) reported using special ergonomic equipment. The use of ergonomic adaptations correlated 0.37 with the hours worked. There were no significant differences in male and female responses for computer and mouse use, age, sex, hours worked at the computer, percentage of mouse use, and reports of discomfort. Most

importantly, **there was no significant correlation between hours worked and reported discomfort**.

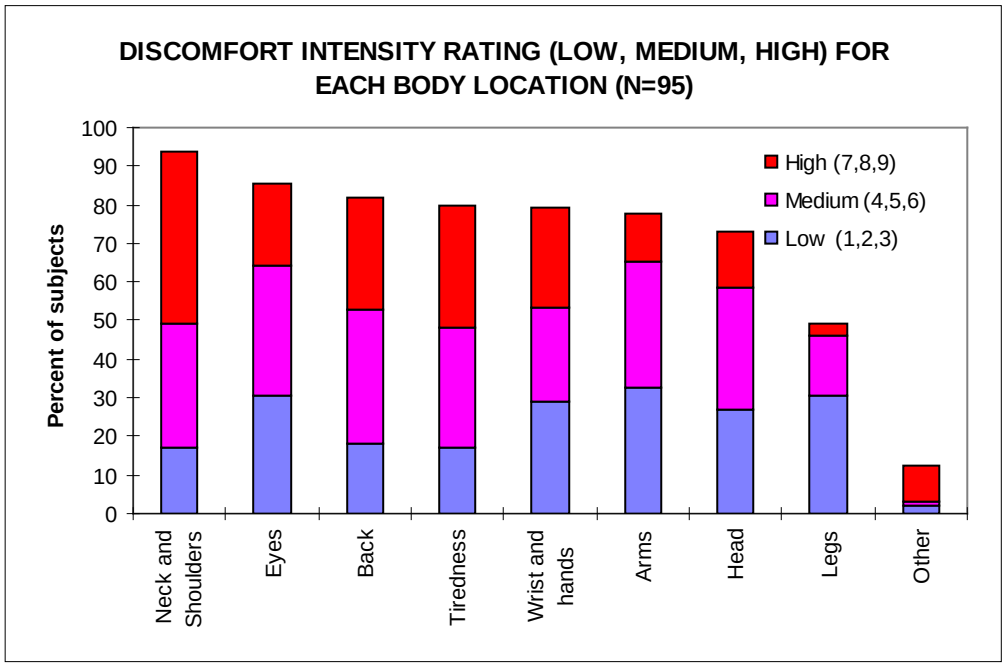

Fig 1. Distribution of discomfort for different body areas. Categories high, medium, low are derived from the responses on the self-rating discomfort scale (0=none to 9=extreme).

Practice	Freq	Example Statement of Practice
Stretch	37	Get up and stretch / arms and legs / 5 min stretches / yoga
Breaks	37	Stand up / get up and move around a lot / break every hour / small breaks
Posture	17	Change position / sit up straight and keep my arms in line / 'detective' check
Vision breaks	14	Look out window instead of screen / don't squint / look at plants
Walks	13	Walk around / walk outside every hour
Movement/exercises	11	Neck exercises / shoulder rolls / roll my head
Ergonomic changes	11	Chair / special cushion / feet flat on floor with back support
Rest & relaxation	7	Focus on letting tension go in muscles / listen to soft music / yawn
Breathing	6	Close my eyes & do breathing exercise / focus breathing in my stomach
Massage	4	Massage my neck occasionally
Eat	4	Have something hot to drink / tea break
Limit time	4	Stop when discomfort felt / only sit down for a half an hour
Alternate tasks	3	Do other tasks between typing jobs

Table 1. Frequency of remediation practices reported by 77 out of 95 students while working at working at the computer. Many reported more than one practice.

Discussion: Discomfort during and after computing among college students appears remarkably high for the short amount of time they work at the computer. Almost every student reported discomfort--only 3 reported none. When responses of the discomfort intensity are grouped into thirds (low, medium or high), more than 44 % of the respondents reported a high intensity of neck and shoulder discomfort. The major correlation in the survey is between the symptom areas (e.g., neck and shoulder discomfort is correlated with back discomfort).

Discomfort occurred despite the fact that 81% of the respondents reported doing something to feel better. Many reported doing interventions that are universally recommended (e.g., breaks, stretching or posture changes); none reported using a system's approach for prevention nor taking frequent micro-breaks. Consequently, they continued to work at the computer with covert increased sympathetic arousal and low level muscle tension (Peper et al, 1994; Peper, Harvey and Shumay, 1997).

We speculate that students did something only after experiencing discomfort. At that point they were attempting to remediate pain rather than prevent it. Hence, they did not change their work style patterns that contributed to the etiology of discomfort. When people work they are usually focused on the task and unaware of increased sympathetic arousal as indicated by low level muscle tension, increased breathing rate, and decreased peripheral temperature (Schleifer and Ley, 1994; Peper, 1994). This postulated lack of awareness matches the observations that, when keyboard placement was altered, there was no significant correlation between muscle tension and subjective awareness of muscle tension (Shumay, Peper and Tibbetts, 1995). Similarly, interpreters for the deaf were usually unaware of the drastic increase in respiration rate and decrease in peripheral hand temperature during interpreting.

The non-significant correlation between hours of computer use and discomfort reinforces the hypothesis that the etiology of computer related disorders (repetitive motion injury) is multi-causal. Factors such as ergonomics, somatic awareness, strength and flexibility, stress and work-style contribute to discomfort. The majority of the respondents reported that their computer work setting lacked optimum ergonomics. Many worked under extreme time pressure to finish papers. Hence, working even a short time at the computer, especially if one is under stress, increases the risk of discomfort.

This disturbing high incidence of discomfort, despite students' reports of interventions, suggests that they need to actively participate in prevention programs to maintain health. They should be taught similar skills as are taught to individuals in the workforce to prevent RMI while working at the computer. When such employees are trained in an active prevention program, such as the Healthy Computing Program at San Francisco State University, their symptoms are significantly reduced. This six session training program includes biofeedback, somatic awareness, work-style, stress management,

strengthening, and ergonomics. Symptoms remain low a year later as measured by a telephone interview (Shumay and Peper, 1997). Similarly, when employees receive weekly Healthy Computing Email Tips™ as part of the Healthy Computing Program they report a reduction of symptoms (Peper and Gibney, 1997).

This survey data suggests that students should shift from remediation to prevention. Most important is learning awareness and work style skills that actually prevent discomfort from occurring. Learning how to stay healthy at the computer should be the first step when they are introduced to computers. This training should be an integral part of every computer class -- from grade school to university. Armed with this training, students can enter the work force with the skills to prevent computer related injuries, and avoid the painful consequences of developing RMI.

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