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A Joint Labor/Management Comparative Study of Various Non-Keyboard Input Devices in a Call Center Environment

A presentation by
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Introduction and History of Ergonomics Between CWA and U S WEST

1987: Complaints of Cumulative Trauma Disorders (CTDs) from directory assistance operators in Denver, CO. OSHA investigates. Ergonomics agreement between CWA and U S WEST.

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- **CWA and U S WEST agree to co-sponsor a NIOSH Health Hazard Evaluation (HETA 89-299-2230) on VDT use by operators**
- **CWA and U S WEST develop ergonomics language in collective bargaining agreements**
- **Joint labor/management cooperative approach to ergonomics**

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History of Ergonomics in Albuquerque

- In December, 1998 (at the Mutual Occupational Safety and Health Committee or MOSHC meeting), discussion was raised on conducting a comprehensive pilot study of computer input devices in order to see if "ergonomic" devices were of any help in overcoming discomfort or pain and, if so, which devices were appropriate under what circumstances.

Why Albuquerque was selected:

- Cadre of trained ergonomic assessors in place and familiar with workstations at location
- Single building with multiple workgroups performing the same tasks, with similar workstations and computer software/hardware
- Robust ergonomics program where employees understood and "valued" ergonomics
- Support for the study by employees and management

Why the study succeeded in Albuquerque:

- People believed in the study
- Employees were "open-minded"
- The study dealt with "real issues"
- Employees were the "expert" in their jobs
- Elements of the study were "training-oriented"
- Union involvement and management support
- No names used in the study

Difficulties that had to be overcome:

- Four questionnaires were time-consuming
- People didn't understand why questions had to be repeated each time
- Everything had to be done "just right" in order to maintain the integrity of the data and study
- Some people lost enthusiasm for the study as time progressed (study fatigue)

Methods and Results

This pilot study involved a repeated measure design and custom instrumentation to measure perceived ease of operation, productivity and comfort with regards to three types of input devices.

The Subjects

- 44% were able to place their "mousing" device next to their keyboard
- 79% place their "mousing" device further away from and/or higher than the keyboard
- 5% have used input devices in their lap

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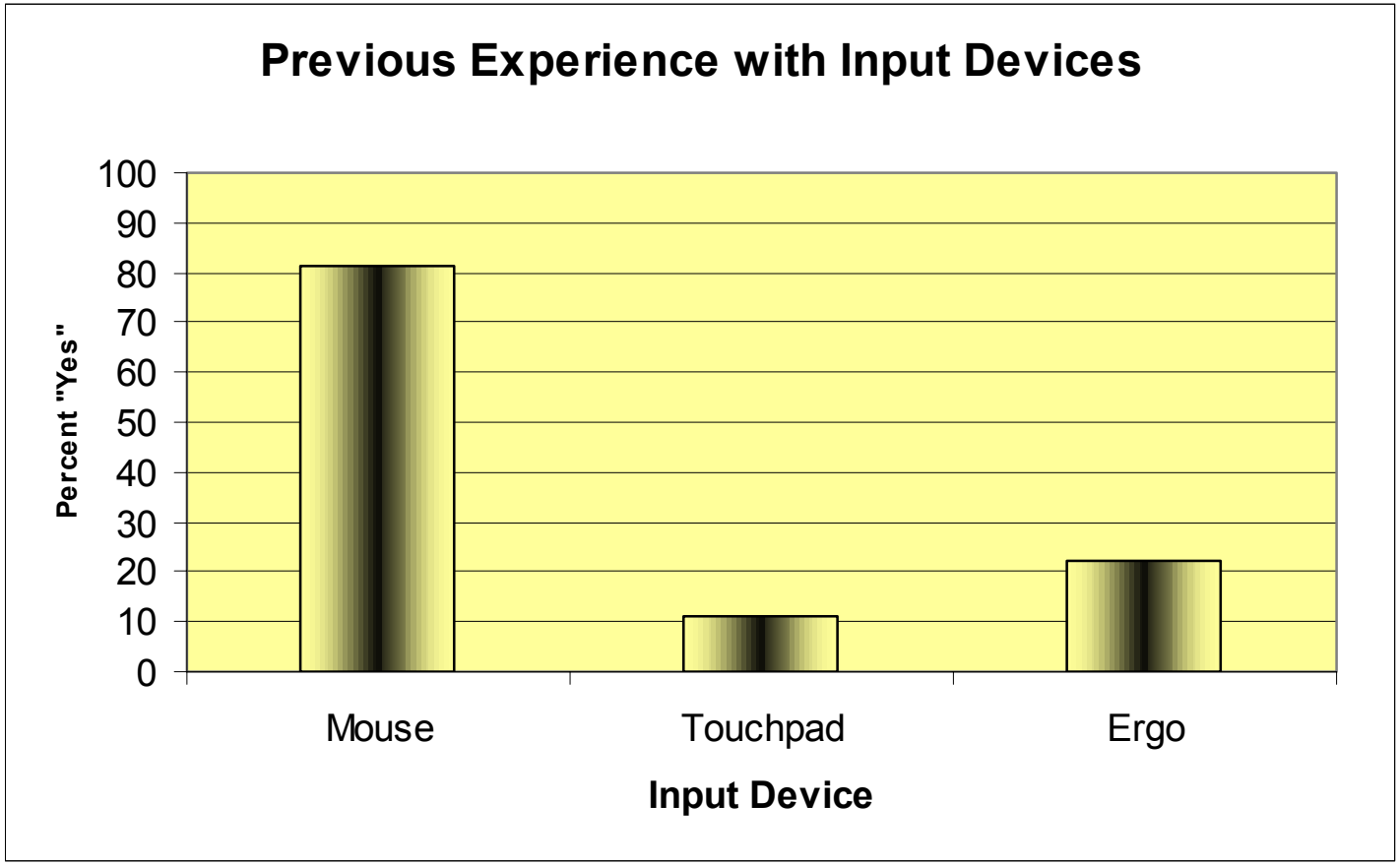

