PANTALLAS, ANGULO, POSTURA, DISTANCIA, TIMEPO ::: MALESTAR , EYE DRY, ITCHING

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* Common symptoms of the aforementioned include eye strain, headache, blurred vision as well as neck or shoulder pain that often increases in severity with the amount of video display terminal (VDT) use [

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* Although several studies have revealed the frequency of CVS and risk factors such as prolonged computer usage and improper workstation postures

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* The viewing of digital electronic screens is no longer restricted to desktop computers located in the workplace. Today’s visual requirements may include viewing laptop and tablet computers, electronic book readers, smartphones and other electronic devices either in the workplace, at home or in the case of portable equipment, in any location
* Some screen sizes may necessitate very small text which the observer frequently positions at a closer viewing distance than had previously been adopted for hard copy printed materials. These increased visual demands may give rise to a variety of symptoms which have been termed computer vision syndrome (CVS).
* The electronic screen would simply represent another visual target. However, there is evidence that the two forms of target presentation are not equivalent. For example, Sheedy et al.16 compared the performance of an editing task when the material was either presented on a VDT or in hard copy form. They observed that subjects made fewer errors and performed the task quicker with the hard copy presentation. Similar findings of fewer errors when viewing printed materials have also been reported in other studies.17–19 More recently, Chu et al.20 compared ocular symptoms immediately following a sustained near-task viewed either on a computer monitor or in hard copy format. Identical text was used in the two sessions, which was matched for size and contrast. In addition, target viewing angle and luminance were similar for the two conditions. Significant differences in median symptom scores were found with regard to blurred vision during the task and the mean symptom score.
* In addition, target viewing angle and luminance were similar for the two conditions. Significant differences in median symptom scores were found with regard to blurred vision during the task and the mean symptom score.
* Accordingly, it appears that the symptoms associated with CVS do not result from simply performing a near-vision task for a prolonged period of time. Even when viewing a modern flat panel monitor, subjects reported significantly greater blur during the computer task, when compared with a hard-copy printout of the same material.
* As noted earlier, many of the portable devices used today for written communication (e.g. text messaging, e-mail and internet access) have relatively small screens that may necessitate close working distances and small text sizes. These can increase the demands placed upon ocular accommodation and vergence when compared with printed materials. Indeed, Bilton28 proposed the term ‘1, 2, 10’ to describe commonly adopted working distances, with mobile (cell) phones and e-books typically being held approximately one foot (30 cm) away, desktop computers being viewed at about 2 feet (60 cm), while televisions are often viewed at a distance of 10 feet (approximately 3 m).
* In considering ocular factors that may lead to CVS, two primary areas have been identified namely: (1) inappropriate oculomotor responses and (2) dry eye. It should be noted that non-ocular causes of CVS such as poor design or organization of the workstation, which may also be a significant cause of symptoms such as back, neck, shoulder and wrist pain as well as inappropriate lighting and excess glare are beyond the scope of this paper and will not be discussed here
* Accommodation Blurred vision, either at near or when looking into the distance after prolonged computer use is a symptom commonly associated with CVS. This could result from an inaccurate accommodative response (AR) during the computer task or a failure to relax the AR fully following the near-vision demands. Patients’ symptoms frequently relate to near-visual activities, and inappropriate responses, whether under or over-accommodation relative

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* Visual display terminals (VDTs) can be used to store and convey static and dynamic visual information, and thus they have inevitably become interfaces in both the office and the industrial workplace. However, VDTs have brought with them numerous complaints of visual fatigue, mental load, and musculoskeletal pains. Of these complaints, visual fatigue is the most pronounced and prevalent

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* In the modern world, the viewing of electronic displays has become a huge part of daily living at home, at work, during leisure time and on the move. The use of desktop, laptop and tablet computers, smartphones and electronic reading devices has become ubiquitous (Rosenfield, Howarth, Sheedy, & Crossland, 2012)
* . It has been shown that the magnitude of ocular and visual symptoms is higher when viewing these digital displays, in comparison with hardcopy printed materials (Chu, Rosenfield, Portello, Benzoni, & Collier, 2011).
* While it is difficult to estimate accurately the prevalence of symptoms associated with electronic screens, as both working conditions and the methods used to quantify symptoms vary widely, an investigation of computer users in New York City noted that 40% of subjects reported tired eyes ‘‘at least half the time’’, while 32% and 31% reported dry eye and eye discomfort, respectively, with this same frequency (Portello, Rosenfield, Bababekova, Estrada, & Leon, 2012).
* Further, a recent survey of 200 children between 10 and 17 years of age by the American Optometric Association indicated that 80% of participants reported that their eyes burned, itched, felt tired or blurry after using a digital electronic device (http://aoa.uberflip.com/i/348635, page 20).

