EARLY ERGONOMICS

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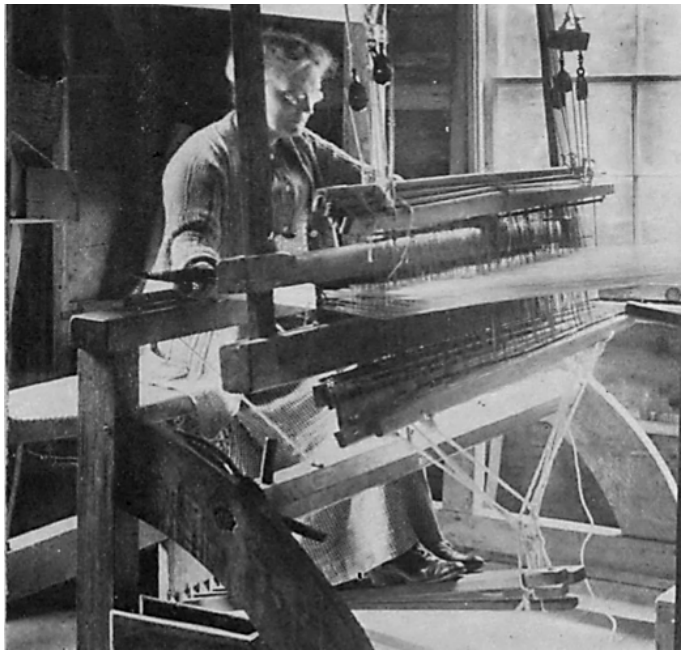
Introduction of new technology

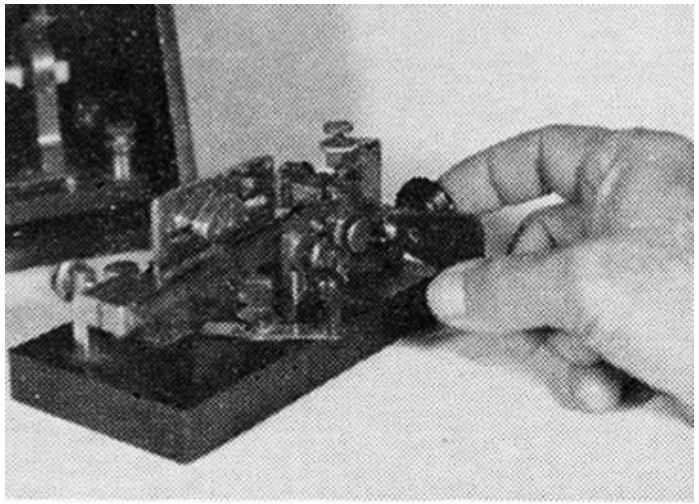
1700s:

- ‘weaver’s bottom’

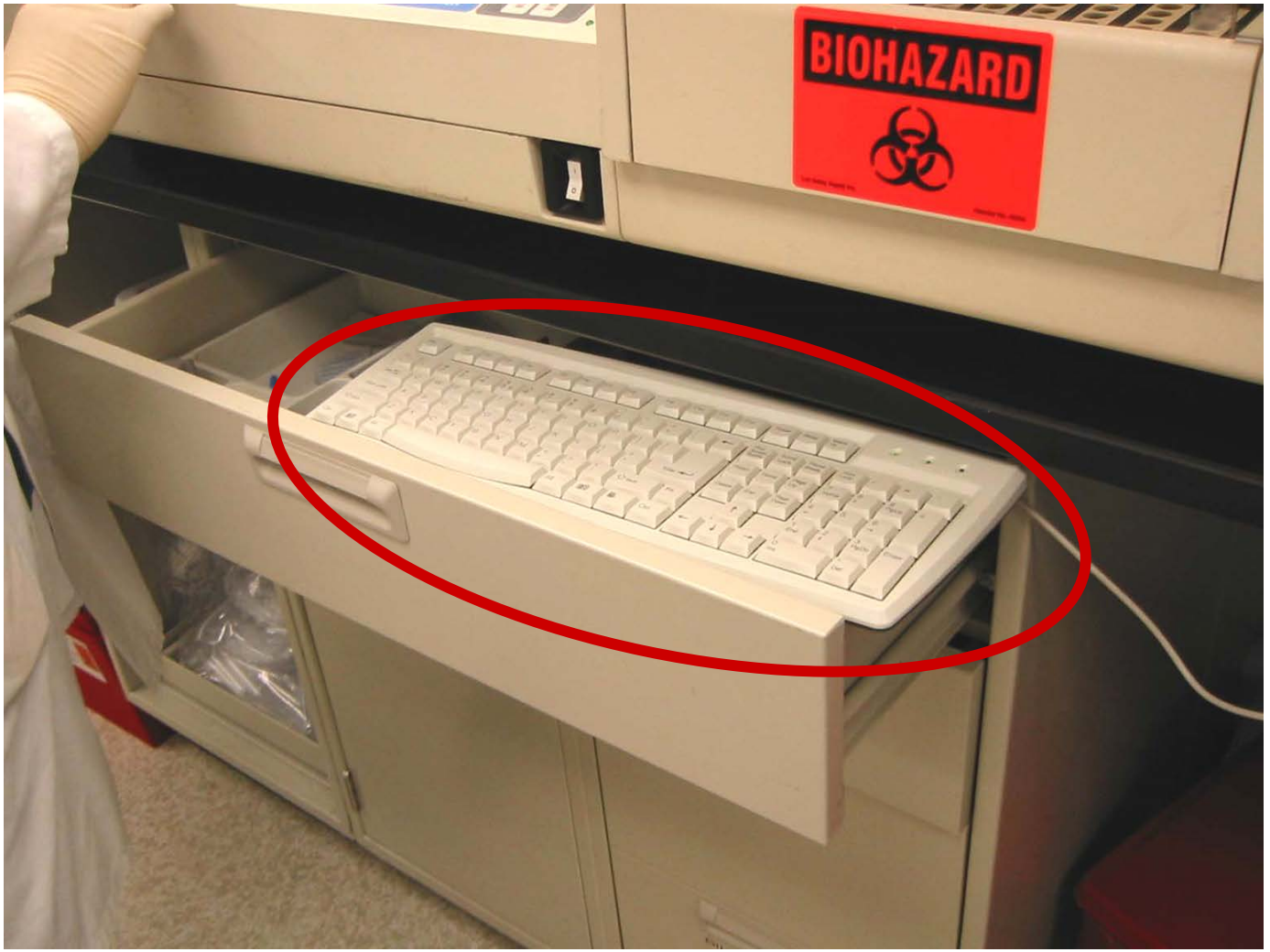


1800s:

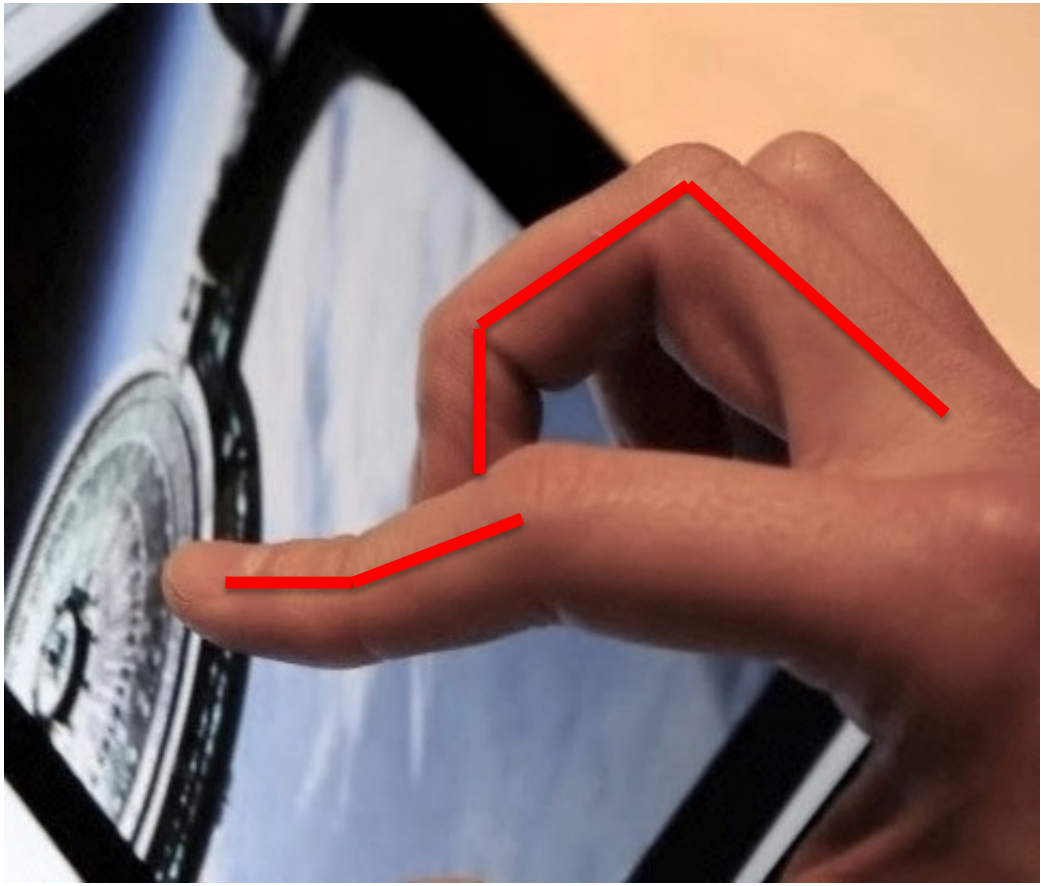
- ‘telegrapher’s wrist’