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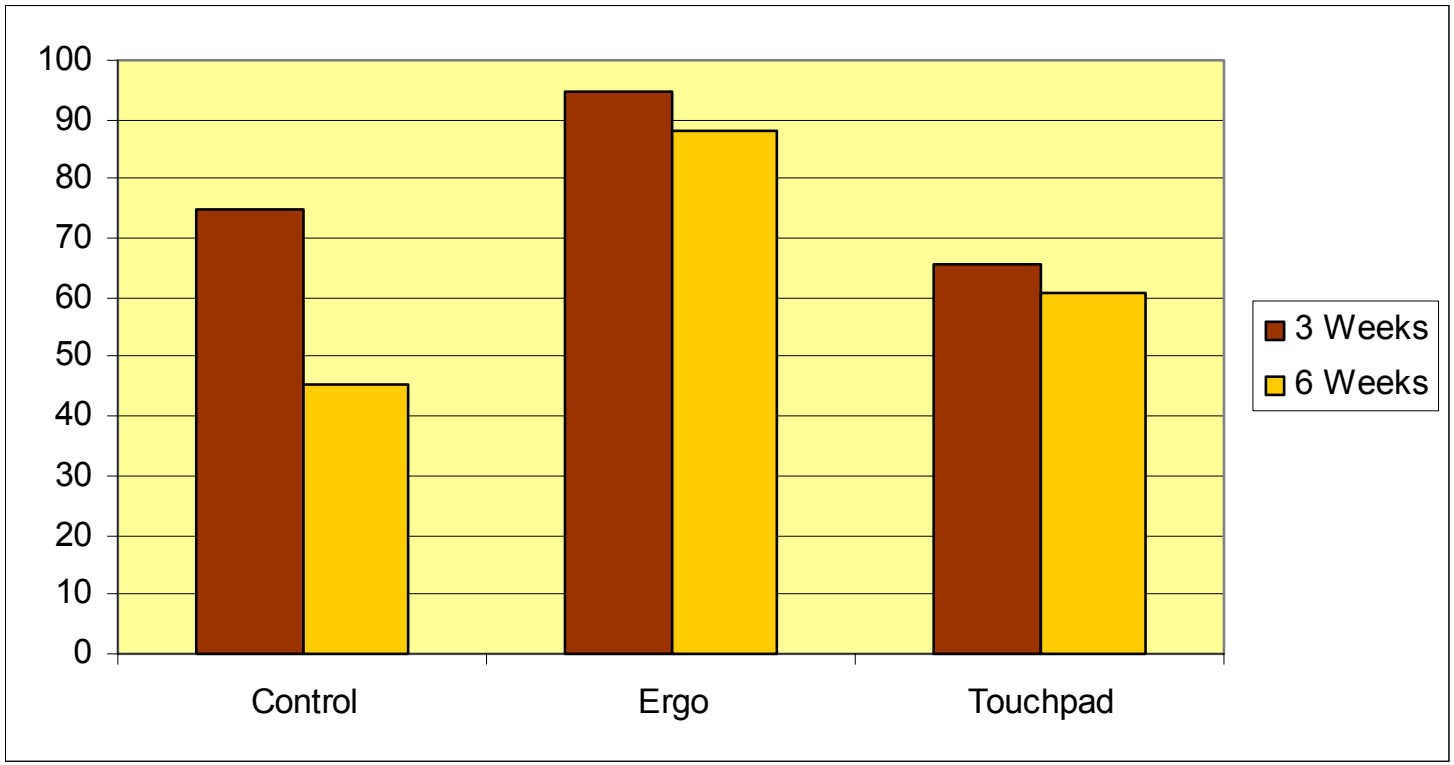
Positive Reaction to the Devices



