



# How to Make Occupational Health and Safety Training More Effective: Findings from a Field Trial

A Collaborative Project Between the IWH and PSHSA, WSPS, IHSA and LMRIS

Jan. 28, 2014

This project was supported by a grant from the Workplace Safety and Insurance Board



# Project Team

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# Take Away Messages

Training should target building self-efficacy of workers as a key design objective

For office ergonomic training we found minimal differences between in-person training and eLearning

Working with workers and supervisors in multiple follow-up sessions over time is the training design difference



# Take Away Messages

- We can design and implement a well-designed field trial
- Evaluating the comparative effectiveness of different types of training and training content in the field is important
- Training with different delivery modes and the same content can be developed with instructional system design
- Ergonomics is a win win improving health and performance



# Is Research on Training Needed in Ontario?

- There are a range of training programs being offered
- There is limited evidence on the comparative effectiveness of different styles of trainings/topics
- The Ministry of Labour is targeting ergonomics training
- It is beneficial to know what types of ergonomics training are most effective
- **No well-designed studies have shown which ergonomics training works best**



# What Would You Do If You Wanted to Change Practices and Improve Health?



Don't Parachute In!



# Building The Office Ergonomics Training

Content was reviewed against current available science and standards (CSA Z412 2011 & ANSI/HFES 100-2007)





# Three Training Approaches

- In-person Training: 90 min, Power Point presentation, engagement activities developed and tested in previous study by Amick (2003)
- eLearning: 90 min (9 x ~10 min modules), online, embedded engagement activities developed and tested in previous study by King (2012)
- Enhanced Training (+): In-person/eLearning + 3 x 30 min sessions to help employees apply training knowledge and build skills; 1 x 60 min session to educate managers and supervisors on how to better support their staff



# Office Ergonomics

Online course



## Course Modules

1. **Overview and Introduction**
2. Musculoskeletal disorders and risks
3. Work postures and breaks
4. The workstation
5. The office chair
6. Computers input devices
7. The computer monitor
8. Lighting, glare and vision
9. The "comfort zone"





# Enhanced Training Objectives

1. Continue to reinforce knowledge and build self-efficacy in identifying hazards and implementing the appropriate solutions
2. Build a dialog on the floor between workers to enable development of healthy computing norms (and down the road a stronger safety culture)
3. Engage supervisors and build a dialog between supervisors and employees to support norm development and collective efficacy of the work unit



## 3 Sessions Over 3 months with Employees

Session 1 introduces the Ergo-Buddy assessment (use MSD Toolbox Office Ergo Checklist) of paired group members assessing another group member

Session 2 focuses on the ergo assessments of paired group members and prepares the group members to do an ergo assessment of someone who did not participate in the training

Session 3 focuses on the ergo assessments of non-group members and positive reinforcement of the group to continue to work together



# One Session With Supervisors With Four Goals

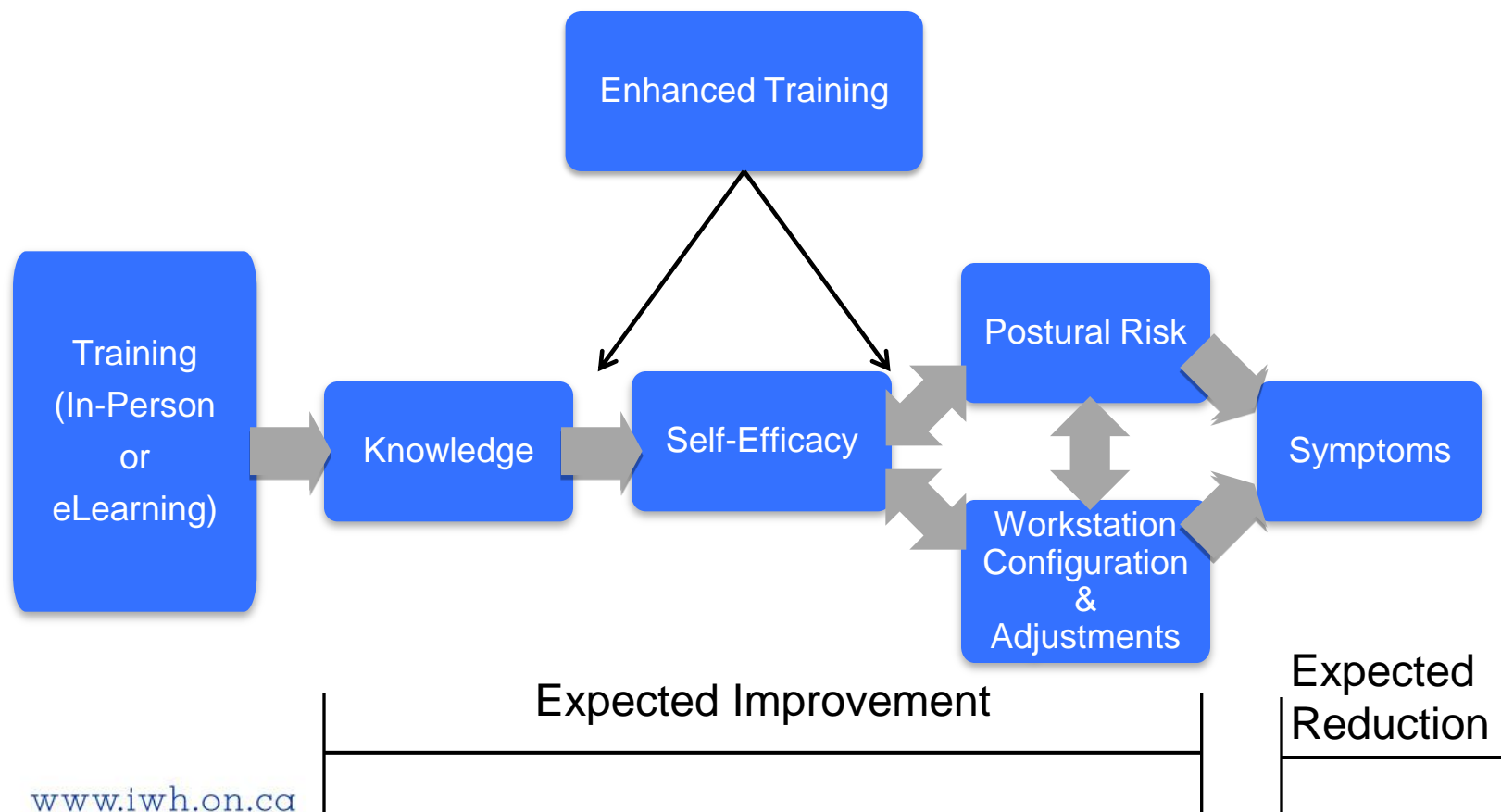
1. To ensure all supervisors are aware of what is occurring with employees especially ergo-buddies
2. To have supervisors understand role in supporting development of norms
3. Coach supervisors in how to support building a healthy computing culture
4. Build supervisor self-efficacy