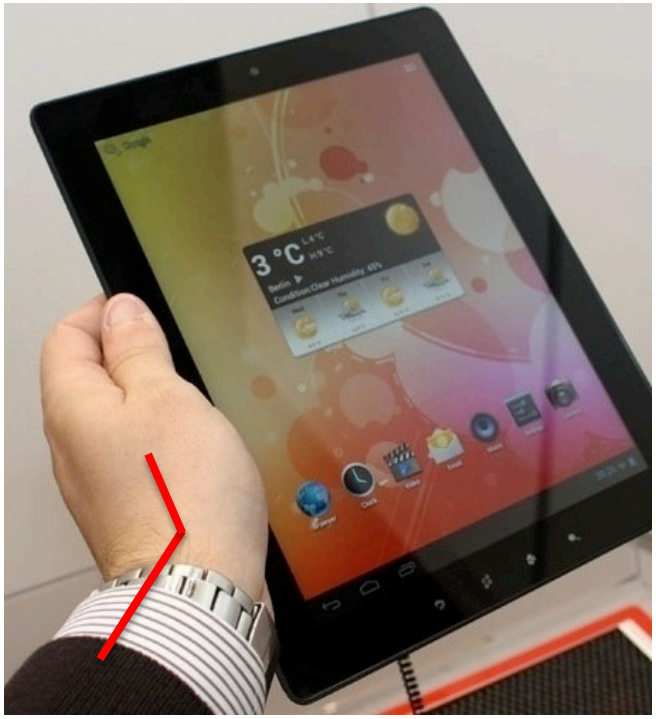
When work changes,
new problems are created



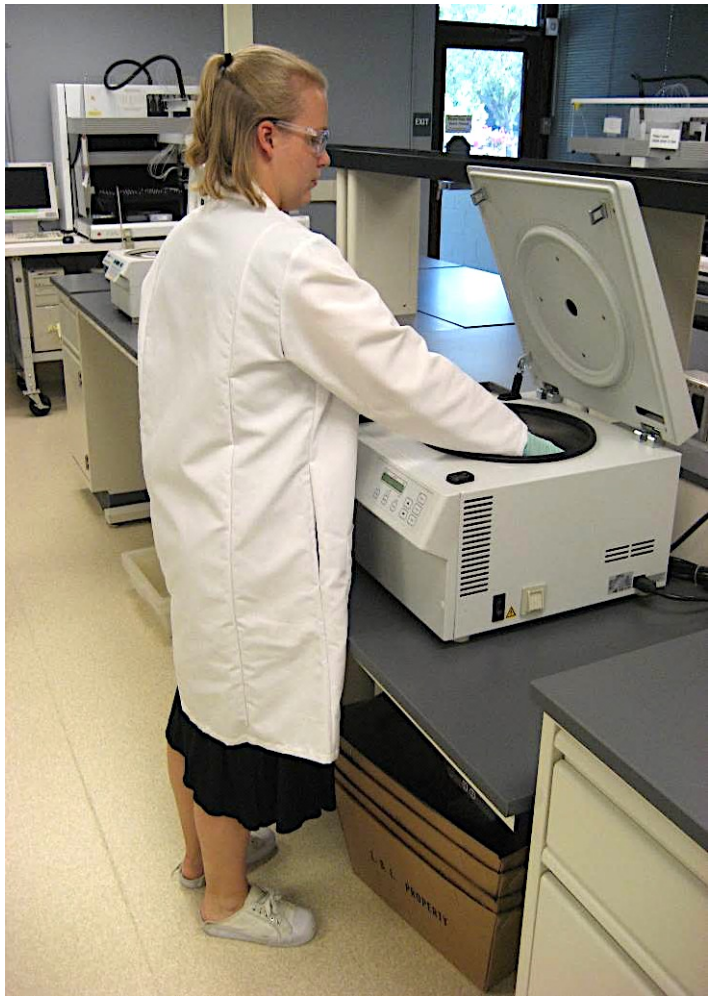
Tablets: awkward positions in the dominant hand and…

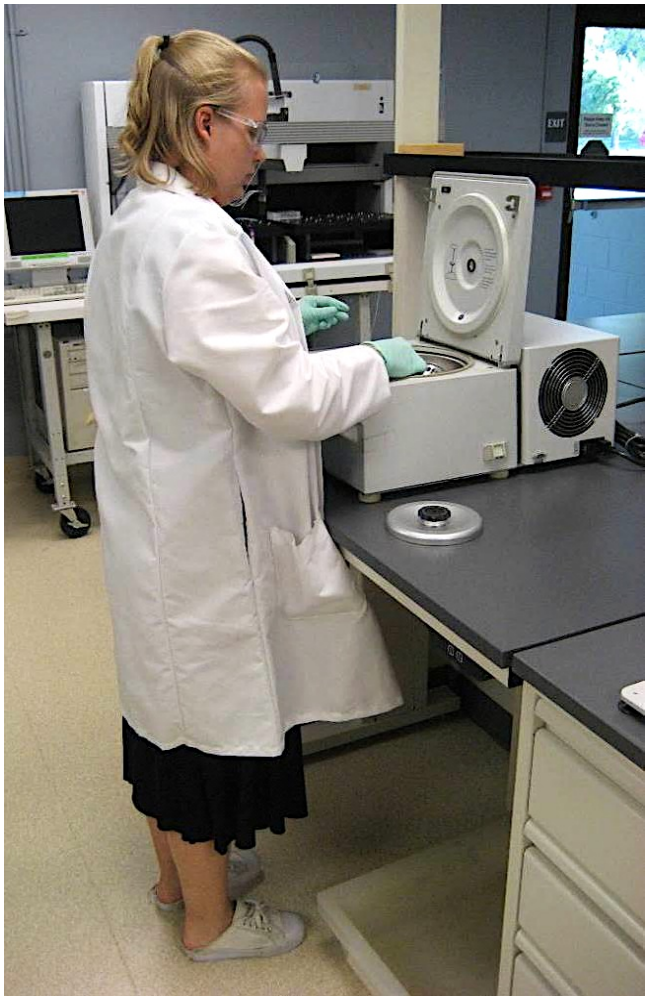


…unanticipated awkward postures in the other hand



Good ergo anticipates changes in equipment and technology over time





Good Ergo Involves Planning!

Too low for a 6’6” man

Too low for a 5’4” guy!

Q: Why are we working like this?

A: The ironworkers got here first!

Barriers to successful ergo programs

- Denial:

'If I ignore/hide the problem, maybe it will go away'

'It won't happen to me' ➔***Panic!!***

- Focusing on one simple explanation:

'I'm just out of shape'

'It's the Aging Workforce'

- Getting emotional:

'All these complainers are just lazy'

'I'm too embarrassed to tell anyone about this'