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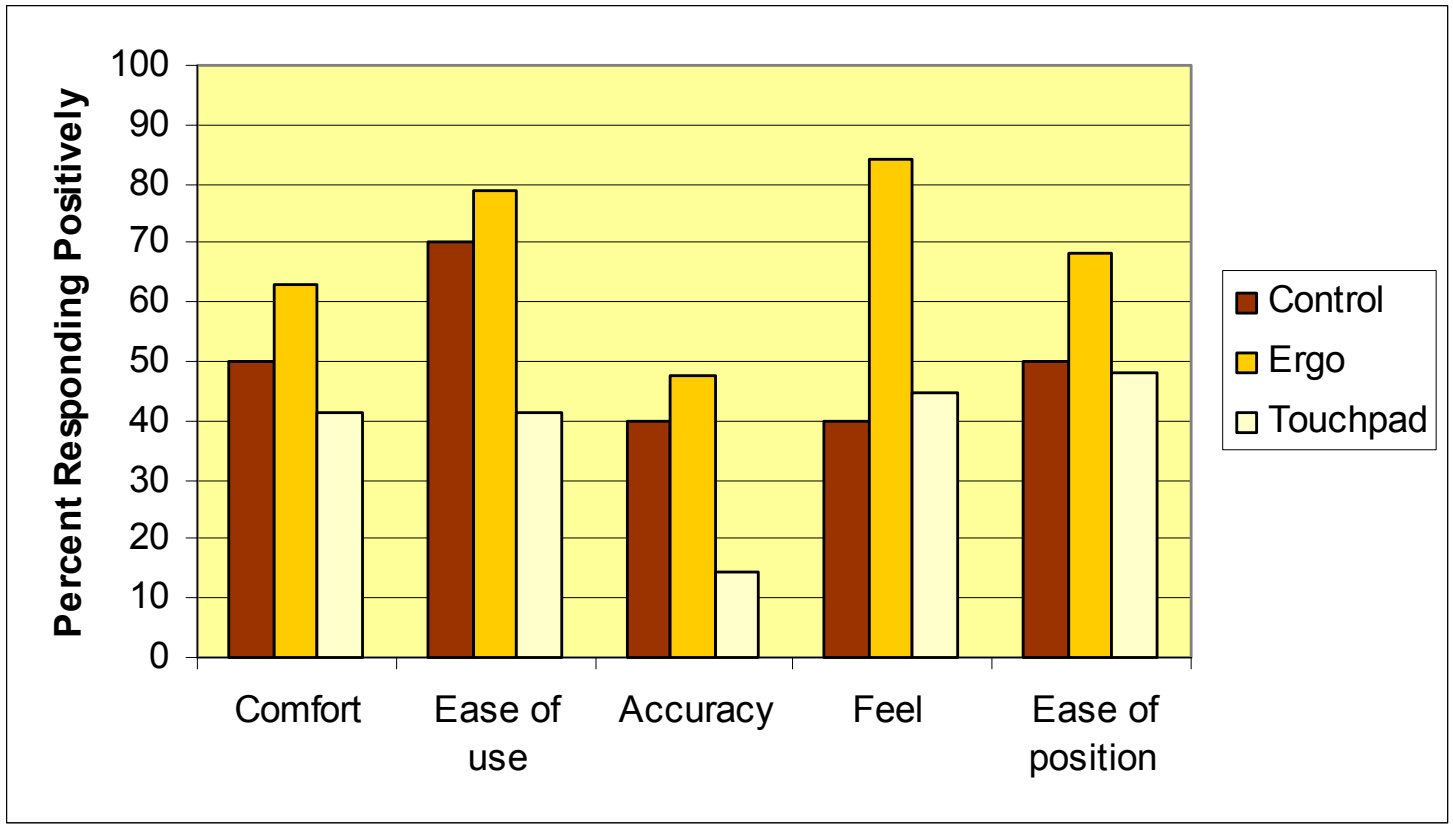
Reported Positive Attributes