# Perceived Pros and Cons By Training Designers

Training Methods:	In-Person	eLearning	Enhanced Approaches
<b>PROS:</b>	<ul style="list-style-type: none"><li>• Tailor your message to your audience's needs</li></ul>	<ul style="list-style-type: none"><li>• Consistent delivery</li><li>• \$ savings over time</li><li>• Train high #s at once or as needed</li></ul>	<ul style="list-style-type: none"><li>• Allows for trouble shooting</li><li>• Increased self-efficacy</li><li>• Practice skills</li><li>• Coach supervisors to support workers</li></ul>
<b>CONS:</b>	<ul style="list-style-type: none"><li>• Costly</li><li>• Potentially inconsistent</li></ul>	<ul style="list-style-type: none"><li>• Updates to content harder to make</li><li>• (Costly to update)</li></ul>	<ul style="list-style-type: none"><li>• Additional costs and time</li></ul>

# Project Theory Of Change





# What Did We Think Would Happen?

	Knowledge	Self-Efficacy	Practices (workstation & posture)	Symptoms
Control	NC	NC	NC	NC
In-person	Improve	Improve	Improve	Reduced
E-Learning	Improve	Some Improvement	Some Improvement	Reduced
Enhanced	Improve	Sustained Improvement	Sustained Improvement	Sustained Reduction

# Quasi-Experimental Study Design

- Five study arms/groups
- Training provided to four groups using the same content
- Control group received link to MOL site

**(1)**  
**In-person  
Training**

**(2)**  
**eLearning  
Training**

**(3)**  
**In-person  
Enhanced  
Training**

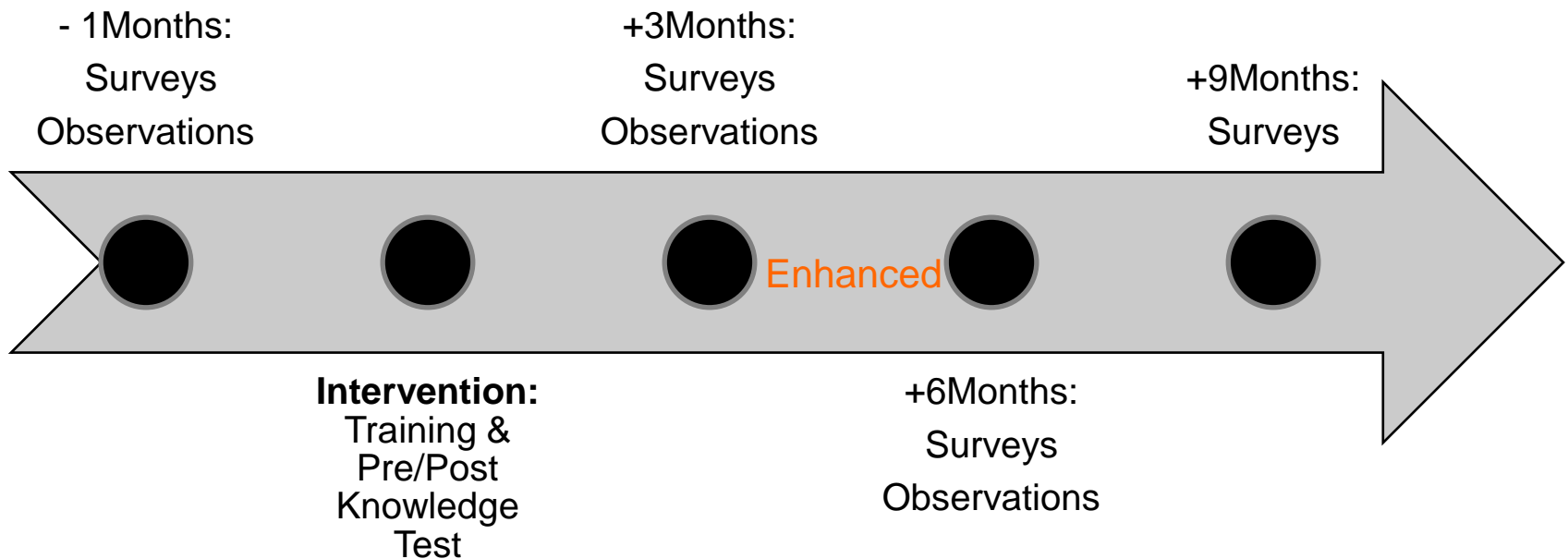
**(4)**  
**eLearning  
Enhanced  
Training**

