

# *Effects of an Ergonomic Intervention on Musculoskeletal Discomfort among Office Workers*

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*Rudakewych, M., Valent-Weitz, L. and A. Hedge (2001) Effects of an ergonomic intervention on musculoskeletal discomfort among office workers. Proceedings of the Human Factors and Ergonomics Society 45th Annual Meeting, Vol. 1, 791-795.*

# *Acknowledgements*

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- *Cornell University*

# *Study Goals*

- *Evaluate the effects of an ergonomic intervention on the self-reported health and well-being of personnel.*
- *Investigate non-environmental correlates of musculoskeletal discomfort among computer users.*

# *Survey Sample*

- *1,100 employees retrofitted and participated in entire ergonomics program*
- *599 responded to pre-intervention survey*
- *534 responded to post-intervention survey (approx. 12 months period)*
- *195 only pre-intervention survey*
- *130 only post-intervention survey*
- *356 matched sets (by July deadline for HFES)*
- *404 matched cases (by end of August).*
- *~66% participated in some aspect of the study.*

# *Study Design*

- *Sample selection*
  - *356 workers matched pre-and post-intervention*
- *Pre-retrofit survey*
  - *questionnaire administered during ergonomic training (phased over a 4 month period from May through September, 2000) and while the retrofit was being implemented*
- *Post-retrofit survey*
  - *questionnaire administered in June 2001*

# *Ergonomic Intervention*

- *All study participants provided with:*
  - *Negative slope keyboard tray*
  - *Upper mouse platform that pivots over keyboard tray*
  - *Ergonomic chair*
  - *Ergonomic training*
- *Upon request and following training, some study participants provided with:*
  - *Document holder*
  - *Anti-glare screen filter*
  - *Assistance in adjustments of workstations*

# *Participant Characteristics*

	<i>Men</i>	<i>Women</i>
<i>Gender (%)</i>	<i>47.8</i>	<i>52.0</i>
<i>Mean Age (yrs)</i>	<i>46.5</i>	<i>49.0</i>
<i>Mean Height (cm)</i>	<i>179.8</i>	<i>163.1</i>
<i>Mean Weight (kg)</i>	<i>87.9</i>	<i>64.5</i>
<i>Right-handed (%)</i>	<i>97.3</i>	<i>97.6</i>
<i>Years worked</i>	<i>17.6</i>	<i>15.6</i>
<i>Hours per week</i>	<i>35.3</i>	<i>34.8</i>

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# *Participant Computer Use*

	<i>Men</i>	<i>Women</i>
<i>Computer work (mean # days/week)</i>	<i>5.3</i>	<i>5.2</i>
<i>Computer work (mean hours/day)</i>	<i>5.5</i>	<i>6.0</i>
<i>Touch typists (%)</i>	<i>51.1</i>	<i>14.2</i>
<i>Fast typing speed (%)</i>	<i>8.7</i>	<i>26.0</i>
<i>Glasses/contact lens (%)</i>	<i>70.3</i>	<i>70.0</i>
<i>Bifocal/progressive lens (%)</i>	<i>29.2</i>	<i>30.0</i>