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Responses of Primary Interest

- Force required to activate the device
- Smoothness of operation
- General effort required to operate the device
- Comfort level
- Ease of accuracy
- Overall ease of operation
- Reports of pain/discomfort and location

No Differences Found

- Force required to activate the device
- Comfort level
- No age effect
- No gender effect
- No effect from hours of use per week
- Unable to assess effect of experience

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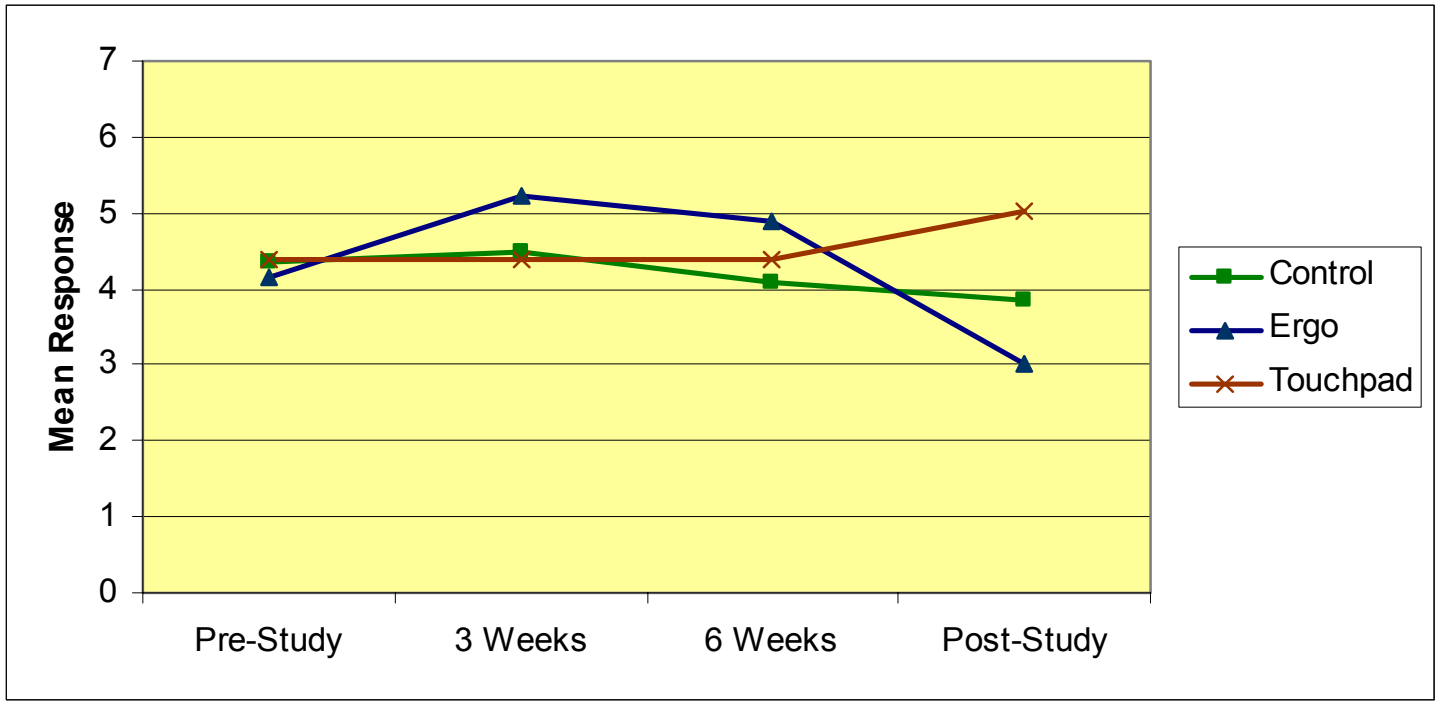
Smoothness of Operation