**(5)**  
**Control  
Group**





# Study Timeline





# Outcomes of Interest

- Engagement
- Knowledge
- Self-efficacy
- Postural risk
- Appropriate office workstation configuration
- Appropriate office workstation adjustments made
- Musculoskeletal and visual symptoms



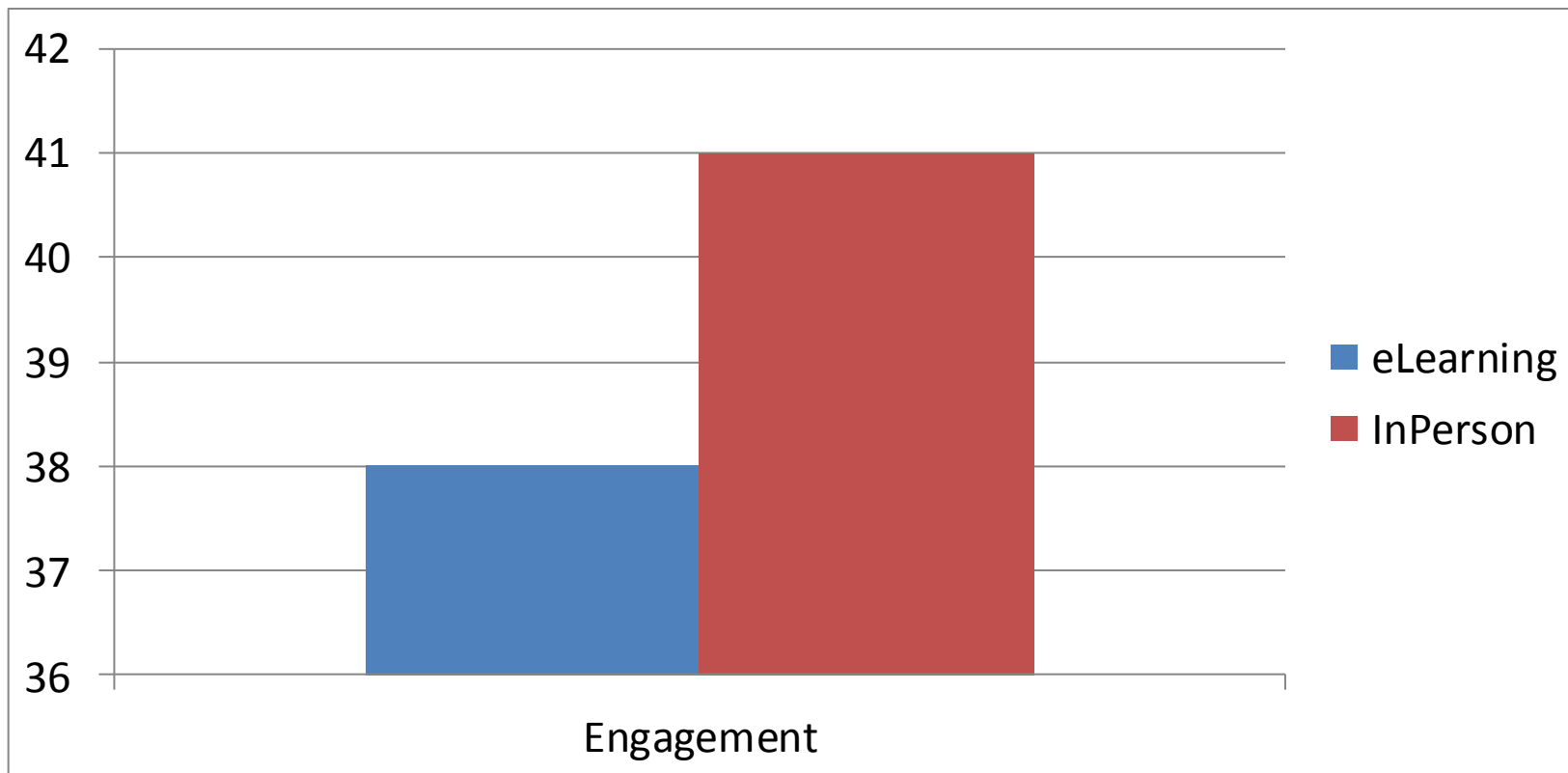


# We Invented a New Scale to Assess Worker Engagement in the Office Ergonomics Training

1. The examples used in the training helped me understand office ergonomics
2. The training helped me to apply the ergonomics concepts to my own work situation
3. The practice I did in the training helped me understand office ergonomics
4. I was able to get answers to all of my questions about office ergonomics answered / during the training
5. While / doing the training, I discussed some of the office ergonomics concepts with / others
6. During / the training, I tried out different work postures
7. During / the training, I tried out changes to an office chair
8. During / the training, I tried out changes to a workstation