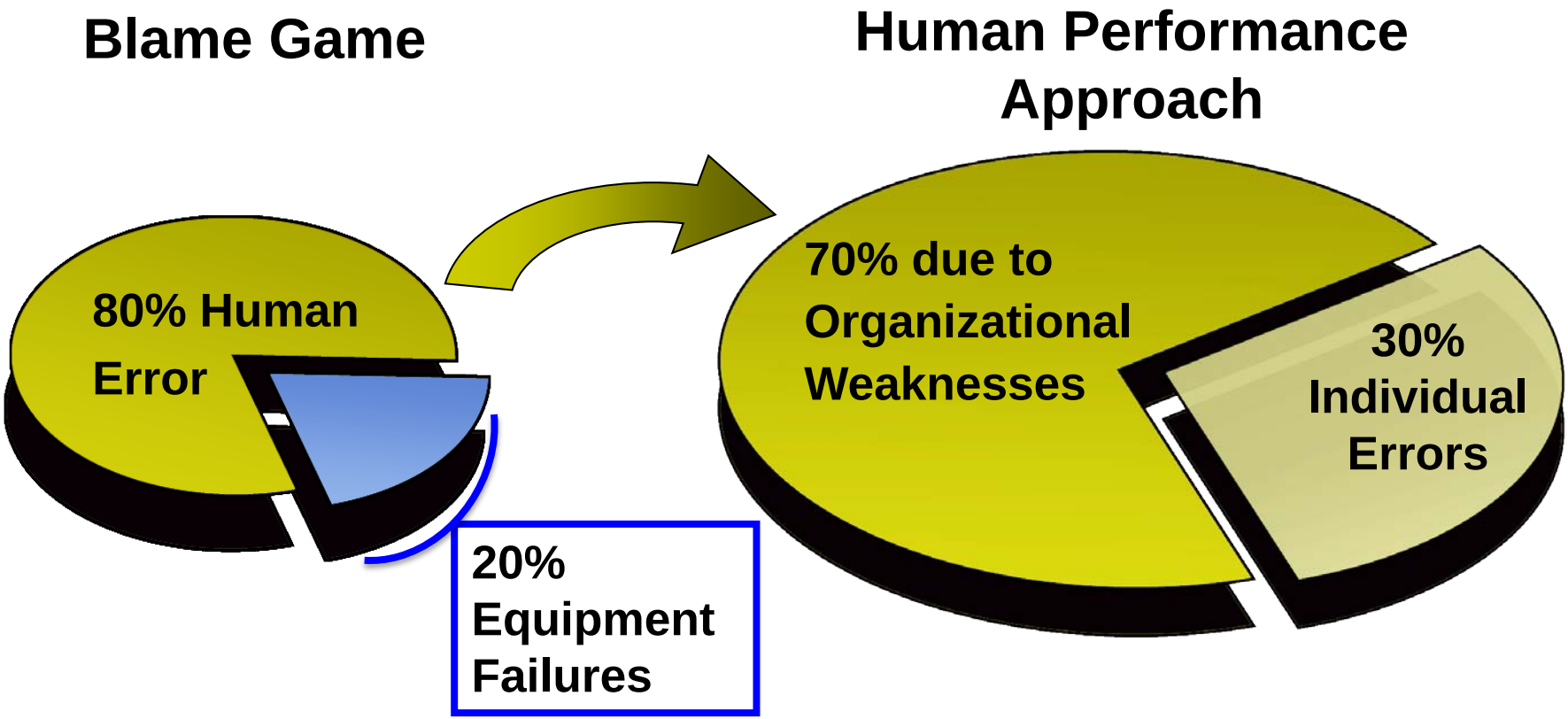
Fear of reporting discomfort

- Sense of failure, vulnerability, blame
- “Costing Supv/Division time & money”
- “Falling behind in my work”
- Worried about retaliation

➔Delayed action

Pipe wrench not enough

A Human Performance Approach: Systems Analysis vs. Blame



DOE, HPI Handbook, 2009

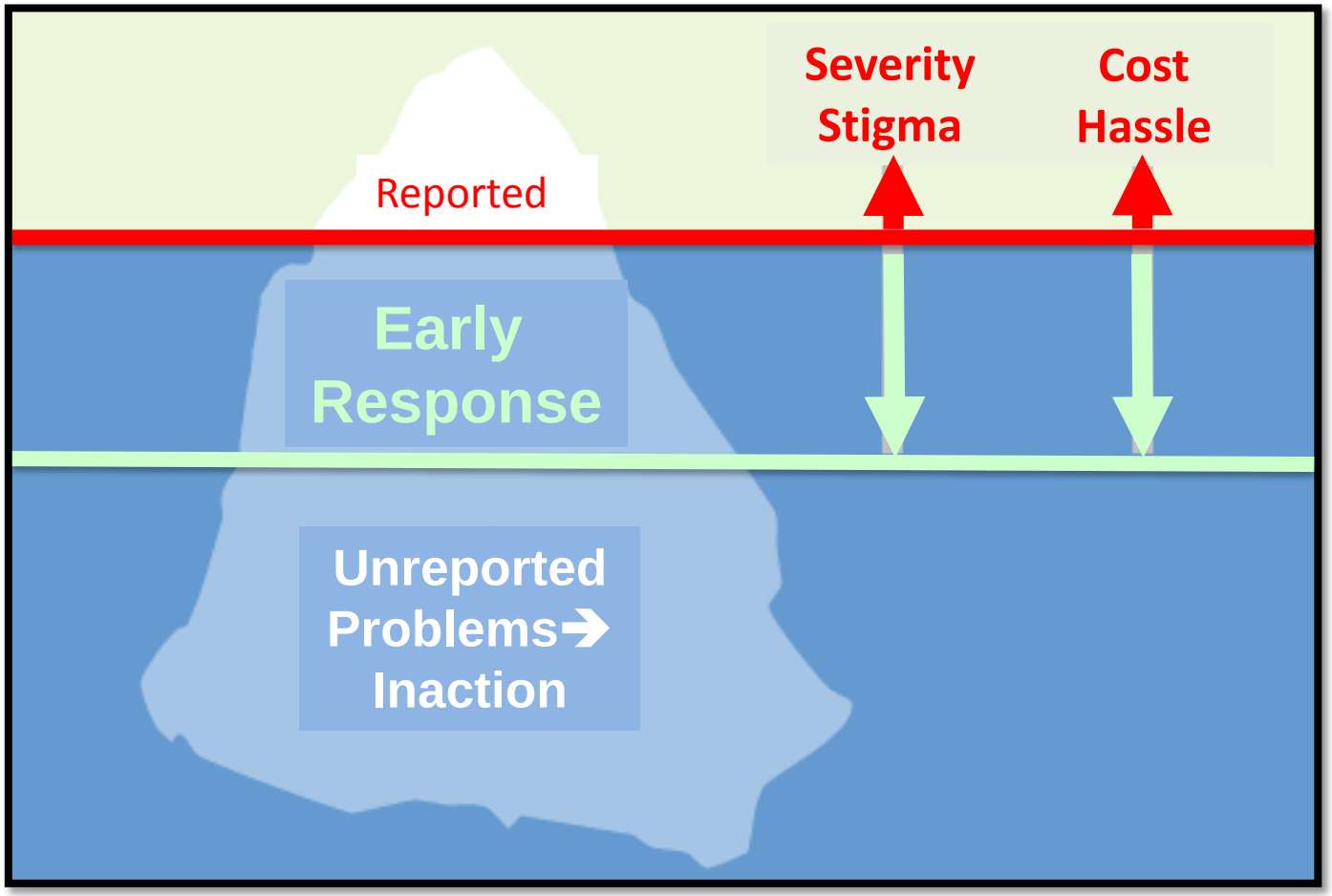
Organizational & Individual Resilience

"Human error/injury is caused not only by normal human fallibility, but also by… organizational weaknesses in work processes and values."

- People cannot perform better than the organization supporting them
- Many error- & injury-prone situations are *predictable*.

DOE, HPI Handbook, 2009

Ergo problems often fly ‘under the radar’, especially if there’s no middle ground



What we can do

1. Develop ‘middle ground’ bet. **inaction** and **reports**
2. ‘Lower the volume’ re: problems & discomfort
3. Increase use of early warning systems:
   - Walk-throughs for moves; testing new software
4. Look at multiple ways to reduce risk, speed recovery
   - ID activities that trigger discomfort
   - Rapid response for (temporary) ergo modifications
5. Follow-up to assess progress, need for next steps

Rapid response system

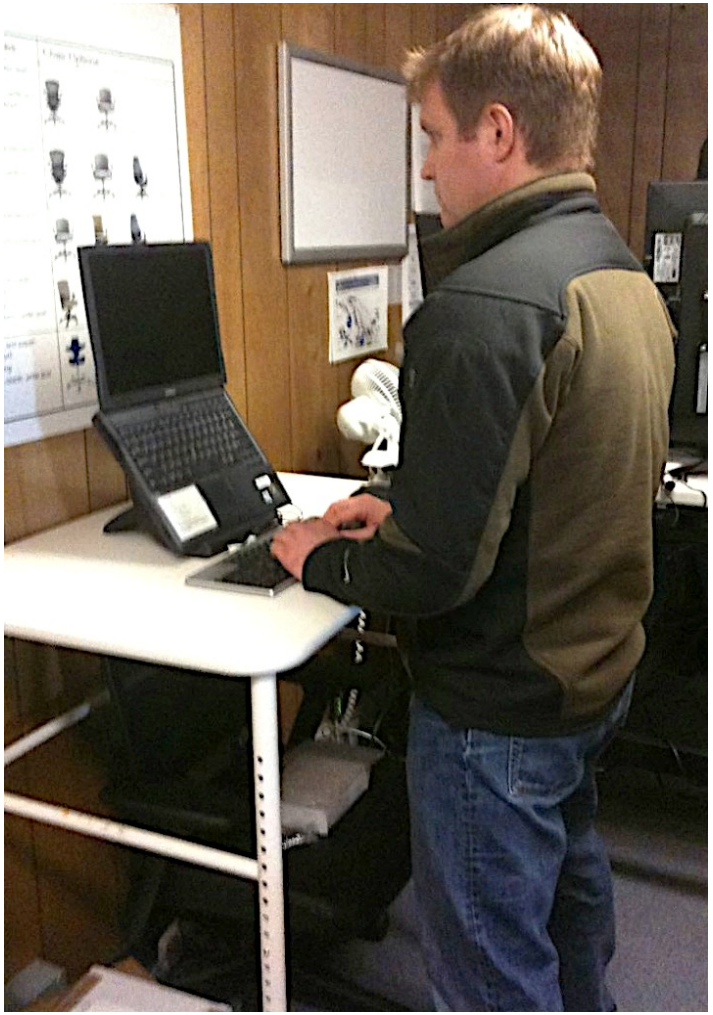
Before

After

Rapid response kit for computer use

Ergo Display Room:

- Frequent upgrade of items- feedback from users
- Ergonomics Technician



American College of Occupational & Environmental Medicine Recommendations

- **"...*demedicalization"*** of Early Discomfort Period
- Give ergonomics, work practice changes, & basic self-care (ice/hot packs) a chance to work during the Early Discomfort Period
- "Early intervention is key to prevent **disability**"

ACOEM (2006)

Ergo Advocate Program

‘Basic Training’ ➔First level of an early detection system

- Aware of ergonomics situation in their area

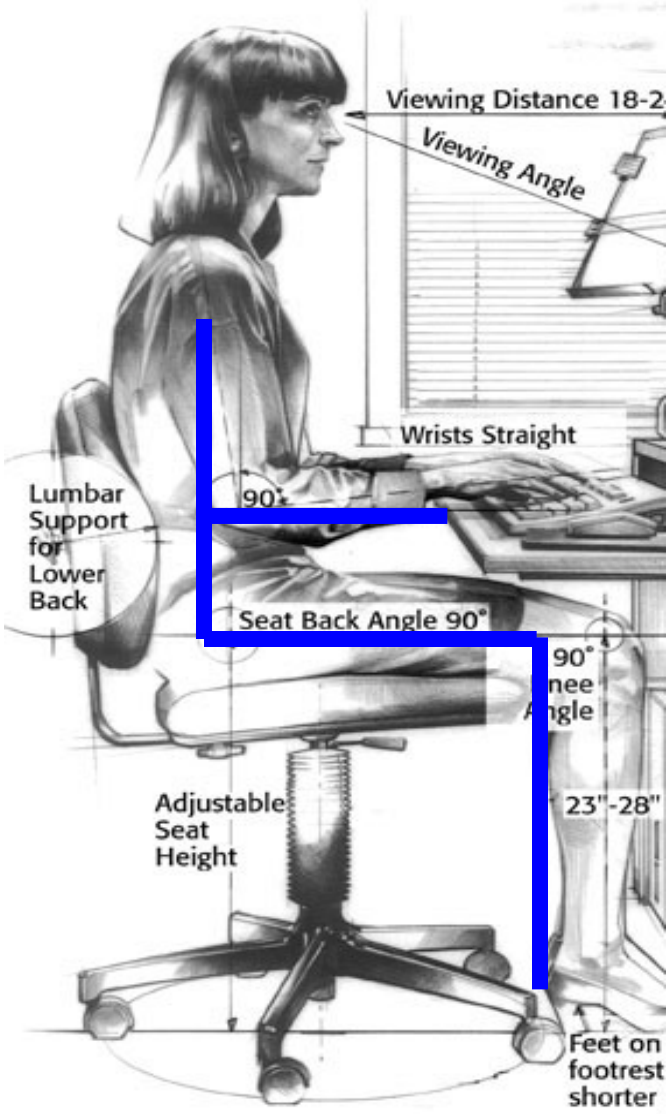
- ID basic problems, implement “quick fixes”

- Assist employees in ordering/setting up equipment

- When needed, escalate problems to Ergonomist, IT, FA

- Monitor progress of ergo modifications for employees

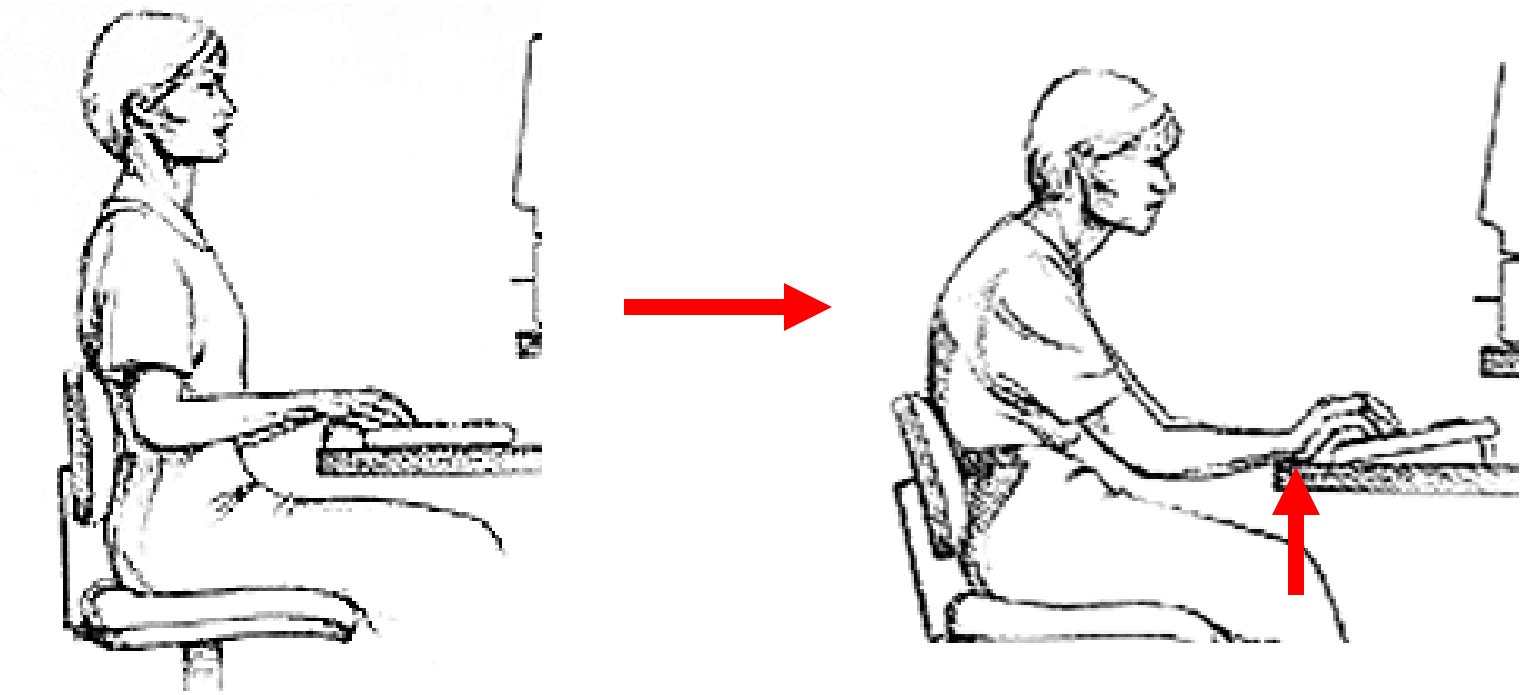
Myth: 90/90 is best



- "Sit up straight!"
- "Keep your elbows, hips & knees at 90°"
- "It's proper, correct"
- "It's ergonomic!"
- **It's…BS!!**

Reality

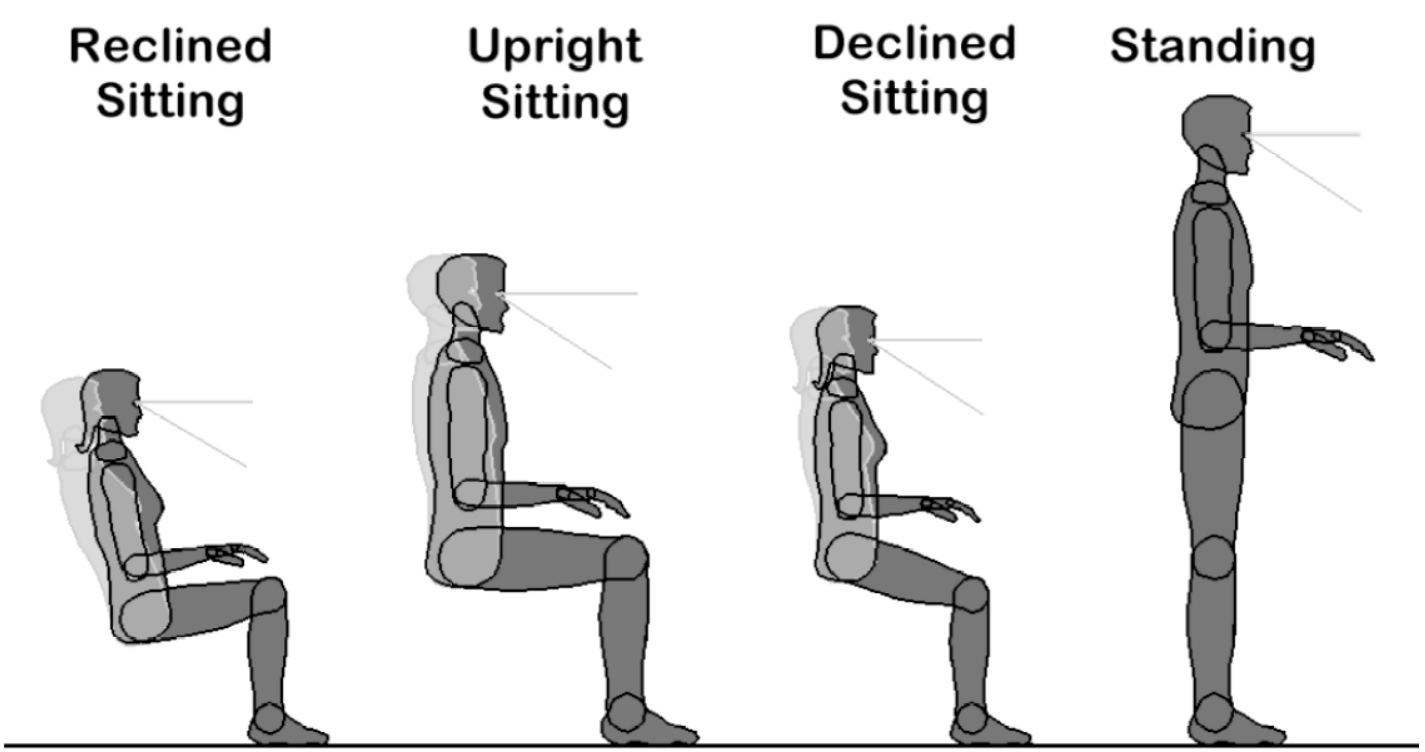
Most people unload their bodies one way or another