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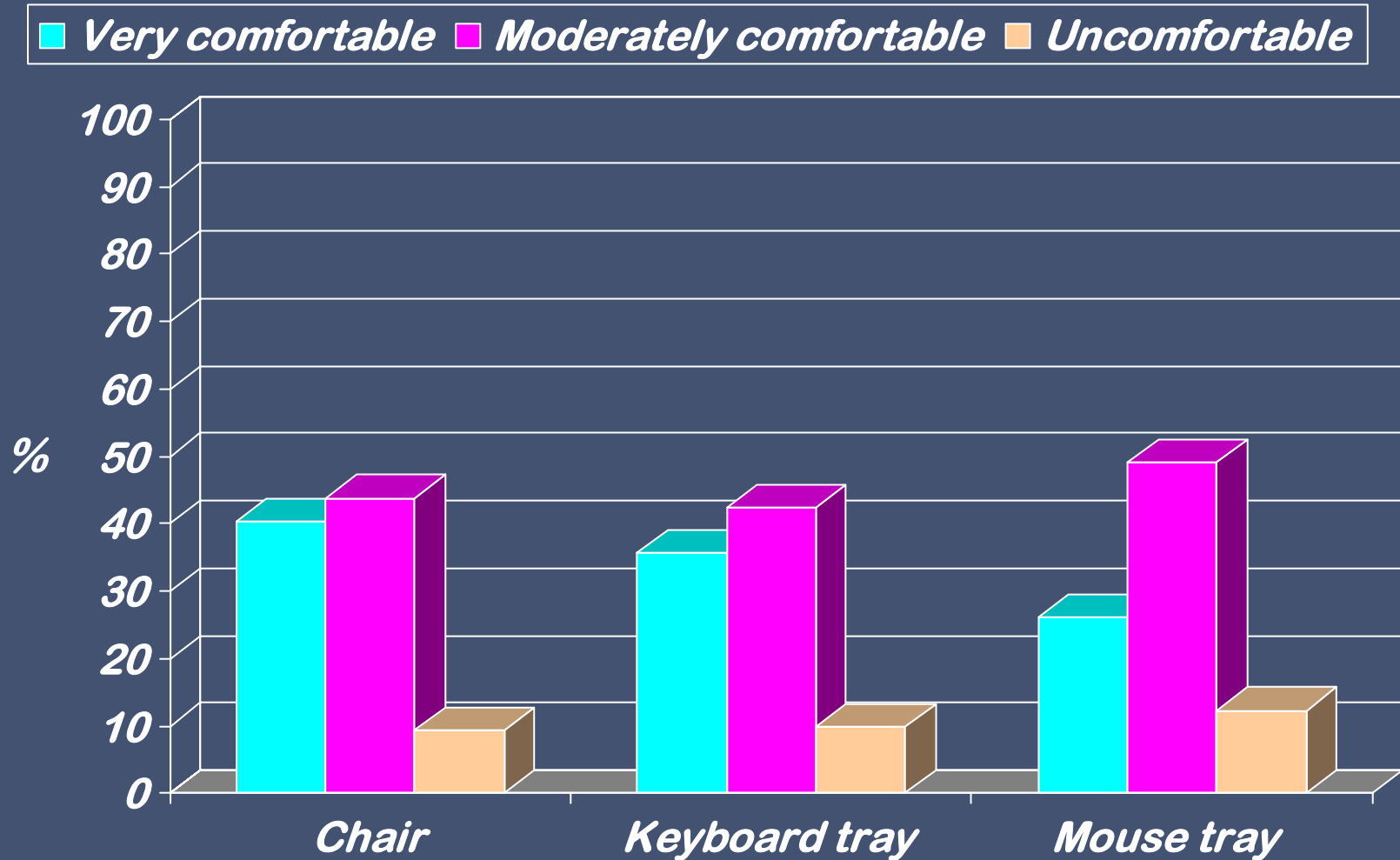


