Effect of Participatory Ergonomics Training on Non-ergonomist Ratings of Ergonomic Exposures

A Healthier Workforce Center for Excellence Pilot Study

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HEALTHIER WORKFORCE CENTER FOR EXCELLENCE

Rationale

Participatory ergonomics (PE) often suggested as an effective intervention strategy to control musculoskeletal disorders (MSDs)

Elements of participatory ergonomics programs

- Joint employee-management team
- Diverse personnel experience and perspectives
- External ergonomist
- Training in ergonomics process
- Support meetings with ergonomist

PE Interventions: Reported Benefits

- Reductions in work-related musculoskeletal symptoms
  - e.g.: Vink & Kompier, 1997; Evanoff et al., 1999; Bohr 2000; Bohr 2002
- Reductions in MSD claims rates and costs
  - e.g.: Lanoie & Tavenas, 1996; Moore & Garg, 1998; Evanoff et al., 1999; Carrivick et al., 2002; Joseph 2003; Moreau, 2003; Butler, 2003
- Reduced exposure to physical risk factors
  - e.g.: Vink & Kompier, 1997; St. Vincent et al., 1998; Laing et al., 2005
- Other reported benefits:
  - Reduced work stress, sick leave and absenteeism, improved productivity and product quality
- Review of PE and health outcomes was equivocal
  - Rivilis et al. (2008). Applied Ergonomics, 39:342-258

PE Interventions: Knowledge Gaps

- Limited description of change theories used to implement PE interventions
  - Wijk and Mathiassen, 2011
- Infrequent use of process evaluation
  - Dale et al., 2012
- When reporting effect of PE on exposures:
  - Inconsistent or unspecified exposure assessment methods
  - Role of external ergonomist unclear

PE Interventions: Exposure Assessment

- Ability of non-ergonomist to <u>independently</u> perform exposure assessments is unclear
  - Saleem et al., 2003; a lab study with university students
- Diversity of PE committee members
  - Intimately familiar with industrial processes
  - Inherent baseline understanding of ergonomics

Study Objective

- Provide quantitative information about a nascent PE committee's collective understanding of ergonomics exposures
  - Compare pre- and post- training

Specific Aims

Specific Aim 1

Establish and train a participatory ergonomics committee at nearby manufacturing facility

Specific Aim 2

Examine effect of training on measures of agreement between expert and non-expert ratings of ergonomic exposures

Methods: Aim 1

Ergonomics process training content

- Musculoskeletal disorders; anatomy and risk factors
- Exposure assessment
- Video analyses of actual tasks
- Design and implementation of controls

Support meetings

- Facilitate discussion
- Assist with prioritization and control design

Methods: Aim 1

Facility Description

Global manufacturer with >20,000 employees

Facility produces vinyl-framed windows

Approximately 350 employees on-site

Multiple assembly lines, organized by area and then tasks

Ergonomics Committee Members (n=9)

Production manager

HR manager

Quality/reliability representatives (3) (responsible for safety)