Differences between groups over time significant at p<.025

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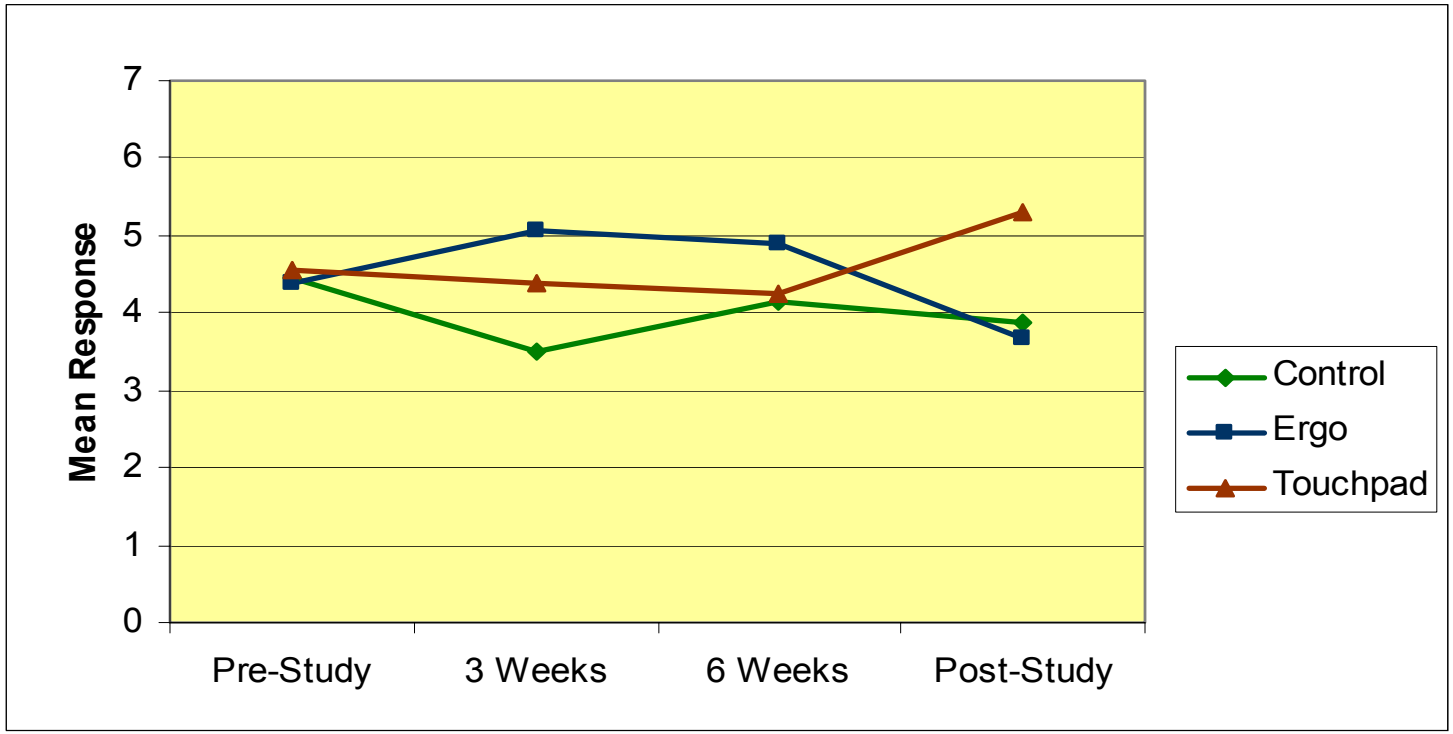
Effort Required for Operation