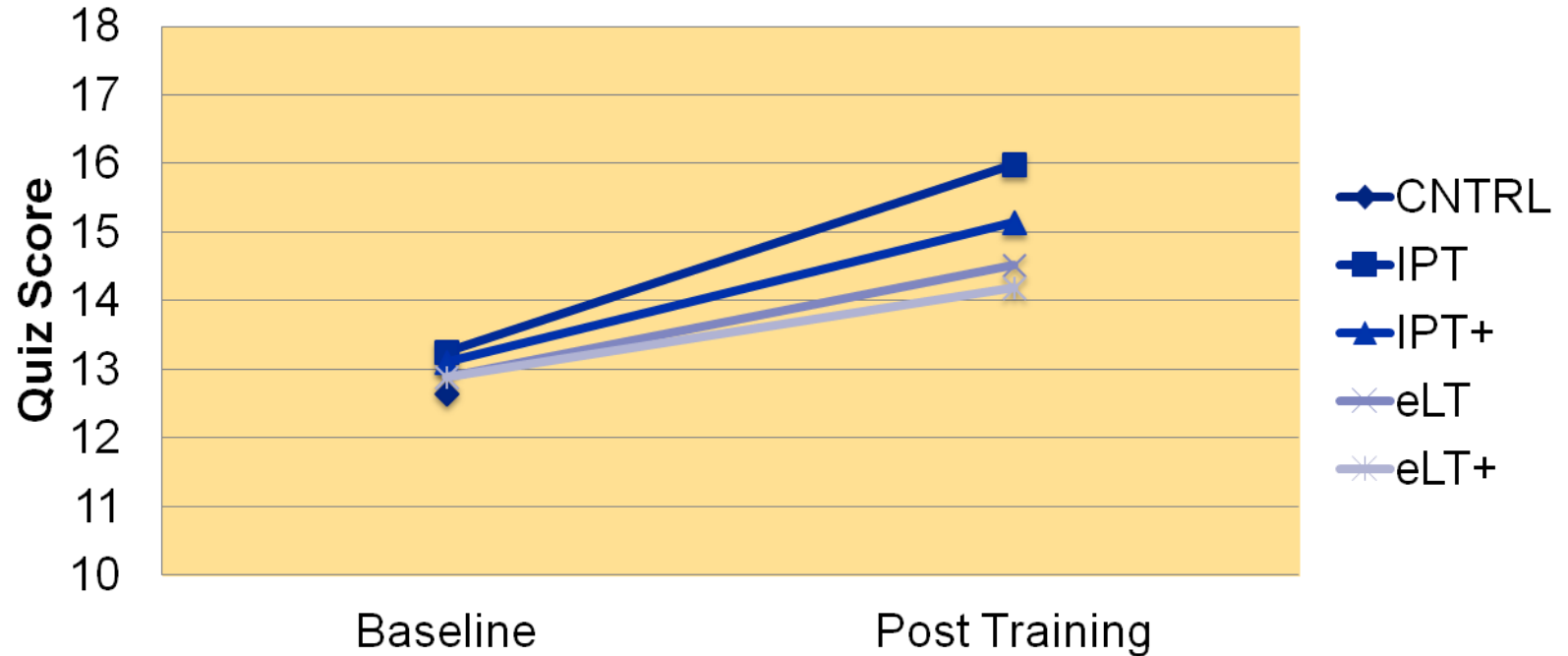


# Results



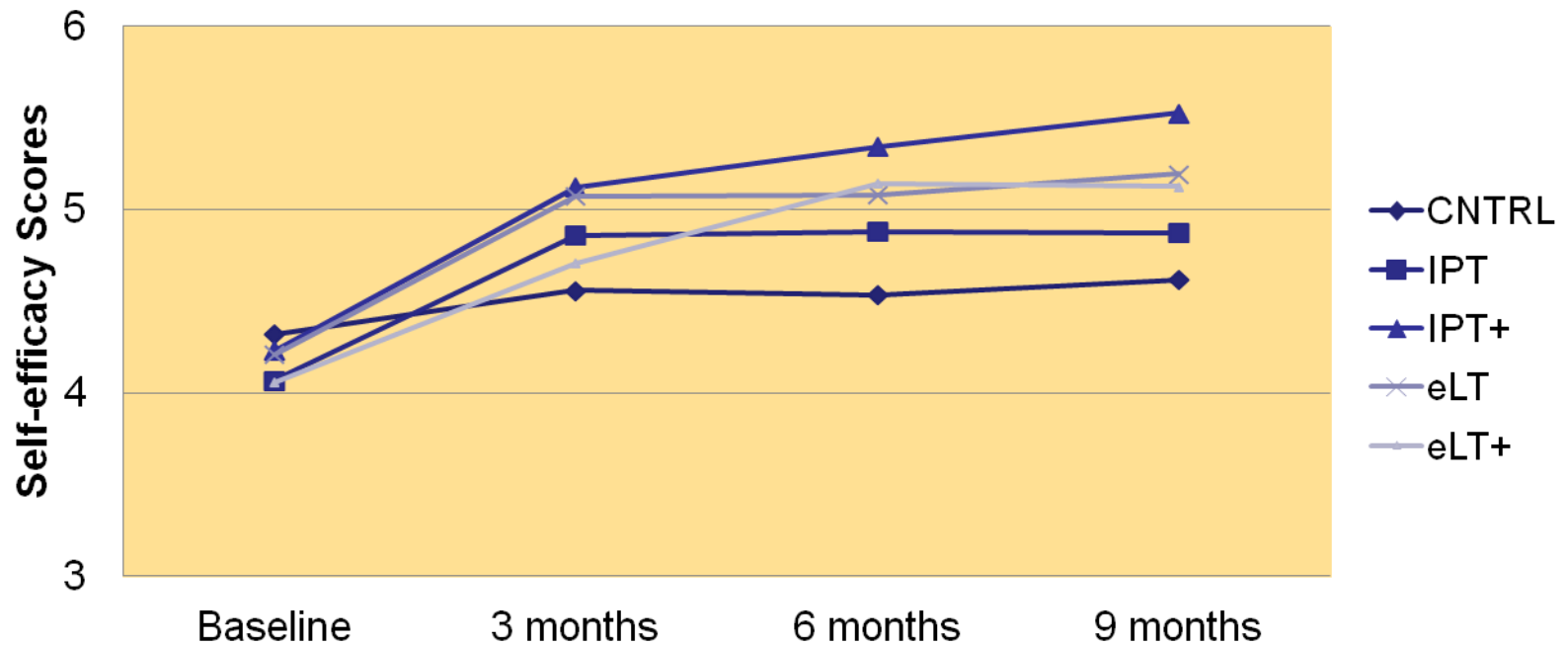
# Results

## Knowledge over time, between groups



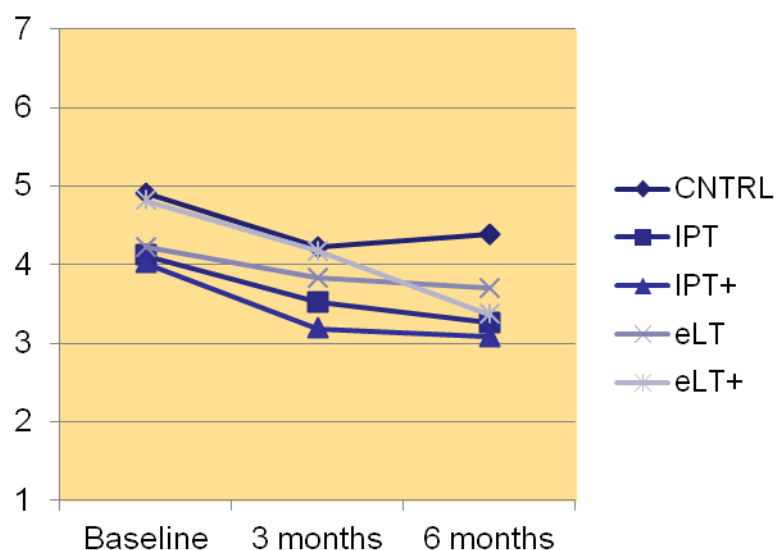
# Results

Self-efficacy over time, between groups