# *Continuous Computer Use*

*Mean duration of work without a rest break.*

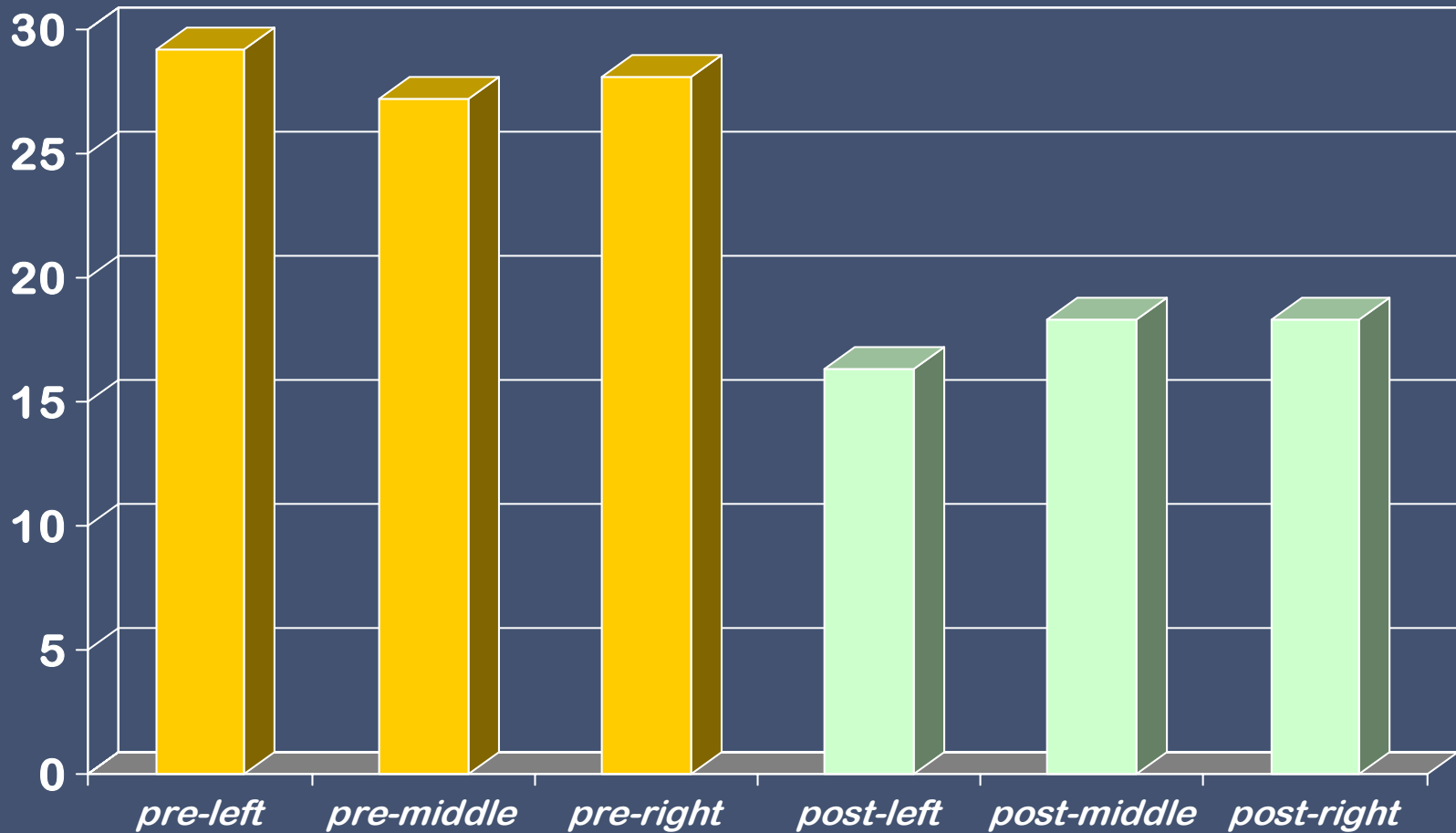
<i>Time interval</i>	<i>Keyboard</i>	<i>Mouse</i>
<i>&lt; ½ hr. (%)</i>	<i>18.3</i>	<i>43.5</i>
<i>½-1 hr. (%)</i>	<i>32.6</i>	<i>28.9</i>
<i>1-2 hrs. (%)</i>	<i>29.2</i>	<i>13.2</i>
<i>2-3 hrs. (%)</i>	<i>14.9</i>	<i>10.4</i>
<i>3-4 hrs. (%)</i>	<i>1.4</i>	<i>1.1</i>