Difference between groups over time significant at p<.05

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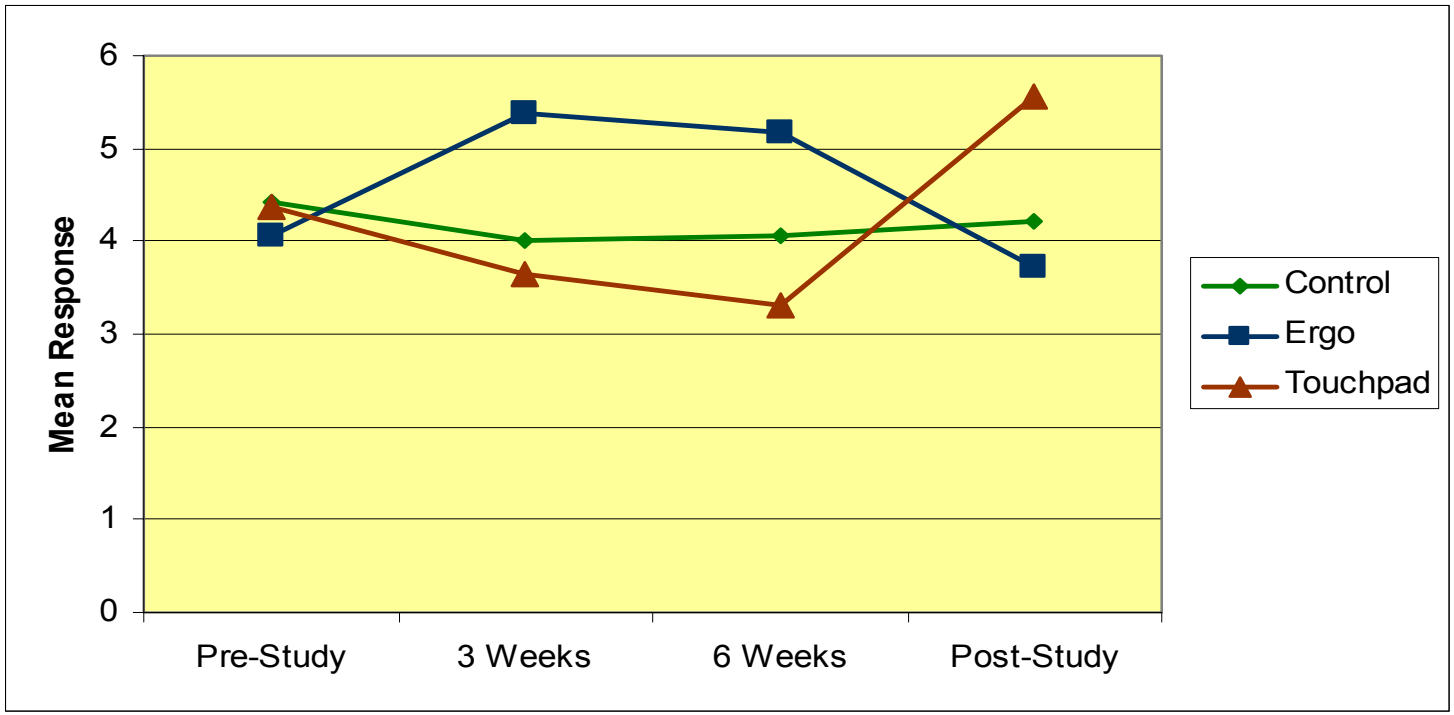
Perceived Accuracy of the Device