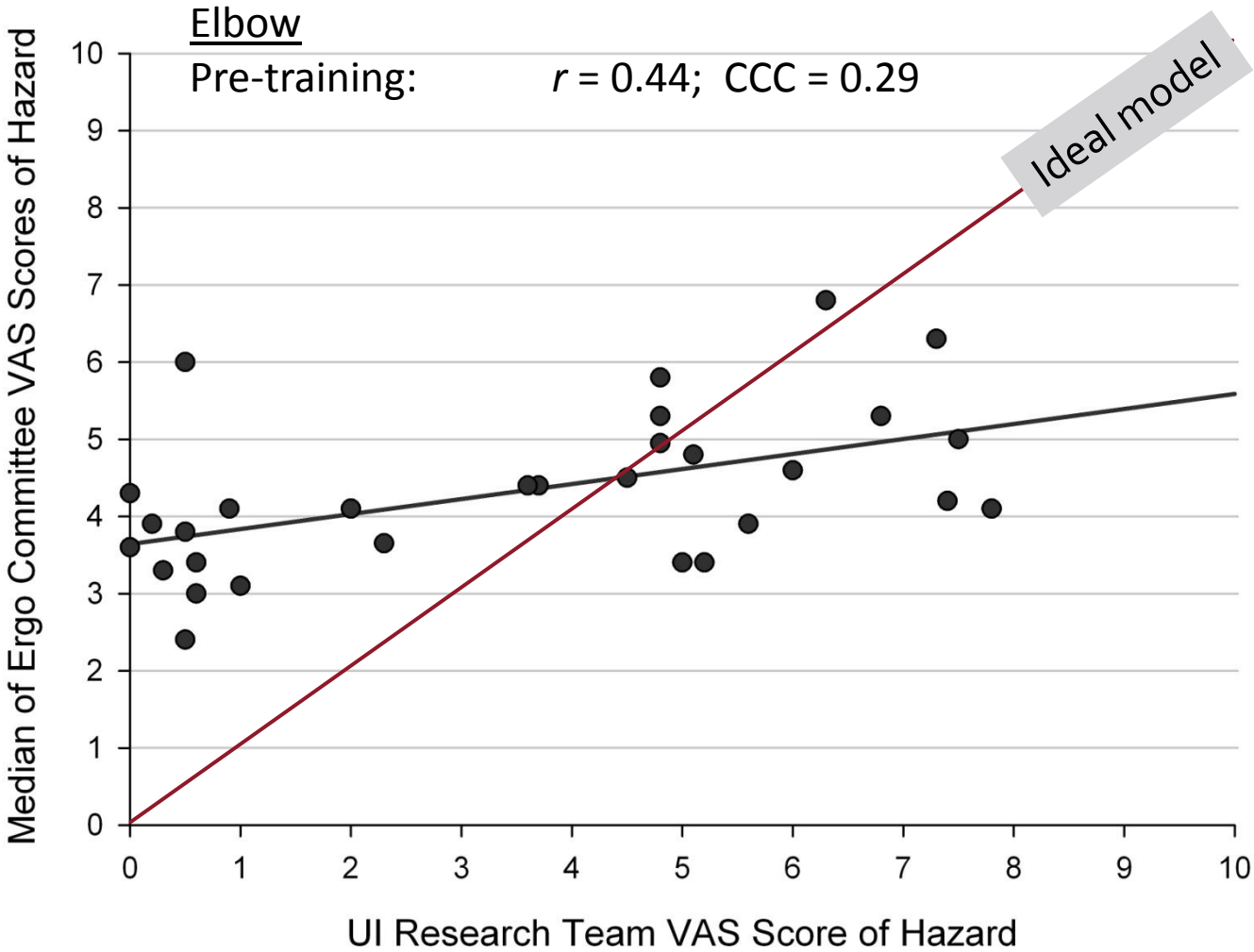
Maintenance representative

Employee representatives (3)