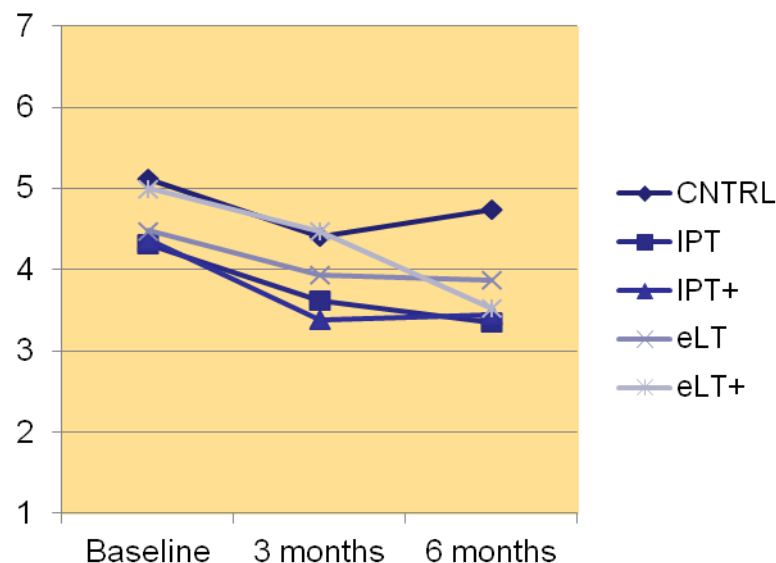


# Results

Postural risk over time,  
between groups (Left)

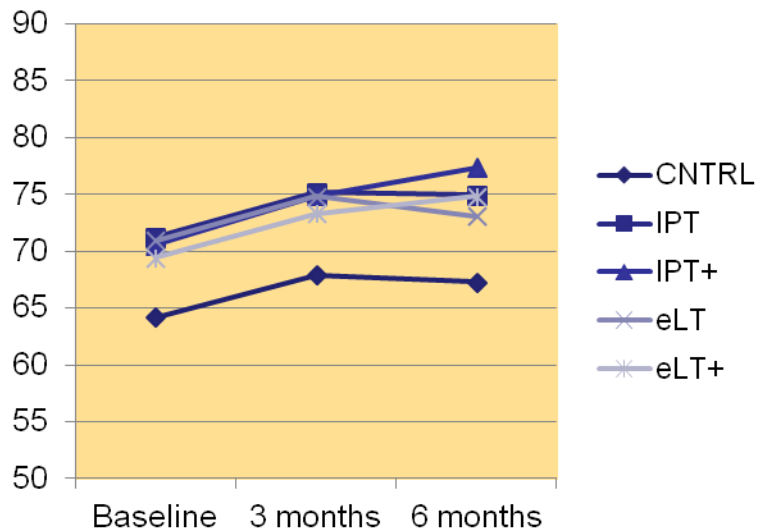


Postural risk over time,  
between groups (Right)

