

## Scholarly Article Critique

**Student Name:** Emily van der Kamp

**Case & Diagnosis:** Case 7 Shoulder and neck pain

### **Summary and Critique of Scholarly Articles.**

**Title of Article:** “The Impact of Computer Display Height and Desk Design on 3D Posture During Information Technology Work by Young Adults” (Straker, et al., 2008)

#### **1. Pertinence of article to our topic:**

Our topic is upper back/shoulder pain. This is a research article presenting the posture measurement results from a study of the effect of screen display height as well as desk height on posture during work performed on both a computer and on paper. The use of both computer and paper is the same as in our case, our client works both with a computer and on paper. The participants were young adults, which is the population that we are interested in. The review of the literature gives good background and general information about the impact of posture on musculoskeletal injury risk. The implications for our topic is that posture and the effect of desk design and display height is important to consider when addressing neck/shoulder pain in young adults who spend a lot of time at a computer.

#### **2. Précisé of the article**

##### **a. Purpose of the study**

The purposes of this paper were twofold; first to review the existing scientific evidence of the effects of display height and desk (arm support) on posture, and second to present the results of a study comparing the effect of 2 different types of desk and 3 different display heights on posture while doing information technology work. In the study 3D imaging techniques were used to compare both the independent and interactive effects of each of the different conditions on head, neck and upper limb posture.

##### **b. Research design of the study**

This research used a quantitative experimental design. The participants were 36 young adults between the ages 18 and 25. There were 6 different combinations of the desk and display conditions. The independent variables were desk (curved or straight) and display (high computer display, low computer display and paper). The dependent variables were the specific angles of head, neck and upper limb posture as measured from infrared images of reflective markers placed on anatomical reference points of the participant's bodies. All participants completed the informational technology task in each of the 6 combinations but in randomized order. The task involved reading

information and filling out an activity sheet. When the display condition was a computer, the activity sheet was filled out with the keyboard, when the condition was paper the activity sheet was also paper. The participants were given 10 minutes to complete the task in each condition followed by a 5 minute break away from the desk while it was adjusted for the next condition.

**c. Data collection and analysis**

3D imaging of posture was performed using “the Peak Motus passive reflector motion analysis system (Chattanooga, USA)”. Participants had reflective markers fixed onto anatomical landmarks and by taking 3D images using seven infrared cameras researchers gathered x,y,z coordinates of the reflective markers, this was used to establish angles between participants’ head, neck and upper limb body segments while they worked at a desk.

Statistical analysis was performed using SPSS: “Univariate RANOVA with post hoc contrasts were calculated for each dependant variable using a critical alpha level of 0.01” and “Huynh–Feldt epsilon corrections were used if Mauchly’s test indicated lack of sphericity.”

**d. Outcomes of the study**

Independently both the display and desk conditions were found to have a significant effect on posture, there was no statistically significant interaction effect between the display and desk conditions on posture.

The paper condition resulted in uneven posture between the left and right side which has been previously shown to contribute to risk of musculoskeletal problems related to posture.

**e. Did the author explain why the work was important to, in relation to the work of other researchers?**

The number of people using computers these days is very high; it is estimated that two thirds of young adults use computers. Alongside the use of computers is the development of musculoskeletal disorders which may be related to computer user’s posture. Through their literature review the authors gave a thorough analysis of the previous research conducted in this area of study. This study distinguishes itself from other studies in that it compared postures at a computer to posture while working on paper. Also, no other study had previously looked at the interaction effects between desk and display height.

**f. What are the conclusions?**

The type of desk, height of computer display or whether the work is done on paper does matter when considering risk of musculoskeletal injury in people who do a lot of information technology work. A higher display and forearm support may contribute to better posture during this type of work. Working with pen and paper was related to higher risk of musculoskeletal disorder compared to working at a computer.

- g. **If you found issues with the article, explain what your concerns are and how that will affect your reliance in the article as a source of good evidence for your topic.**

The results of this study should be considered in conjunction with other evidence, it was a well-conducted study but has limitations in its applicability beyond the 18-25 year old population. The results could help to inform considerations about what desk and display combination should be used but should not be taken as hard fact for any particular individual. Each individual is different and should be treated as such when choosing a desk and display. In the study they measured angles of the head, neck and upper limb, no information was gathered about the position of the mid and low back as well as the pelvis. Focusing specifically on the head, neck, upper limb allowed them to gather and analyze detailed information about posture with regards to those body segments but not the bigger picture. The head, neck and upper limbs should not be considered in isolation as they are inescapably connected to the back, pelvis and lower limbs. The posture of the rest of the body would logically also have an impact on musculoskeletal injuries as a result of information technology work, even if those injuries manifest in the upper back, shoulders and upper limbs.

## References

Straker, L., Burgess-Limerick, R., Pollock, C., Murray, K., Netto, K., Coleman, J., & Skoss, R. (2008). The impact of computer display height and desk design on 3D posture during information technology work by young adults. *Journal of Electromyography and Kinesiology*, 18, 336-349.  
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