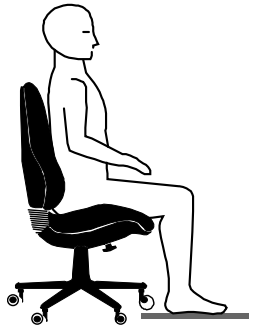
Ergonomics ≠ Rules

ANSI/HFES 100-2007, Human Factors Engineering of Computer Workstations

"… correct the misunderstanding that the 90º posture [is] **the** correct working posture."



Chair Selection Guide



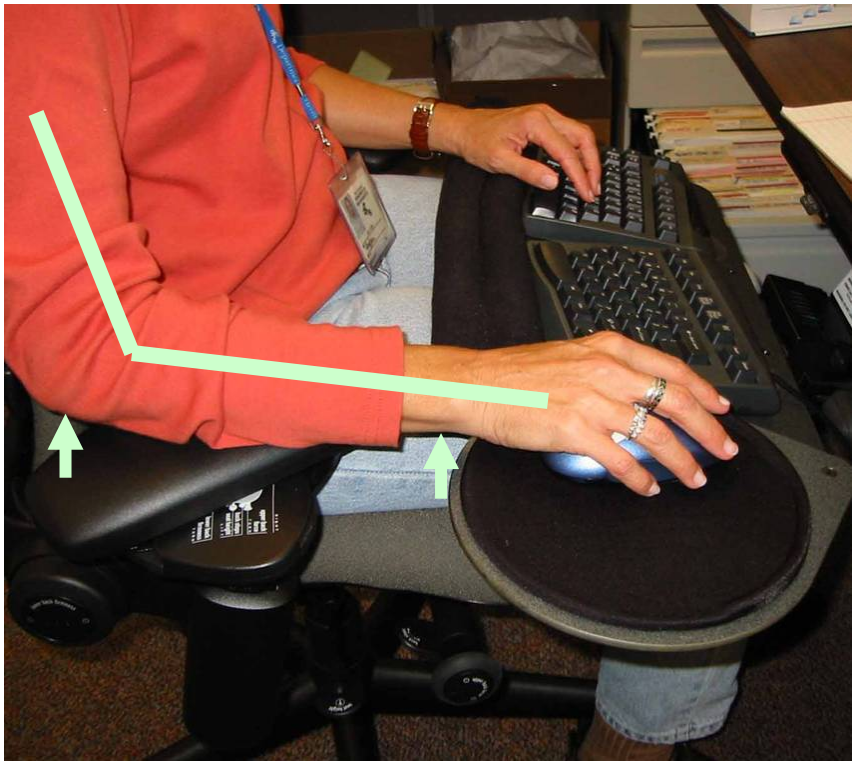
Activity Based Posture	Chair Options
Reclined Sitting: Computer-focused work	 Aeron  Leap
Upright/Mild Reclined Sitting: Variety of work activities Moderate reaching	 Leap  Soma
Forward Sit or "Perch Sit" ▪ Mix of computer & paper-work ▪ Frequent reach, write and reference on desktop	 Soma Comfort

Research Flash:

2.5-year prospective study of 652 computer users

-With forearm support, an ‘open’ angle at the elbow (>120º), resulted in fewer arm/hand problems

-Chair armrests need to pivot



Marcus AIHAJ 2002

Arm Support

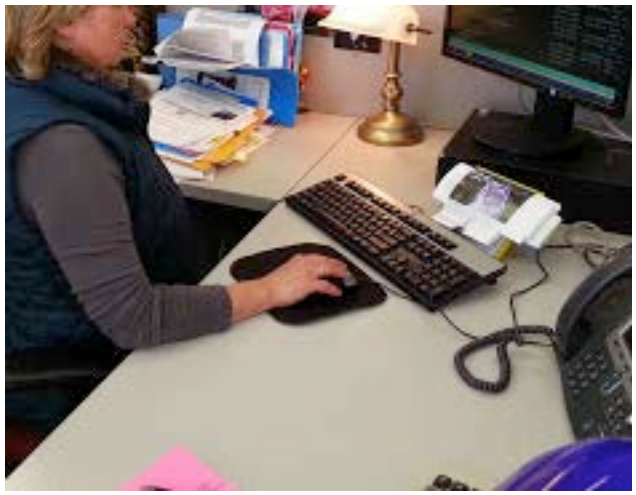
Arm support is not needed for repetitive typing, but is needed for static postures.

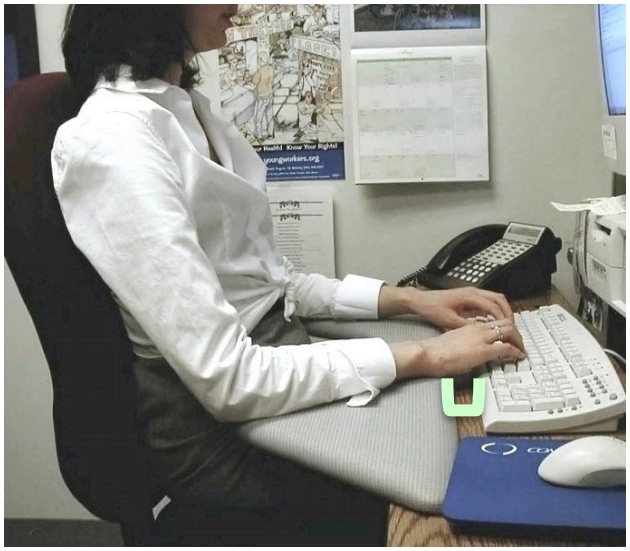
Alternatives:

- Chair armrests
- Push the keyboard farther away, use the desk for arm support
- Arm support attached to the desk

Morencyrest forearm support ➔

- Open space under wrist





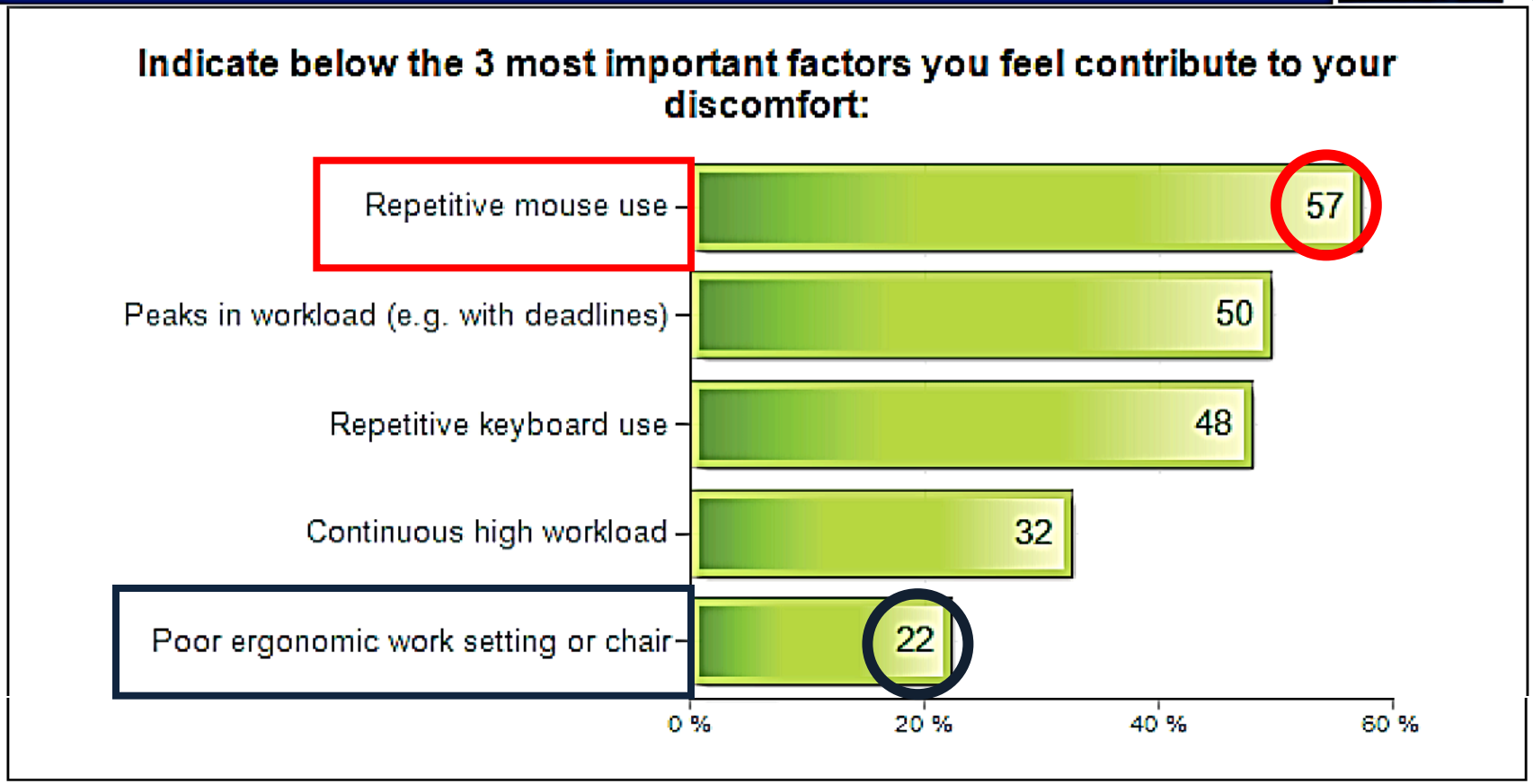
Need new glasses?