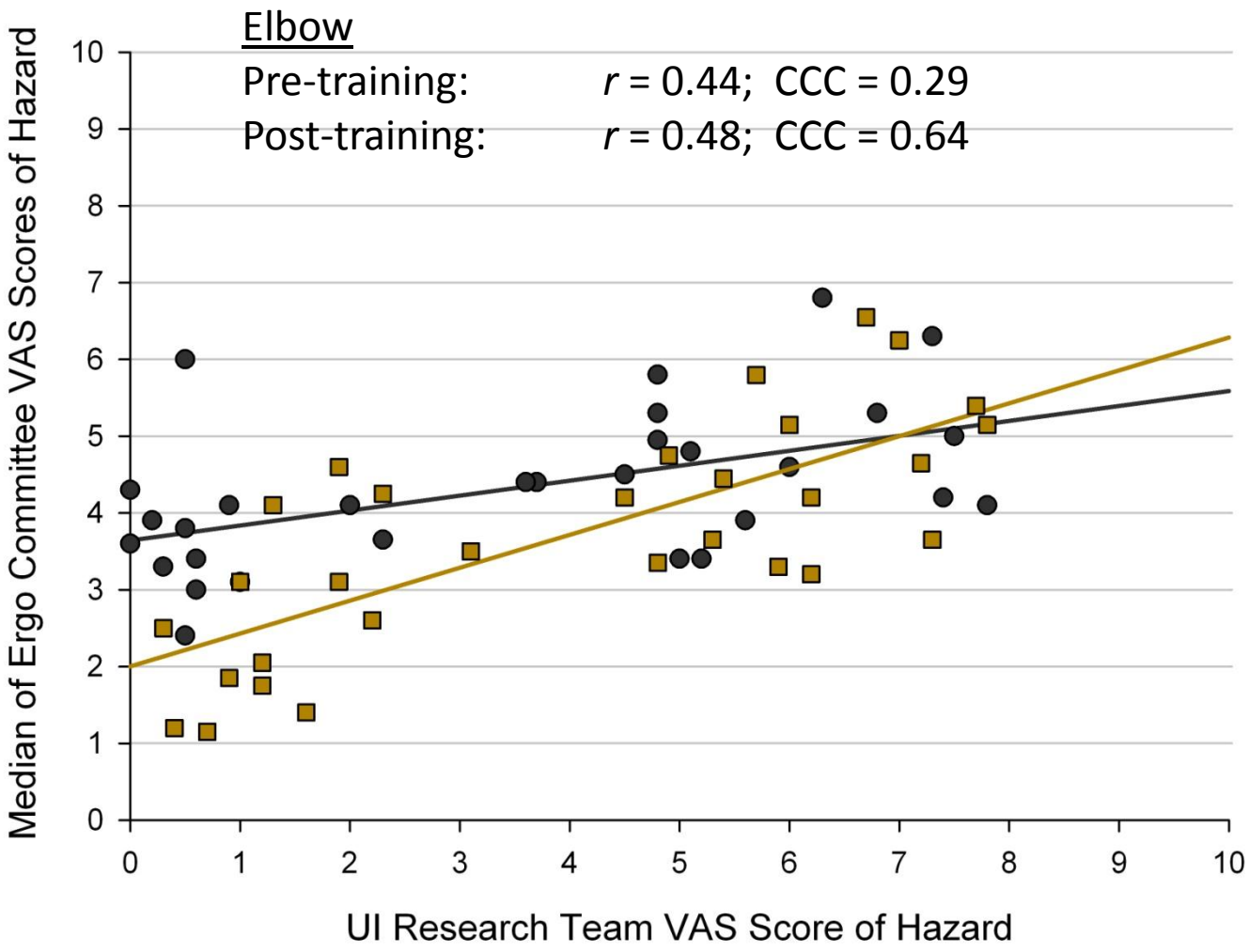
Methods: Aim 2

- Pre- and post-training ergonomic hazard level agreement
- Video of 30 randomly selected tasks in facility
- Visual analogue scales (VAS; 0-10 cm) of hazard level
  - Each committee member assigned ratings individually
  - Research team used a consensus approach
- Low back, neck/shoulder, elbow, and hand/wrist
- Correlations
  - Ergonomic Committee vs. Research Team (Pearson, Concordance)
  - Among the Ergonomic Committee members (ICC; 2-way random)