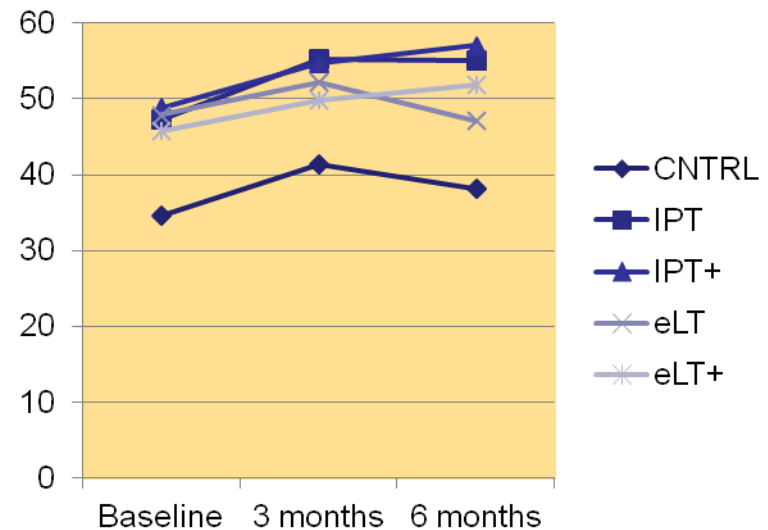


# Results

## Office workstation configuration (AEC)



## Office workstation adjustments (TO)

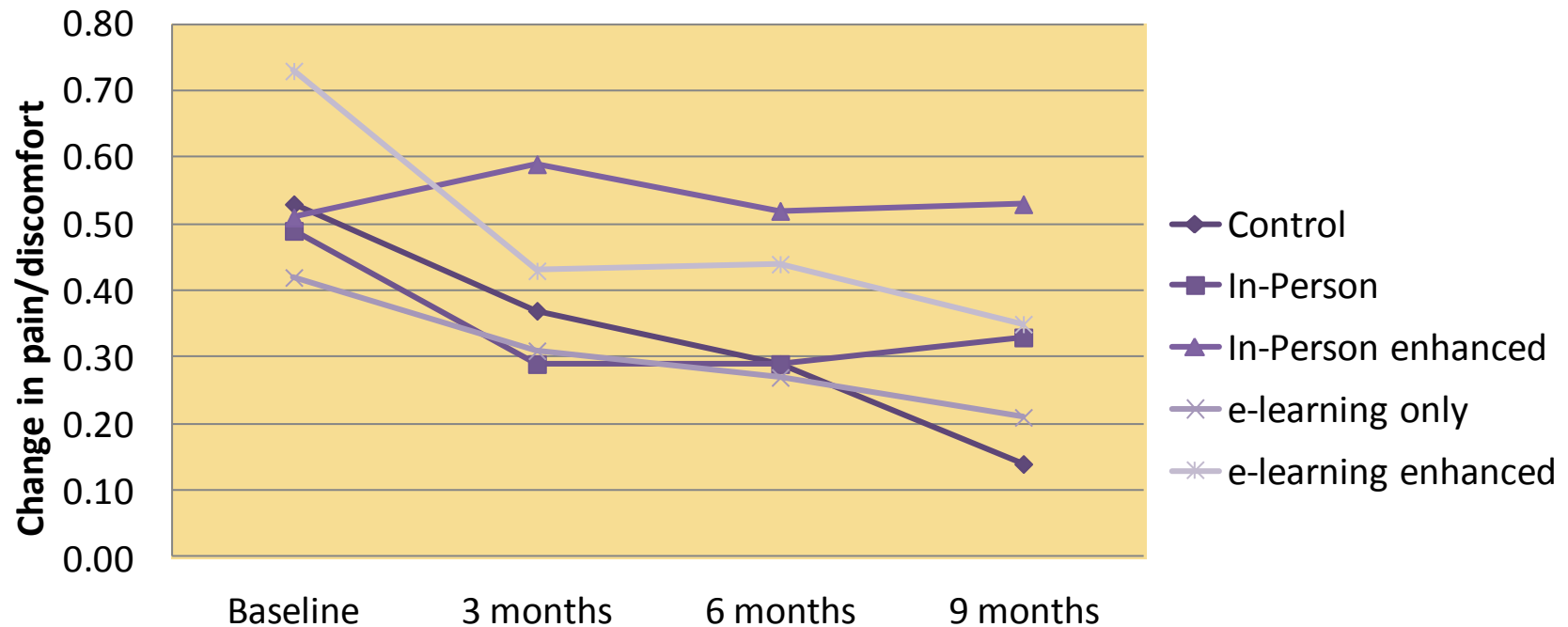






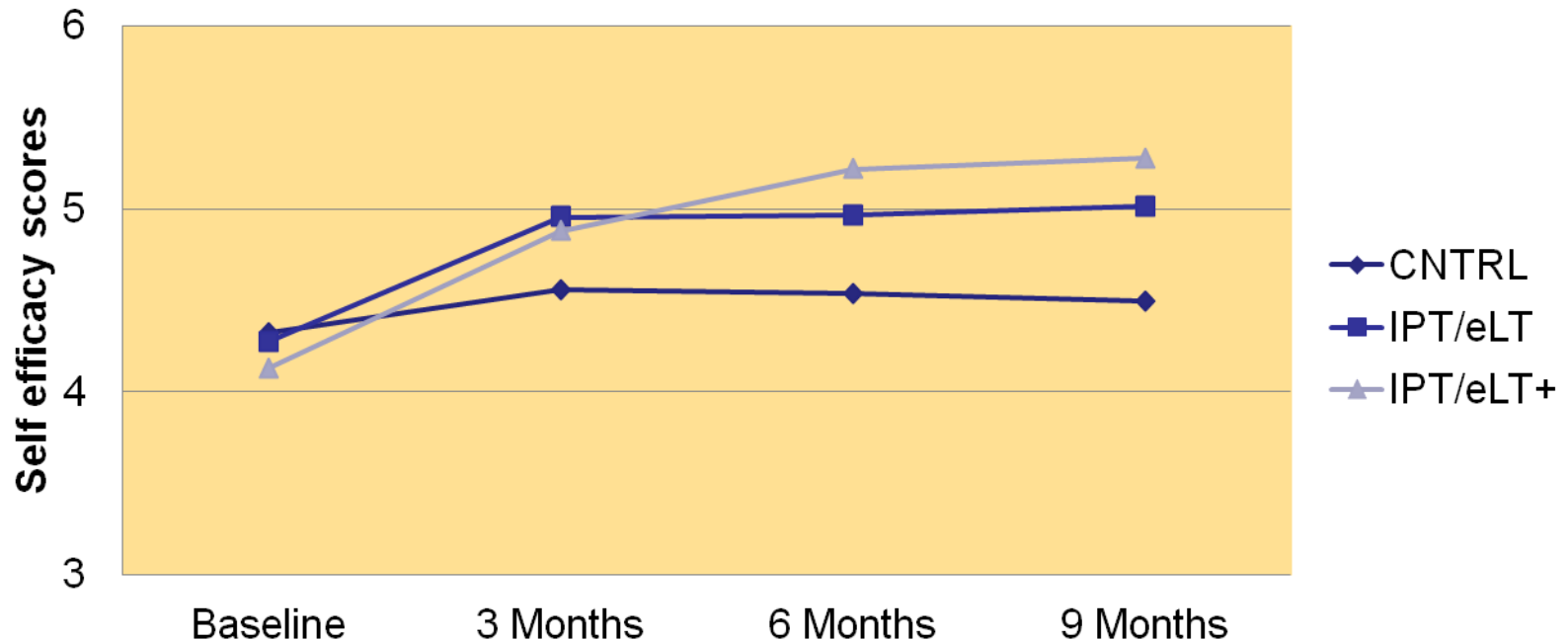
# Results

Daily change in upper extremity pain/discomfort over time, by group