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* I t may be argued that reading text presented in hard-copy or electronic formats is one of the most common cognitive demanding near-vision tasks. Researchers from different disciplines agree that the choice of reading platform, however, is not trivial.
* For example, while dry eye is a frequently reported symptom amongst visual display terminal (VDT) users,1–4 reading in paper format has not been traditionally associated with complaints of dry eye.
* Visual fatigue among VDT users was first documented by Hultgren and Knave in 1974,6 with symptoms increasing toward the end of the day.7 Several factors may account for the differences in visual fatigue among reading platforms. First, ocular exposure, which results in tear film evaporation,8 is influenced by actual screen position, and is more relevant for desktop computers.9 I
* It may be noted that ergonomic recommendations for these devices suggest that the center of the display should be placed slightly lower than the horizontal line of sight. In contrast, laptop users have been observed to place their devices in a variety of positions,10 usually opting for a lower position, compared with desktop computer users. As for tablets, e-books, and other handheld devices such as smartphones, they are usually viewed in inferior gaze, similar to traditional printed reading material, and at a shorter distance, although user preferences also may vary.10,11 Although ergonomic recommendations aim at reducing postural related symptoms arising from prolonged computer use, as far as we know, they do not consider the relationship between display position and ocular surface exposure.
* Second, subtle differences between hard-copy and electronic formats have been observed in spontaneous eye blink rate (SEBR) and blink amplitude (complete or incomplete). Changes in SEBR have been documented to be modulated by fine motor controls, speech centers, emotional states, cognitive demands, and attention,8,9,12–14 although previous research has also revealed a possible influence of other, devicerelated factors on SEBR. Thus, Benedetto and colleagues15 compared a liquid crystal display (LCD) tablet, an electronic ink reader (E-ink) and a paper book, describing an overall subjective preference for the paper book, with the LCD tablet presenting the worst results in terms of visual fatigue and reduction in SEBR, which the authors attributed to the higher level of luminance emitted by the LCD device. On the contrary, Chu et al.,16 while also reporting higher levels of discomfort (in terms of blurred vision) when viewing a text on the computer screen, did not uncover any difference in SEBR between both conditions.17 Interestingly, however, they described a higher percentage of incomplete blinks during computer use, which may have accounted for ocular discomfort. Other authors have also documented that incomplete blinking, rather than an actual decrease in SEBR, is the main contributory factor of dry eye symptoms, further supporting the role of blink amplitude in visual fatigue.18
* Lastly, reading involves horizontal saccade eye movements, followed by fixations. To maintain stable and continuous vision, saccades are accompanied by a certain degree of visual suppression,19 the depth of which depends on the actual amplitude of the saccade.20 Thus, for small amplitude saccades, such as those involved in reading, visual suppression is effective in stabilizing vision. However, visual suppression in saccades with amplitude larger than 338 is less effective, often requiring a coupled eye blink, with its corresponding suppression, to maintain visual stability.21 It may be hypothesized that reading larger text presented in a panoramic display may result in an increase of the percentage of large amplitude horizontal saccades which, in turn, may introduce changes in SEBR.

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* Several researchers9,10,11,12,13 have reported that the distance of the computer from the eyes is a risk factor for CVS and that the closer computers are to the eyes, the more accommodation and accommodative convergence must change to achieve clear retinal images. The physiological explanation for the challenge to accommodation and accommodative convergence is that near distance results in excess accommodation, which leads to overworking the ciliary muscles of the eye, which is manifested as eye fatigue and headache. Prolonged use of computers tends to reduce the rate of blinking, which can cause redness, dryness and eye strain.