Vision Issues - Glasses

- Bifocals/Progressive lenses change everything!
- ‘Cheaters’ don’t work for computer use (16” focal length)
- Many people are better off with **‘single vision prescription lenses’** vs. bifocals or progressive lenses

Mousitis!

LBNL EH&S Culture Questionnaire: Indicate below the 3 most important factors you feel contribute to your discomfort:



Mousitis!

Click+drag = 3x strain in tendons:

- Scrolling, Selecting (e.g., highlighting)
- Dragging (e.g., file to folder; resizing graphics)

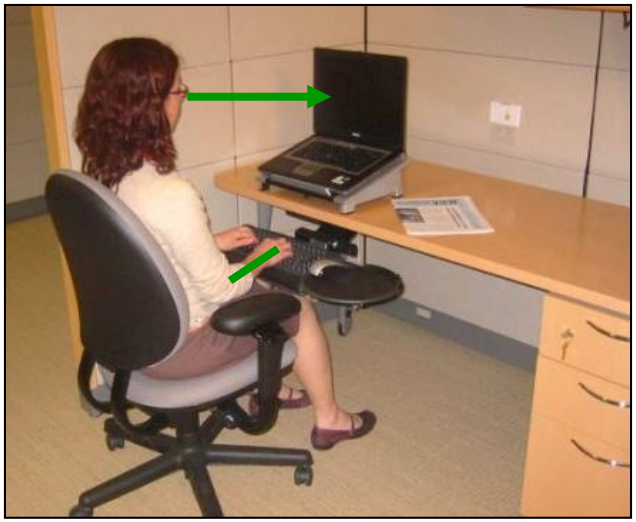
Eliminate click+drag:

- Use 2 mice – one to click, other to drag
- ‘Drag-lock’ button on pointing device
- Keyboard shortcuts for common click+drag

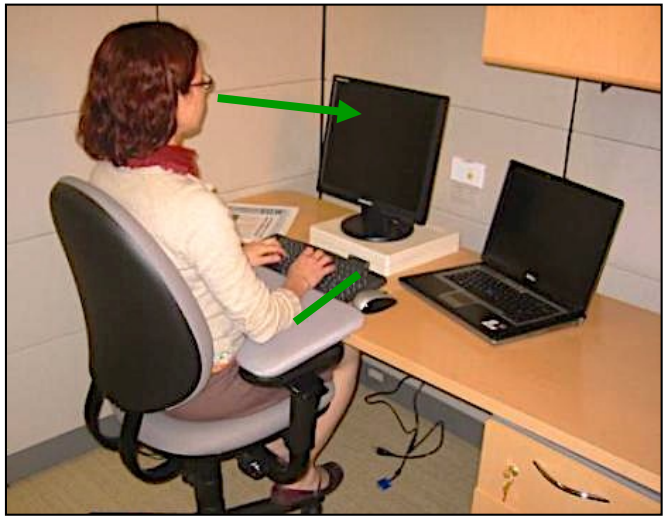
Problems with Laptops

Before

- *Use a laptop riser or external monitor to raise the screen*
- *Use external keyboard & mouse at a comfortable height*



After- Keyboard tray & riser



After- External screen + forearm pad

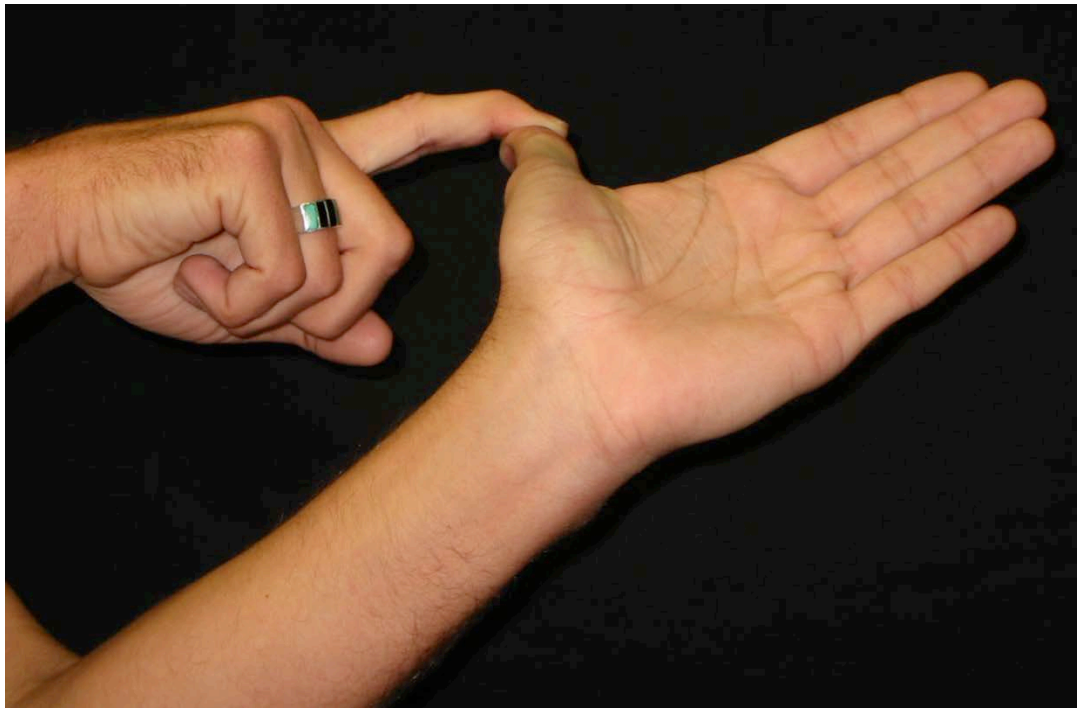
Work Patterns:

- Take Breaks?
- Hours per week?
- Computer + telephone?
- Overtime & deadlines!
- Use of KB shortcuts?

Evidence-based break times

Myth: Stretching exercises…

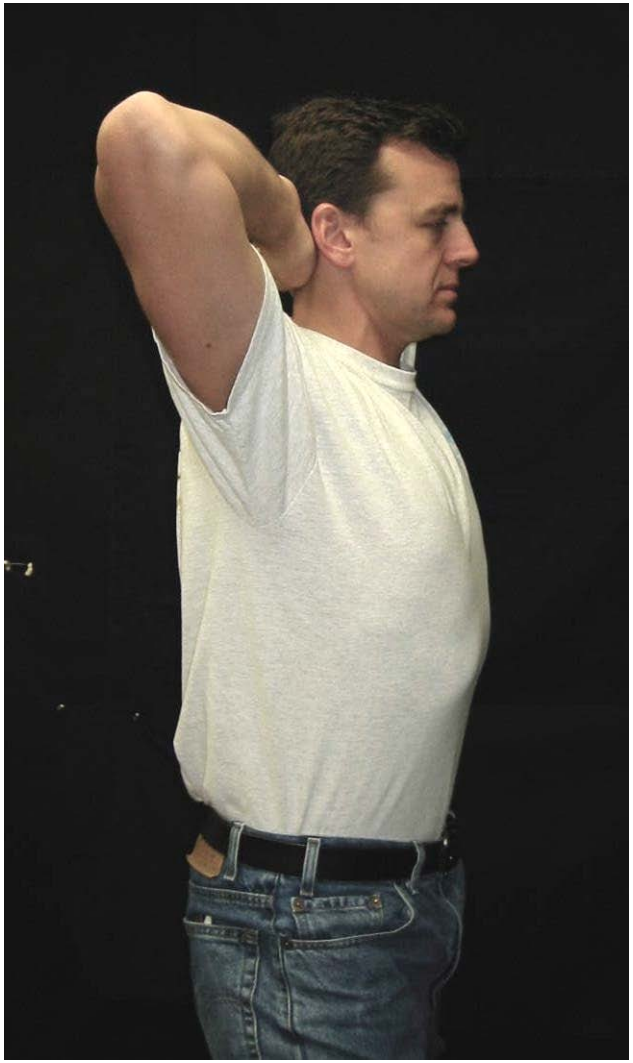
1. Can prevent work-related MSDs
2. Useful as warm-ups before an exertion

