Author's response to reviews

Title: The effect of forearm posture on wrist flexion in computer workers with chronic upper extremity musculoskeletal disorders

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Author's response to reviews: see over
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Title: The effect of forearm posture on wrist flexion in computer workers with chronic upper extremity musculoskeletal disorders

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Version: 2 Date: 02 February 2008
Author's response to reviews: see over
Reviewer: David Rempel
Reviewer's report:

Major Compulsory Revisions:
1. P4 The background suggests that the musculoskeletal disorders experienced by computer users are not known. This is the case for about 50% but not all of those experiencing symptoms. References 5 and 6 are not the most appropriate for demonstrating pathology. Gerr et al. Am J Ind Medicine 41:221-235, 2002 is a prospective study of computer users with a standardized assessment for diagnosing upper limb disorders. Evidence of objective signs (not pathology) is missing in approximately 50% of those with symptoms.

We have modified the text to differentiate between specific and non-specific symptoms, their relative prevalence, and included the suggested reference.

2. P8 Two-tailed testing is preferred. The use of a Tukey follow-up test instead of the more conservative Bonferroni would be more appropriate.

We re-analyzed the data using two-tailed hypotheses for all tests of significance, and used Tukey’s post hoc test for the analysis of multiple paired-means within the groups, and Tukey-Kramer for means testing between groups due to the different sample sizes.

Minor Essential Revisions
3. P4 References 3 and 4 are reviews of the literature and their findings are not equivocal. There are consistent findings that increasing hours of keyboard or mouse use are associated with increasing prevalence of symptomatic reporting.

Our citation was incorrectly phrased. We meant to convey the message that only half of the studies included in each literature review examining the relationship between computer use and symptoms had found a positive association. We agree that the results of the reviews themselves were not equivocal and have made corrections to the text.

4. P7 It would very useful to classify the musculoskeletal conditions of the participants with a systematic history and physical examination. Were these primarily neurogenic or musculoskeletal? What were the specific diagnoses based on one, experienced physician’s evaluation? The control subjects should have been age and gender matched.

Participant recruitment did not involve their respective physicians. The participants reported their diagnoses to us, and unfortunately we do not have
access to any of their clinical data. We have indicated the lack of age and gender matching as a limitation, but note that the ages of 6 of the 7 female control subjects were within the age range of the 4 female UEMSD subjects.

5. P7 measurement of wrist posture with passive flexion would have allowed some differentiation whether the limitation of wrist motion was due to excess muscle tone vs structural changes in the extensor system.

This study was designed to measure whether forearm posture would affect the flexion angle at which pain was elicited in UEMSD subjects during active flexion. We presume that passive measures would have produced increased flexion in both groups, but that differences between each group and between forearm postures would still be evident. It would certainly be useful to have an objective measure of flexion force. However, the application of an external flexion force would show only that non-physiologic wrist joint loading produces an increase in wrist flexion angle. Whether this flexion force overcomes tension in the extensor musculature, or reduces the length of the flexion moment arm due to intercarpal ligament strain would need to be established before conclusions could be drawn. A recent cadaveric study (Patterson, et al. 2007, JHS Am.) found no difference in wrist flexion kinematics between passive and simulated active flexion to approximately 30 degrees. However, in this study antagonist extensor tension was simulated to represent normal in vivo tonus (22N), an assumption that may not be valid in individuals with UEMSD.

6. P8 and all figures Either the term 'dominant' or 'right' should be used throughout the text and in the figures. Both terms are used.

We have changed the figure legend and table to be consistent with the text.

7. Discussion The discussion is long. It is also short on interpreting the findings and lengthy on speculation. The discussion would be improved if these were reversed.

Selected speculative portions of the discussion have been abbreviated. We became aware of a pertinent study after our original submission (Hewitt D., 1928, J. Bone & Joint Surg. Am.) and have included a brief discussion of the relevance of its findings.

8. The term CULP should be replaced with chronic upper extremity musculoskeletal disorder.

The term CULP was replaced with upper extremity musculoskeletal disorder in the text and the title.
Discretionary Revisions
9. P4 Replace 'psychological stressors' with 'psychosocial stressors'

The term 'psychological stressors' was replaced with 'psychosocial stressors'.

10. P7 The extended elbow position allows rotation at the shoulder during forearm pronation/supination - an elbow flexed to 90 degrees would not have allowed this motion.

The elbow was not fixed, so some degree of shoulder rotation may have occurred during forearm pronation/supination. As this would decrease the relative displacement of the distal ECU tendon, in some cases flexion limitations with the forearm supine may have been understated. We do not think this is a significant limitation in our present study, but is certainly a consideration for future work.

Reviewer: ROBERTA BONFIGLIOLI
Reviewer's report:
Minor Essential Revisions
1. Abstract (Results): add a preposition ‘at’ in the dominant wrist ‘at’.. all forearm postures.

The preposition ‘at’ was added to the text.

2. Background: Authors should add as an objective of the study: ‘to determine if wrist postures (flexion angle) can be affected by chronic forearm pain’.

This objective was added.

3. Discussion: Authors should add some limitations of this study:
- the sample size is small (especially for the CULP group)
- in the CULP group subjects without a muscle tendon disorders, but affected by peripheral neuropathy (i.e. CTS), could have been included

We have included sample size as a limitation of the study.
One UEMSD subject had been diagnosed with CTS as indicated in the Methods.

Reviewer's report
Reviewer: Jack T. Dennerlein
Reviewer’s report:
In this paper, the authors summarize a study comparing the range of motion of the wrist joints across various forearm postures within subjects and across symptomatic and asymptomatic groups of human subjects. The authors observed that wrist range of motion (ROM) is smaller for symptomatic subjects and that ROM also decreases for supinated forearm postures compared to pronated. They attribute the postural function due to neuromuscular
biomechanics and the differences across symptomatic subjects due to decreased function; however, cannot draw conclusions about the specific role in the injury pathway due to the cross-sectional design of the study.

*We have included a brief description of the limitations of the cross-sectional design of the study.*

**Reviewer's report**

**Reviewer:** Jesse Jupiter  
**Reviewer's report:**  
I believe this is a most interesting article and should certainly be published in your journal