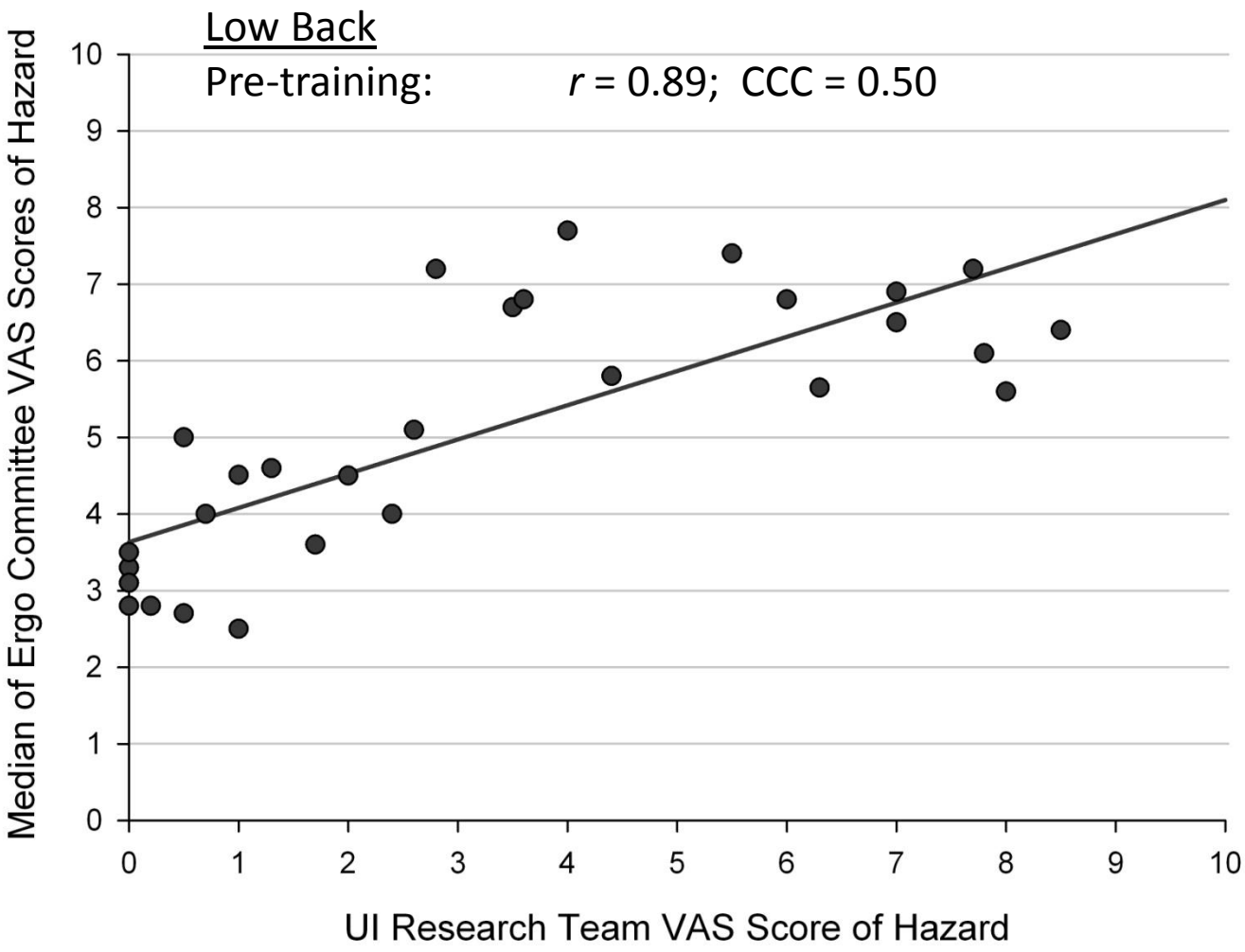
Results: Examples



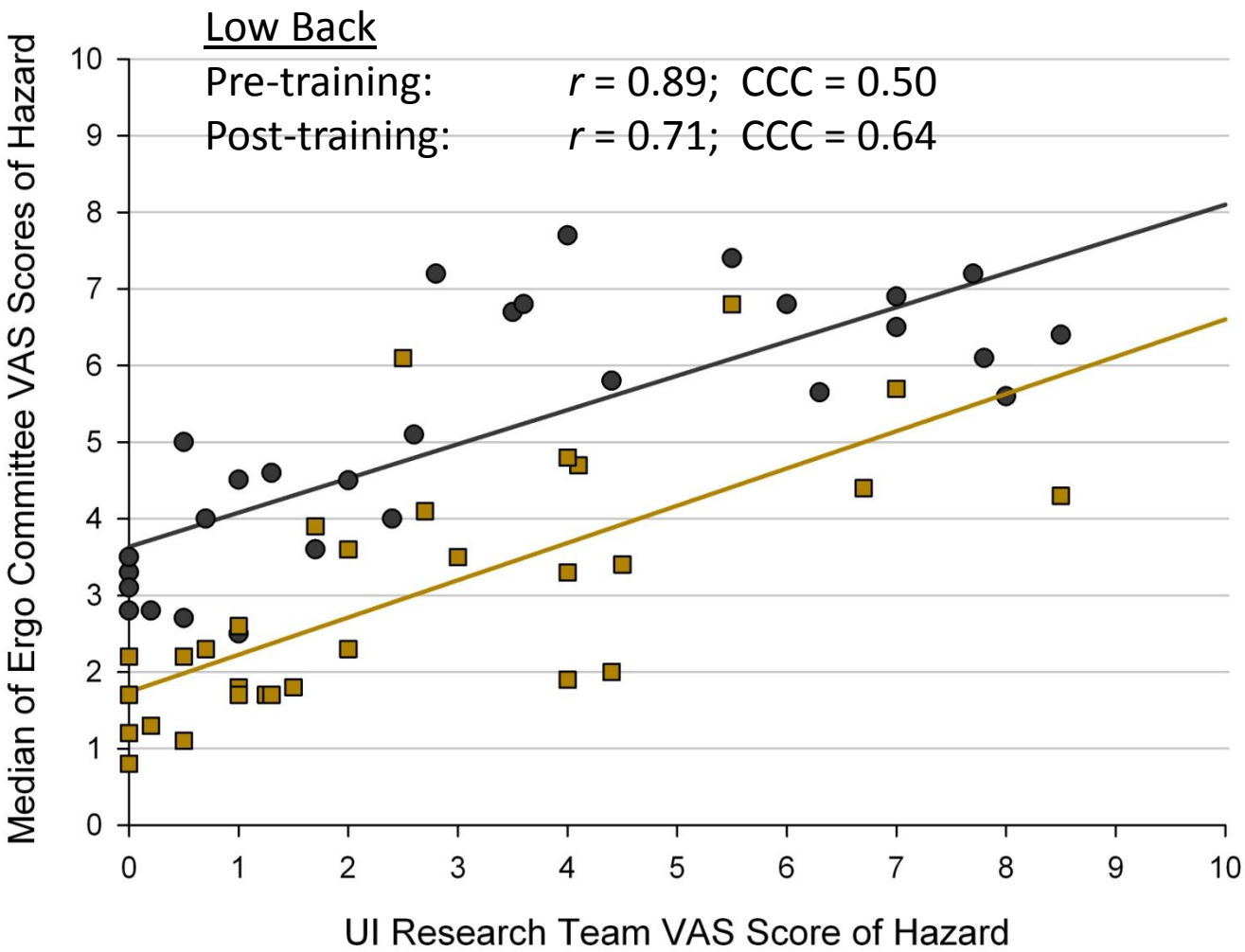
Results: Examples



Results: Examples

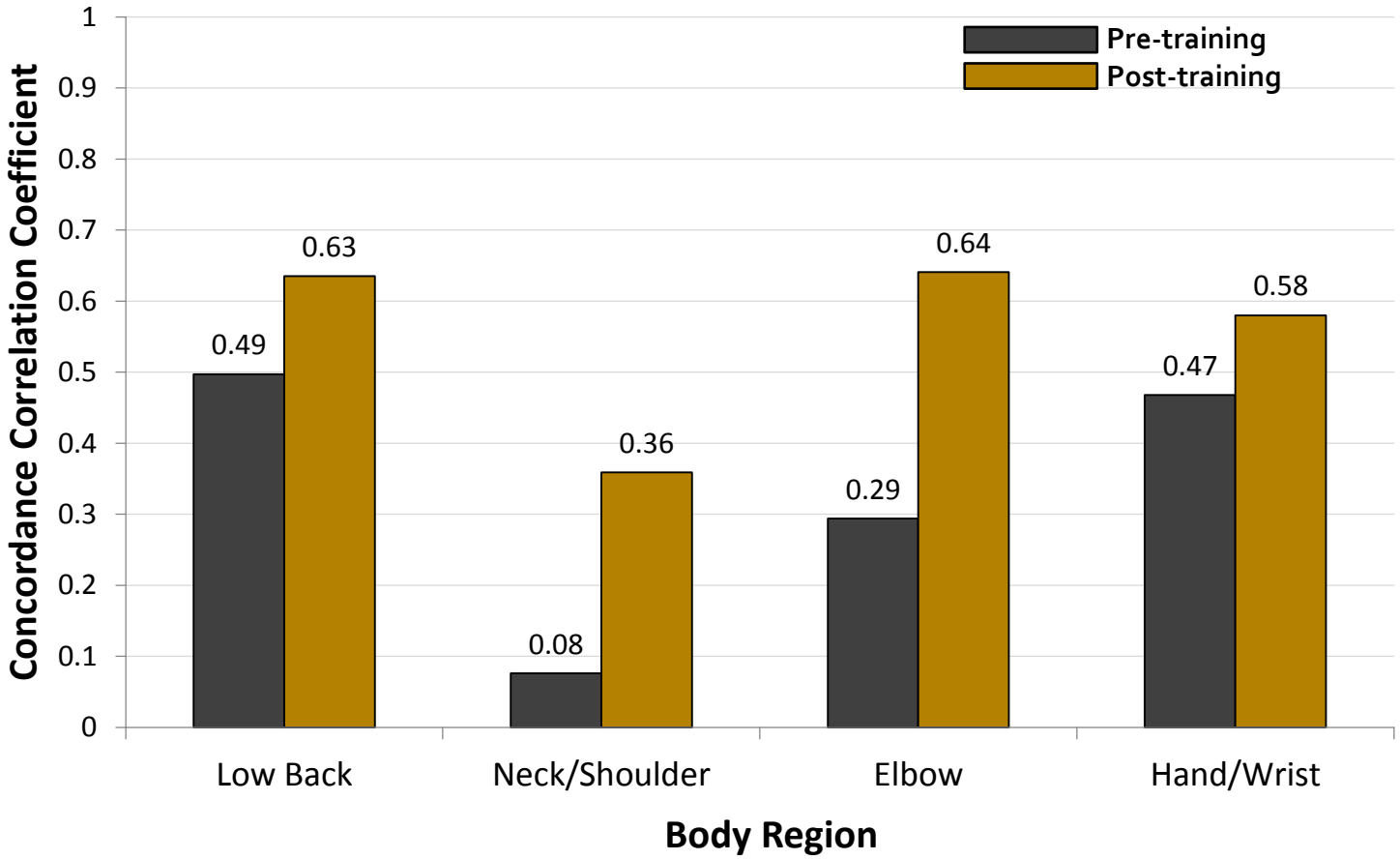


Results: Examples

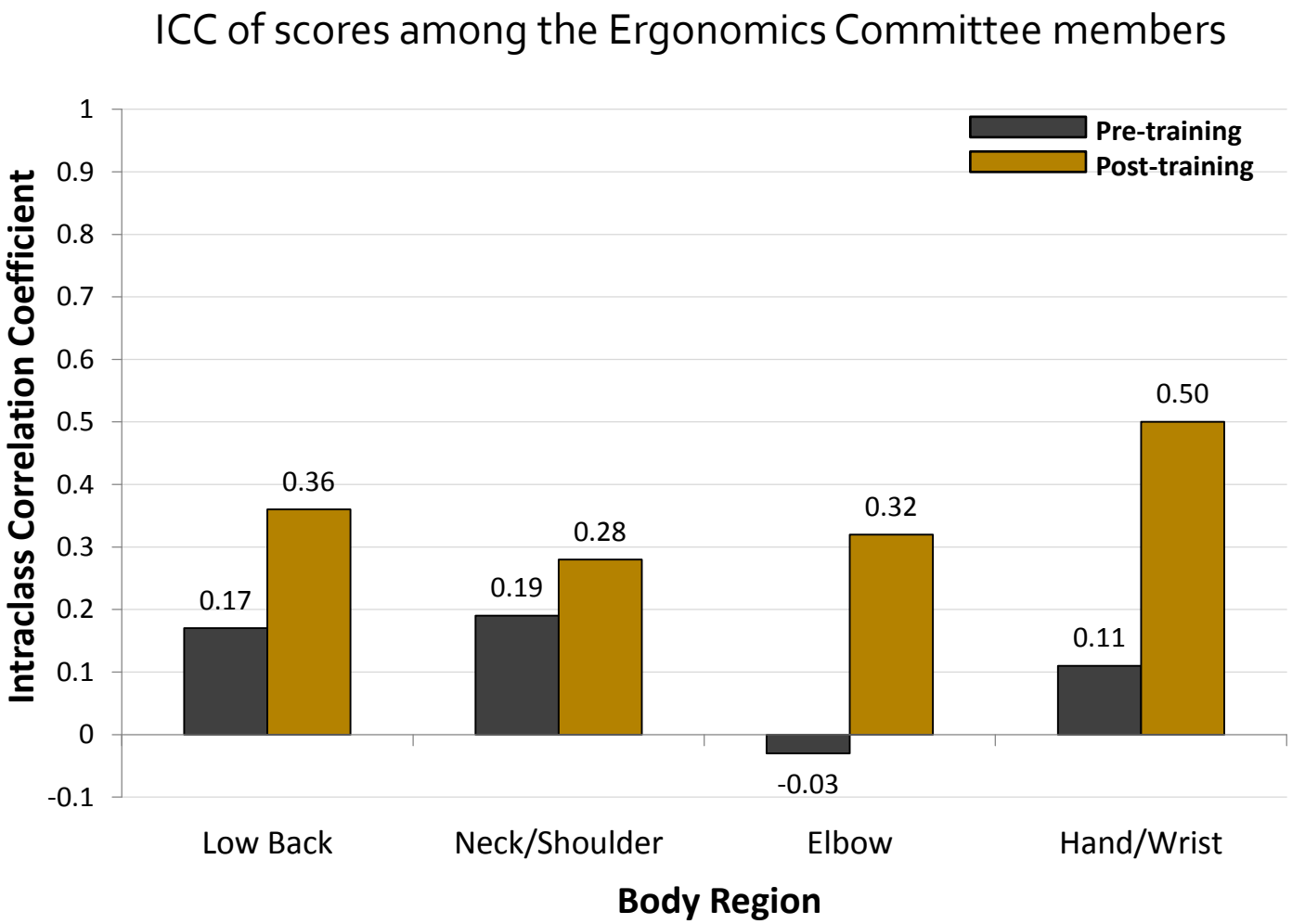


Results: Concordance Correlation

Concordance correlation of Ergonomics Committee score and UI Research Team score



Results: Intraclass Correlation



Summary

- Training improved the Ergonomics Committee's ability
  - Higher concordance correlation for all body regions
- Training helped "normalize" Ergonomics Committee members
  - Higher inter-rater agreement for all body regions
- Work continues with the Ergonomics Committee
  - More complex exposure assessment techniques (e.g., REBA)
  - Ongoing 5-year randomized trial within the HWCE
- Limitations
  - Focus on exposure assessment to evaluate training effectiveness
  - Effectiveness of training or effectiveness of trainer?

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