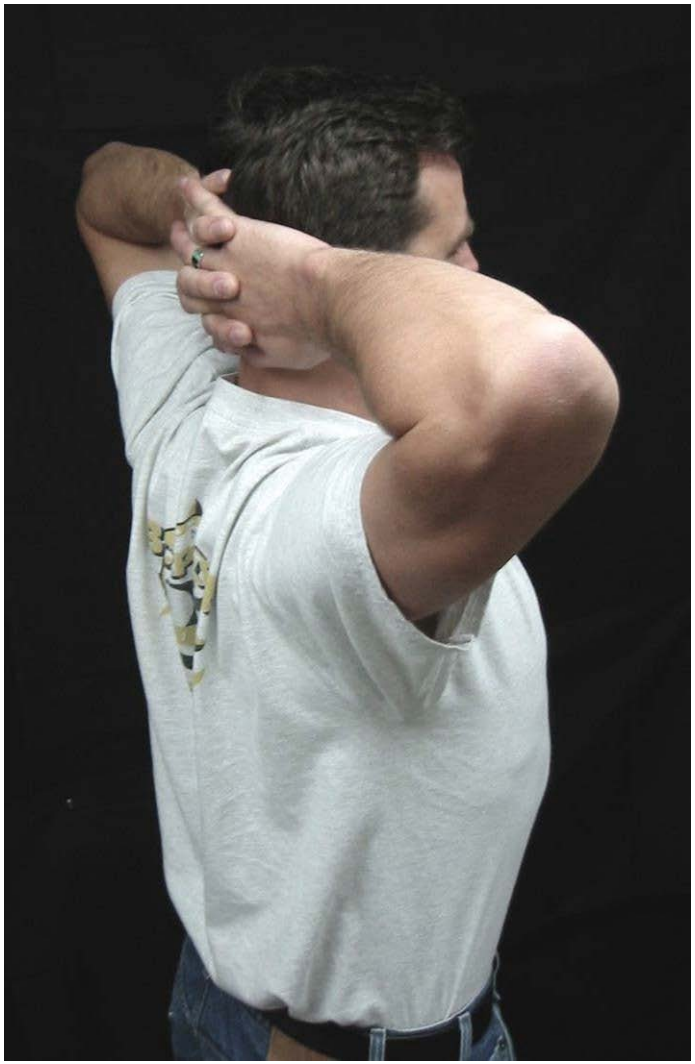


Best break: get up & *MOVE!*

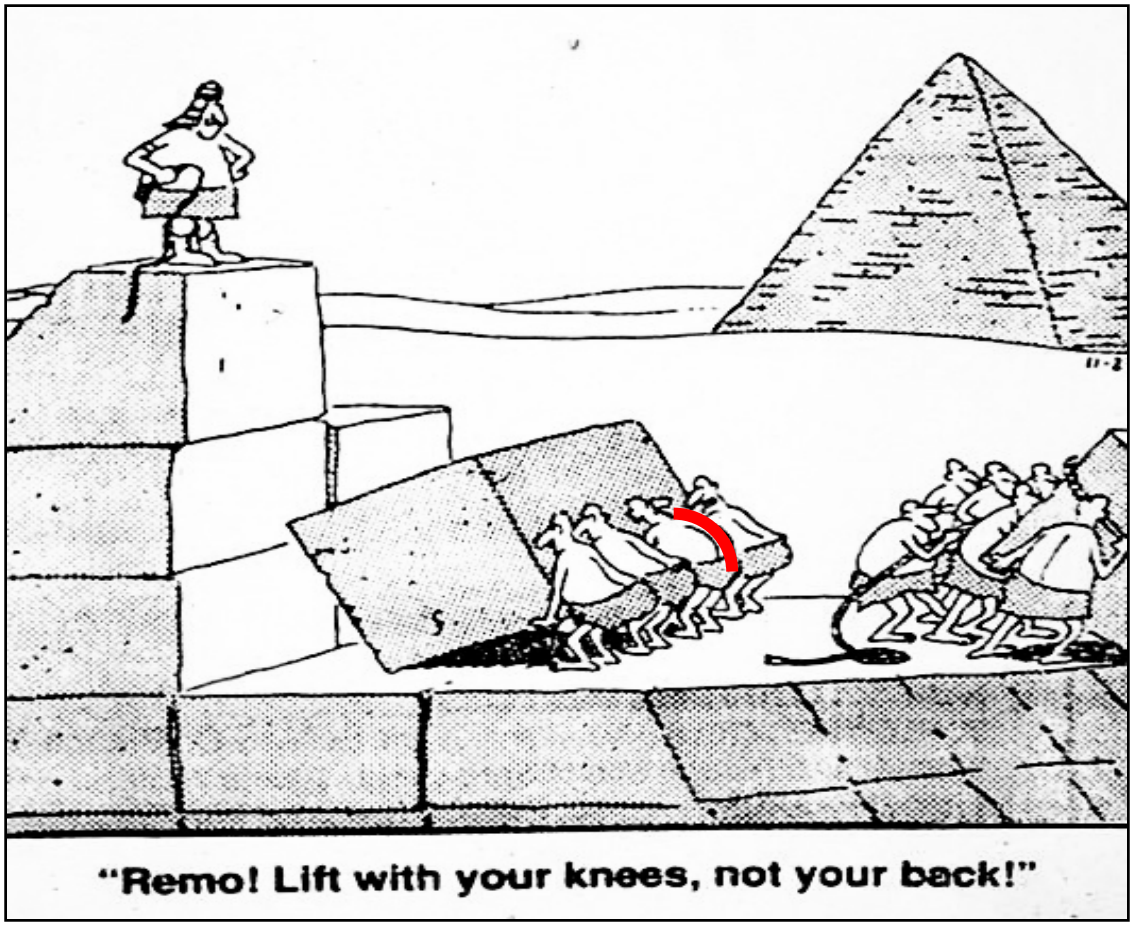

My recommendation... STRETCHING EXERCISES!
300 lbs.
300 lbs.
© 2001 Ergoweb, Inc.