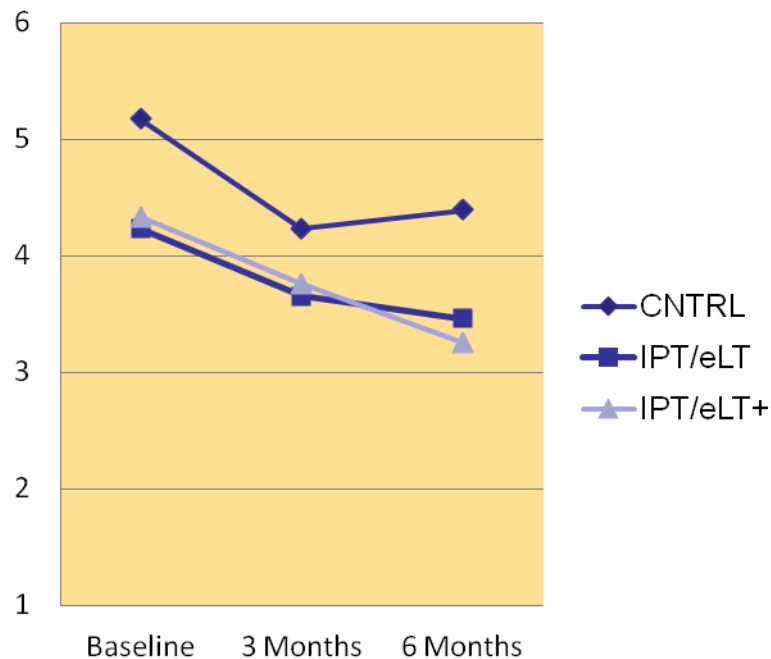
# Results: Enhanced vs. Not-Enhanced

Self efficacy scores over time, between groupings

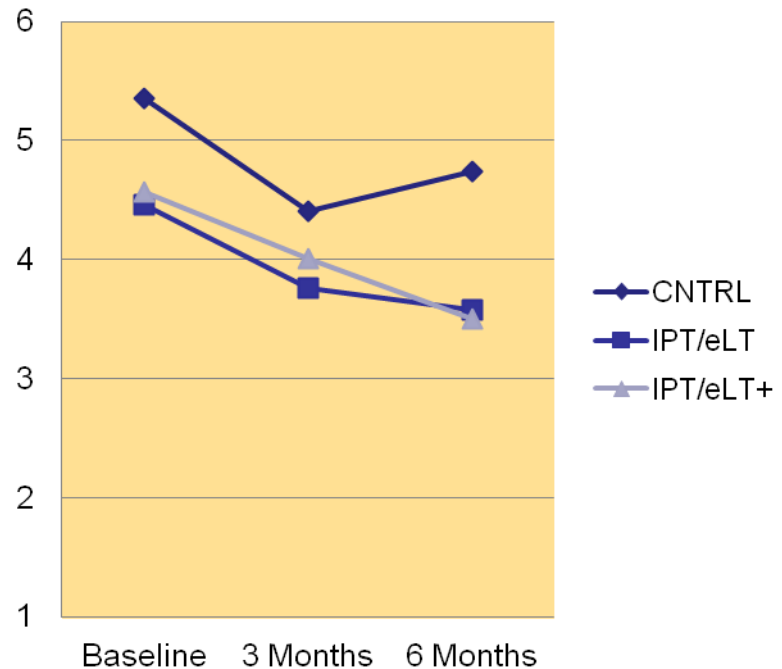


# Results: Enhanced vs. Not-Enhanced

Postural Risk (Left Side)