Difference between groups over time significant at p<.001

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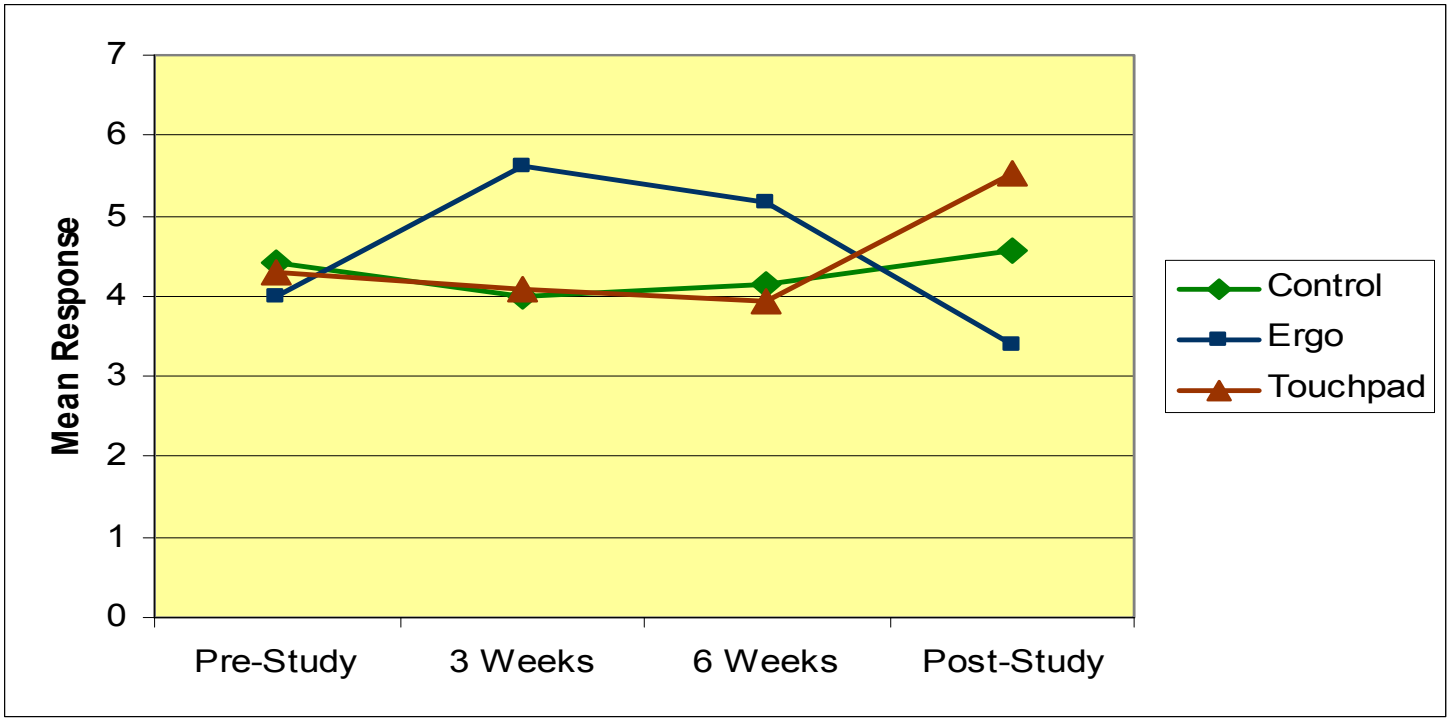
Ease of Use of the Device



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Response Variables as a Group

- Time effect for group of variables as a whole:
  - Responses in general changes over time
- Group by time effect for group of variables as a whole:
  - Responses in general changes differently for the groups over time
- Total years of experience with computers affected responses