# Comfort Ratings for Ergonomic Intervention Products



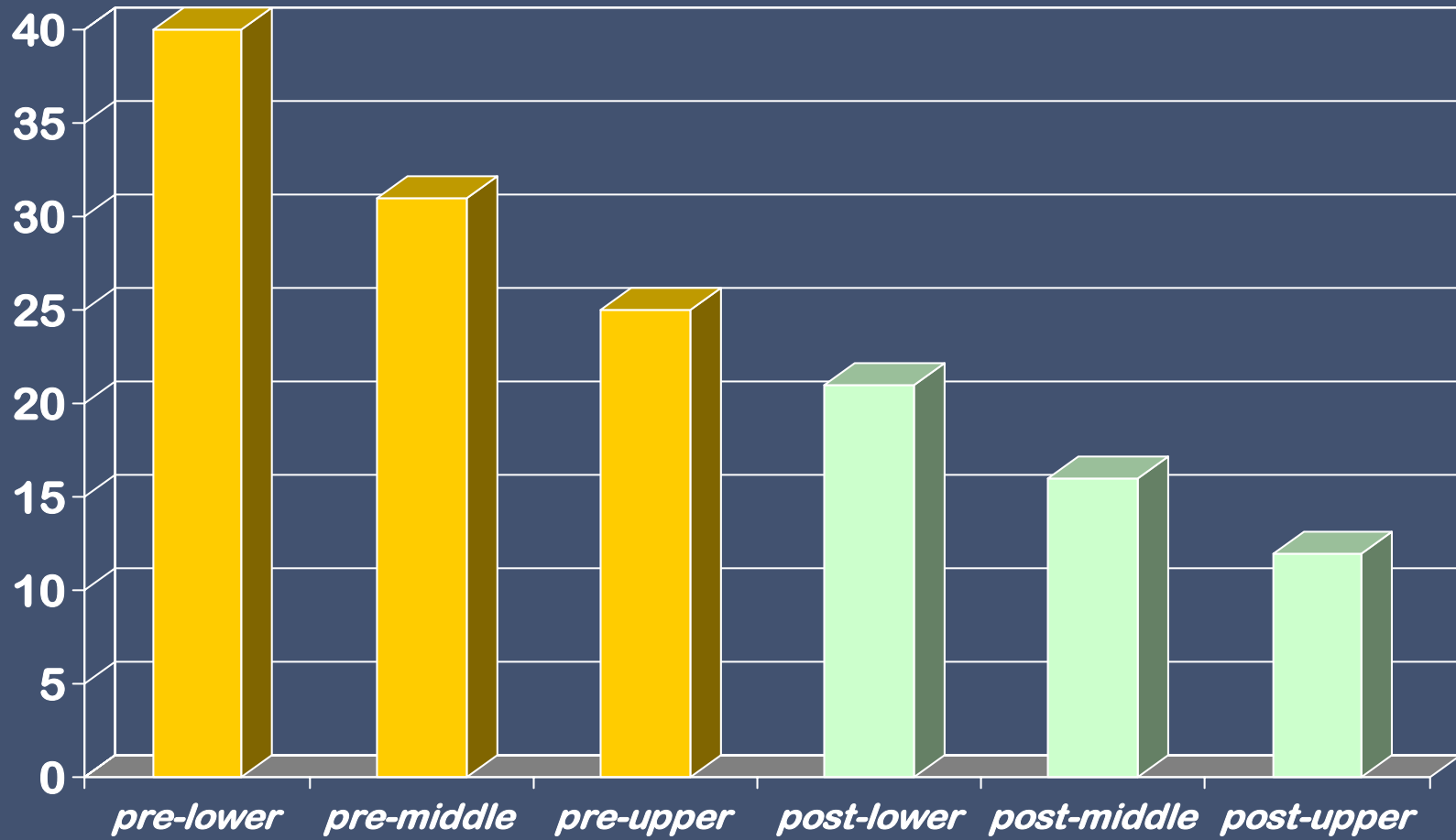
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# *Neck Discomfort*