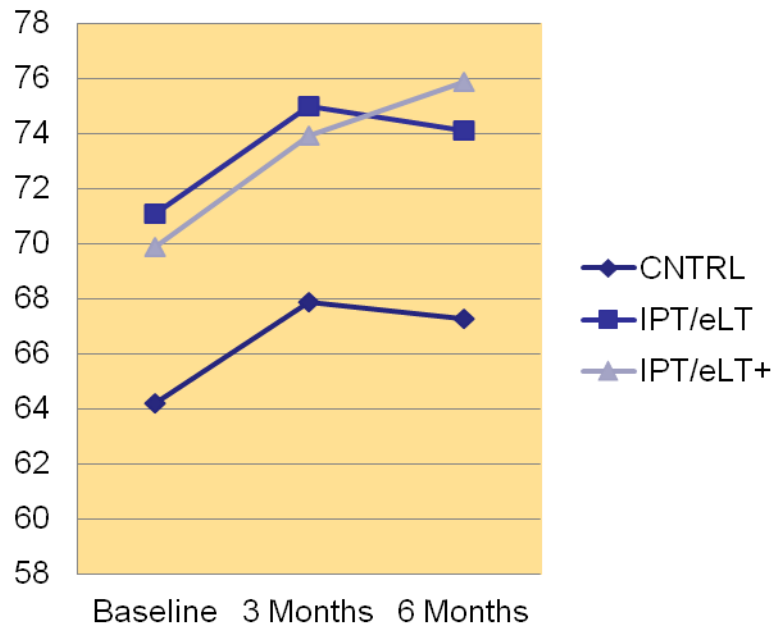


Postural Risk (Right Side)

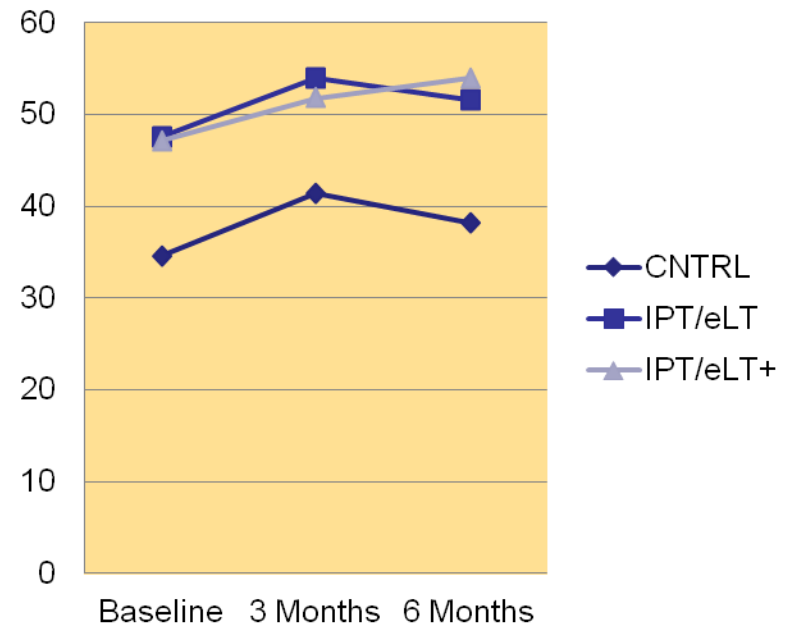


# Results: Enhanced vs. Not-Enhanced

Office workstation configuration over time



Office workstation adjustments over time





# To Summarize

Training is better than no training for most outcomes

Improved outcomes on almost all measures when compared to controls (self-efficacy, postural risk, work station configurations and adjustments)

The eLearning group was a little wonky



## To Summarize

No differences seen between groups or within groups over time on pain symptoms possibly due to low baseline pain reports

Enhanced groups seem to out-perform non-enhanced groups and the control group on self-efficacy, postural risk, and work station configurations and adjustments at 6 and 9 months post training



# Limitations

Lack of randomization could lead to observed difference being due to different persons in each group – we used statistical analyses to control for selection

Intensity of the intervention – lack of consistent effect in eLearning due to 25% not completing all 9 modules

Multiple observers for same workers at some control sites may have biased results



# Limitations

Inter-rater reliability for RULA & OEA was not at acceptable level across all observers again introducing bias

Observers not blinded which could influence their assessments – but did not know which group the worker was in

Huge floor effect for symptoms prevented observing any training effects on musculoskeletal symptoms





# Next Steps For Non-Researchers

Update eLearning and make available for HSAs in SCORM compliant format

Obtain CSA certification of eLearning as standard compliant

Convert postural observation tools into apps for easy use



# Next Steps For Geeky Researchers

Simplify research design and do cost/benefit to determine value of different trainings

- eLearning vs. Enhanced eLearning vs. Control




Refine blended component and measure engagement over time

Disentangle how self-efficacy works and how norms develop

Convert training to game-based design and evaluate effectiveness



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