

# POSTURE AND MUSCLE ACTIVITY IN PREGNANT WOMEN AND CONTROLS DURING COMPUTER WORK

Geneviève Dumas<sup>1</sup> Tegan Upjohn<sup>1</sup> Alain Delisle<sup>2</sup> Andy Leger<sup>1</sup> Karine Charpentier<sup>1</sup> André Plamondon<sup>2</sup> Erik Salazar<sup>2</sup>

<sup>1</sup> Queen's University, Kingston, ON, Canada, e-mail: dumas@me.queensu.ca

<sup>2</sup> Institut de Recherche Robert Sauvé en Santé et en Sécurité de Travail, Montréal, QC, Canada

## INTRODUCTION

For pregnant women, working at a computer workstation for long periods of time may be problematic for the back, the shoulders and the upper extremities. Introduction of forearm support while using the keyboard and mouse has been reported to be an effective intervention strategy for reducing muscle activity in the upper extremities [1,2]. Although several studies have investigated the effects of forearm support on upper extremity posture and muscle activity, none have identified the effects of such support on low back muscle activity and trunk posture. The aim of this study was to compare upper extremity and low back muscle activity and posture in pregnant women and non-pregnant controls and examine the effect of a desk attachment board (Workplace board, *Life With Ease*) during computer work.

## METHODS

Twelve women in their 32<sup>nd</sup> week of pregnancy ( $\pm 2$  weeks), and 18 non pregnant women participated in the study. They were employed in jobs involving computer work for at least 15 hr/wk. Participants' own office workstations were ergonomically adjusted, and normal work activities were performed for two weeks with these adjustments. A 20-minute computer task was completed in a laboratory setting under two conditions: 1) using a standard desk, 2) using the Workplace board. 3D posture and muscle activity were monitored during the task. (Figure 1) Muscles monitored included the upper trapezius (bi-laterally), right anterior deltoid, right forearm extensor, and bi-lateral longissimus (at L1) and multifidus (at L5). Posture was monitored using two Optotrak bars to track IRED clusters on the right forearm, upper arm, C7, head, pelvis and thigh. Participants were tested before and after two weeks of familiarization with the board in their workplace. APDF analyses were performed on both kinematic and EMG data. A mixed design ANOVA with 1 between factor (Group) and 2 within factors (Desk and Visit) was performed.

## RESULTS AND DISCUSSION

Pregnant and control participants were aged 31.8(4.1) and 31.3(6.9) yrs, with a height of 166.9(6.9) and 166.0(10.2)cm, and mass of 69.4(7.3) and 69.0(13.6) kg respectively. No significant differences were found between groups.

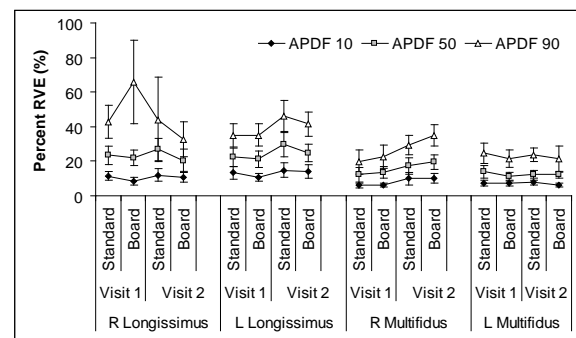
*Upper extremity:* No between-groups differences were detected in upper extremity posture. The Workplace board increased wrist extension at APDF 10, 50 and 90 ( $p \leq 0.01$ ) but more for the control than the pregnant group (interaction at APDF 10 and 90,  $p < 0.05$ ). Elbow flexion increased at all levels in both groups with the board ( $p \leq 0.04$ ). Muscle activity in the anterior deltoid was higher in the pregnant group. An increase in muscle activity was also found with the board in the right trapezius at all levels

( $p=0.01$ ) of APDF, and for the forearm extensor at APDF 10 ( $p=0.02$ ).



**Figure 1:** Pregnant participant completing the 20 minute computer task with the Workplace board.

*Trunk and back:* Pregnant women showed less trunk flexion than controls by 3-5°, and greater lateral neck bend (3°). No significant trunk angle effects were found with the board. No group comparisons were attempted for the back muscle data because of the small sample for the pregnant group due to missing data. Use of the board reduced muscle activity in the left longissimus (APDF 50,  $p=0.02$ ) and multifidus (APDF 90,  $p=0.03$ ) for the pregnant group (Figure 2), and left longissimus (APDF 10,  $p \leq 0.01$ ), right and left multifidus (APDF 50,  $p=0.04$ ) for the control group.



**Figure 2.** Back muscles activity (APDF) in pregnant group.

*Summary:* During computer work, pregnant women sat with a more upright posture than controls, but the posture of their right arm was not different even though muscle activity of their anterior deltoid muscle was higher. The Workplace board may have a beneficial effect for back muscles but may have adverse effects on upper extremities.

## ACKNOWLEDGEMENTS

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## REFERENCES

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