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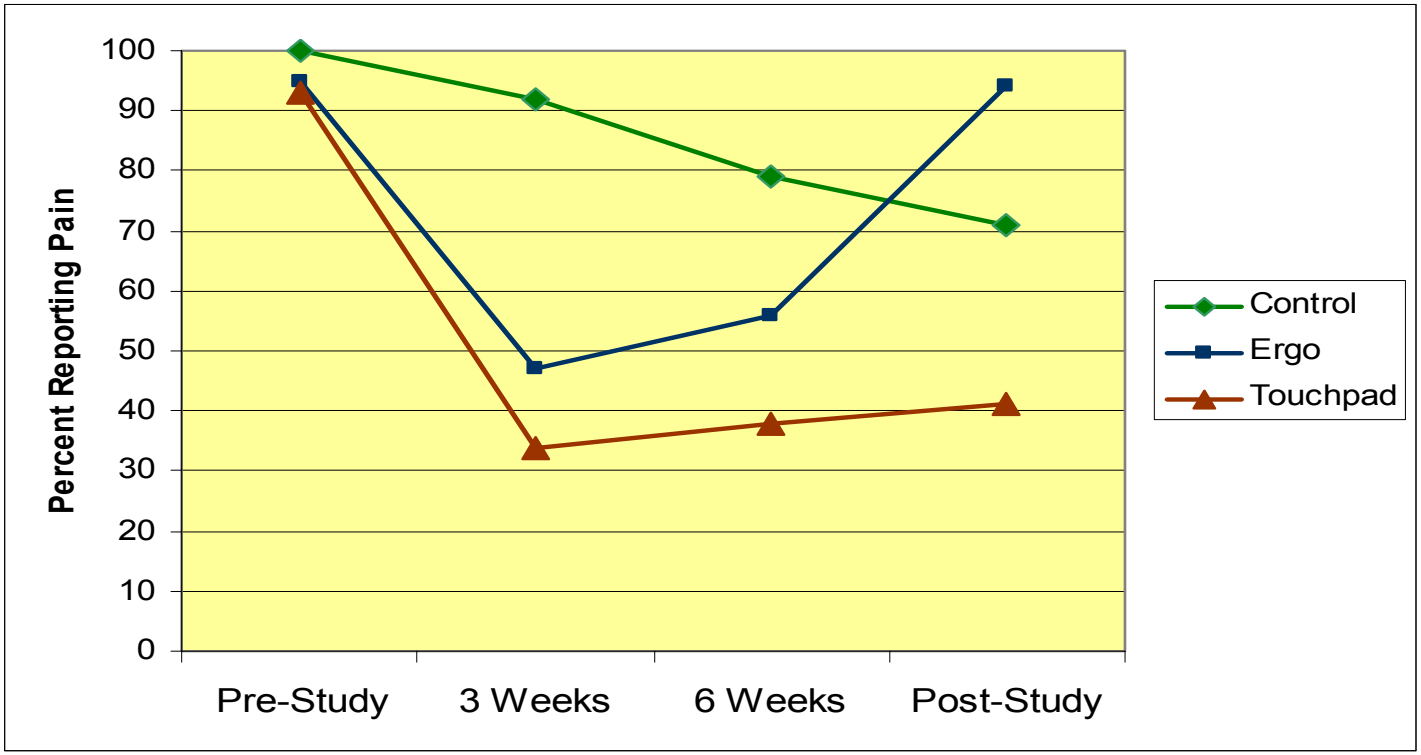
Reported Pain or Discomfort



Difference between groups over time significant at p<.001

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Reports of Pain or Discomfort

- **Most dramatic reductions in pain were relative to shoulder, back and neck**
- **No effect of age or gender overall**

Summary

- Contour mouse groups responded most positively during the study period. Positive assessment of smoothness of general effort required, accuracy and ease of use.
- Cirque Touchpad group responded less favorably during the study period for the same variables, but had best results four week post-test for pain.
- All three treatment groups reported significantly less pain during the study period with a return to pre-study levels for the Contour groups four weeks post-test.

Where do we go from here?

- Data supports strategies for input device selection and position at workstation.
- Data supports positioning the input device at the same level as and left or right of the keyboard.
- Data supports premise that awkward posture and biomechanical forces to overcome disadvantages, not repetitive motion, are the issues with mice.
- "Sculpted, ergonomic mice may or may not have any long-term effect (e.g., maintaining reduced discomfort).
- Although not particularly favored, the touchpad had greatest impact on employee comfort post-test.

Questions