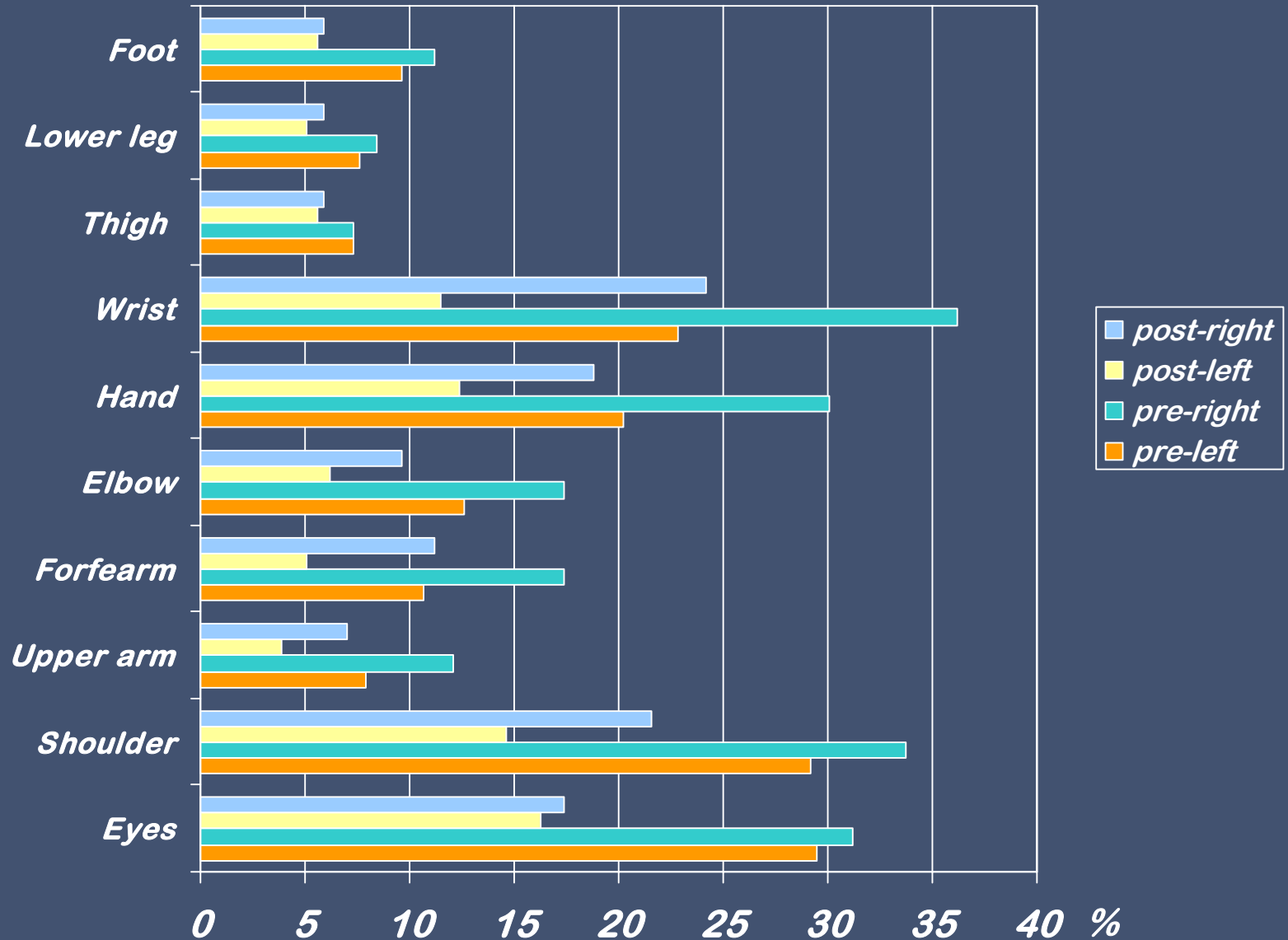
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# *Back Discomfort*



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# Musculoskeletal Discomfort



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# *Change in Musculoskeletal Discomfort*

	<i>% decrease</i>
<i>Eyes</i>	<i>44.5</i>
<i>Shoulder</i>	<i>42.4</i>
<i>Upper arm</i>	<i>45.5</i>
<i>Forearm</i>	<i>42.0</i>
<i>Elbow</i>	<i>47.3</i>
<i>Hand</i>	<i>38.0</i>
<i>Wrist</i>	<i>39.5</i>
<i>Thigh</i>	<i>21.2</i>
<i>Lower leg</i>	<i>31.3</i>
<i>Foot</i>	<i>44.7</i>
<i>Neck</i>	<i>37.3</i>
<i>Back</i>	<i>49.1</i>

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# Conclusions

- *Results show an average 40% decrease in reports of musculoskeletal discomfort maintained some 12 months after the ergonomic intervention.*
- *Results show that an ergonomic intervention that combines engineering controls (keyboard/mouse tray; chair, etc.) and work-practice controls (training) is a cost effective way of reducing musculoskeletal problems in an office.*

# Conclusions

- *Results reinforce the value of a programmatic approach to ergonomics.*
- *A successful ergonomics program requires the following key items:*
  - *Management support (i.e. funding)*
  - *Program management by ergonomic experts*
  - *Assessment of needs - Ergonomic evaluations (facility, workstation)*
  - *Ergonomic intervention – corrective action*
  - *Training (management and employees)*
  - *Tracking progress of program and individuals through surveys etc.*
  - *Employee participation*