Stretching the *Other* Way…



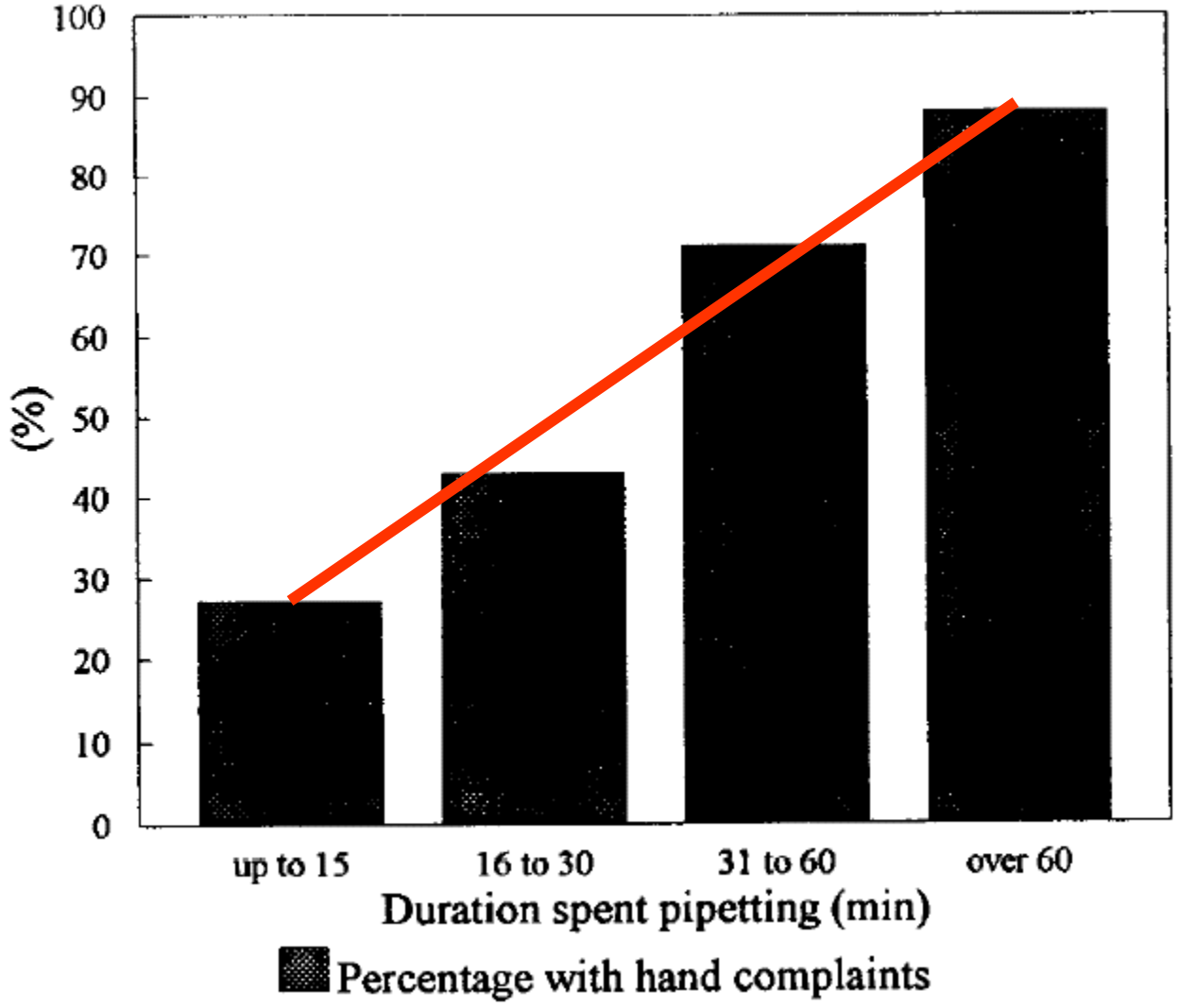


Myth: Training in ‘Proper Lifting Techniques’ will make the job safe



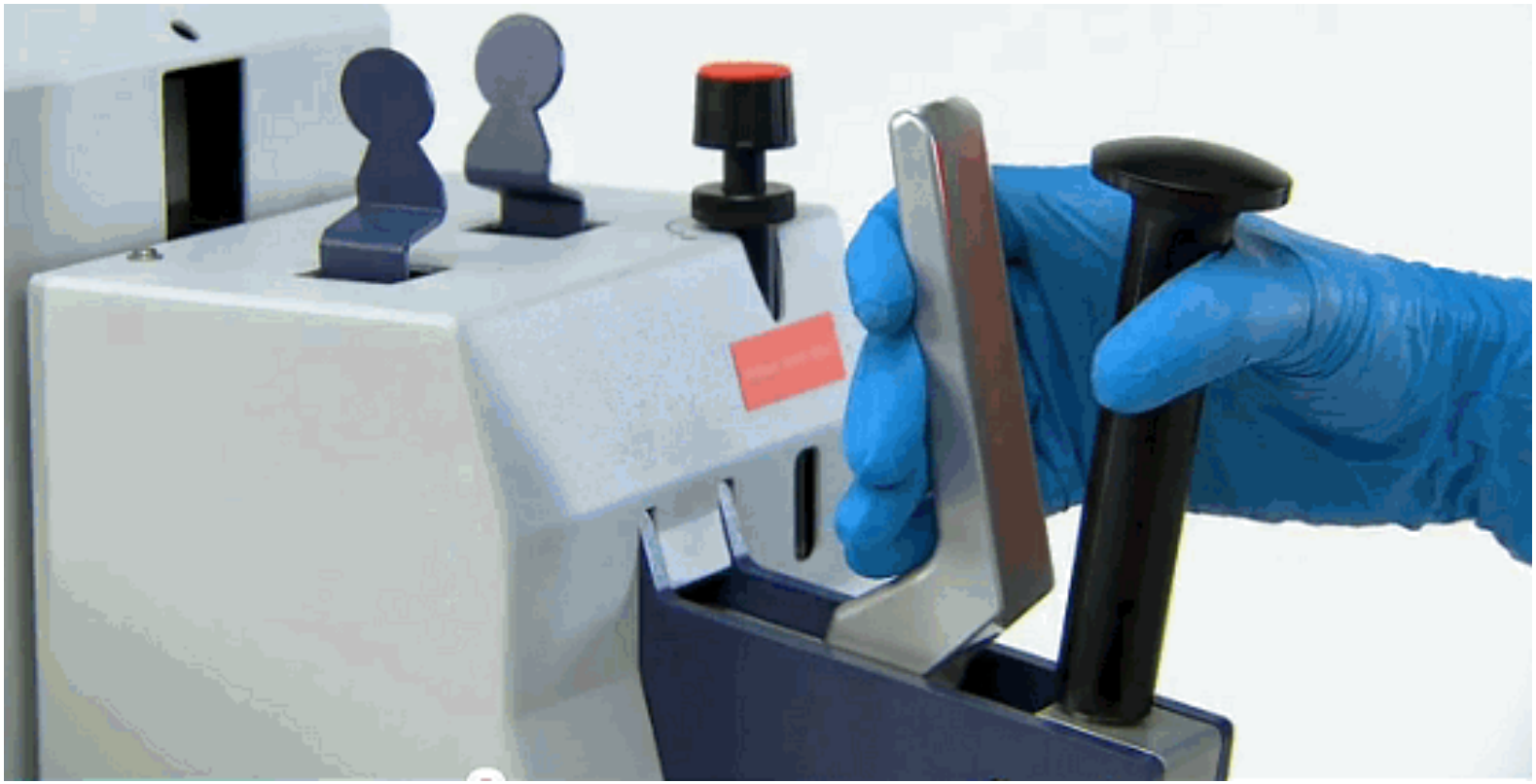
Pipetting- manual

Frequent pipette use (>300 hrs./yr.) is associated with high risk of hand & shoulder problems



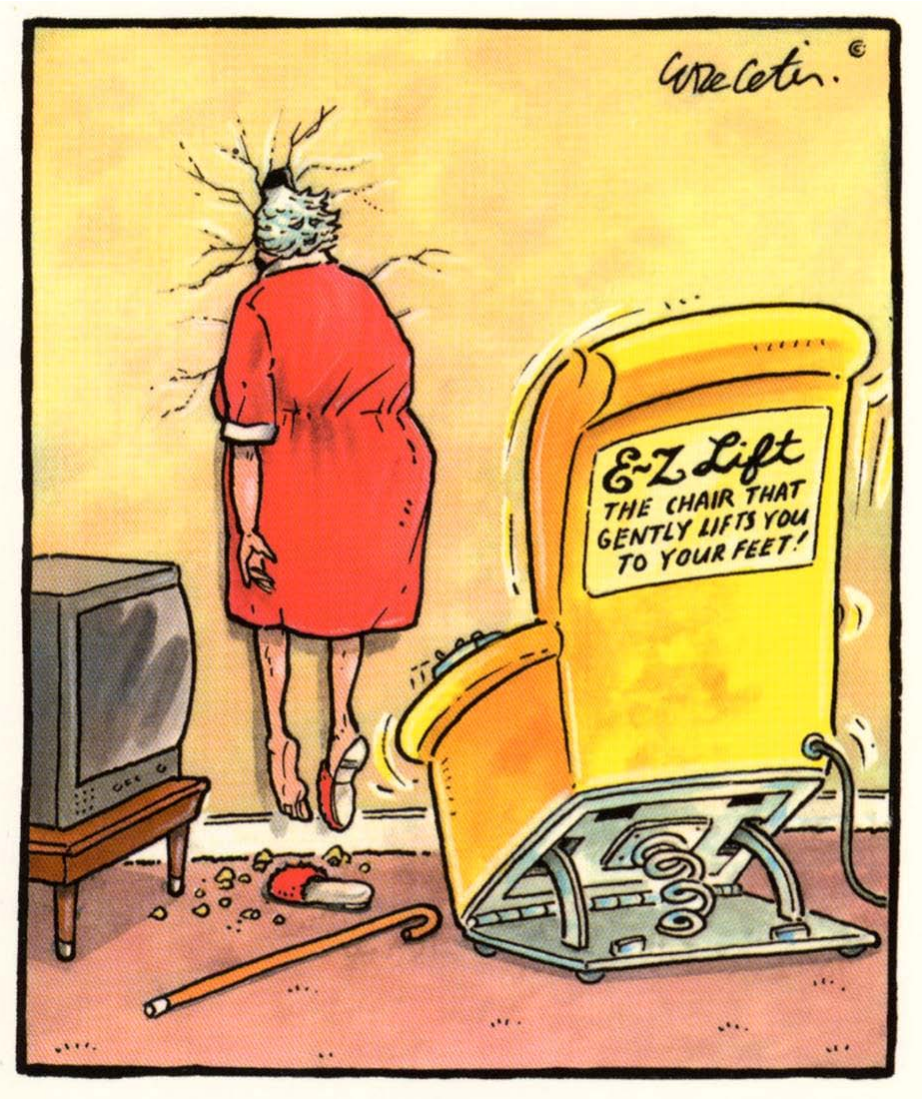
David & Buckle, Applied Ergonomics, 28:4, 1997

Desktop pipettor



Additional awkward grips throughout the cycle of aspiration and dispensing

Test-drive it first!!



Ergo problems- *symptoms* of larger issues

Andy Imada

Improvement is *everybody's* job

Mixed workgroups working together to solve real problems

Bench top DNA Hood **before** modification:

Inadequate legroom & long reach distances

Mock-up for group input & collaboration w/ Ergo Team

Sinking & tilting + better pipette to reduce awkward postures

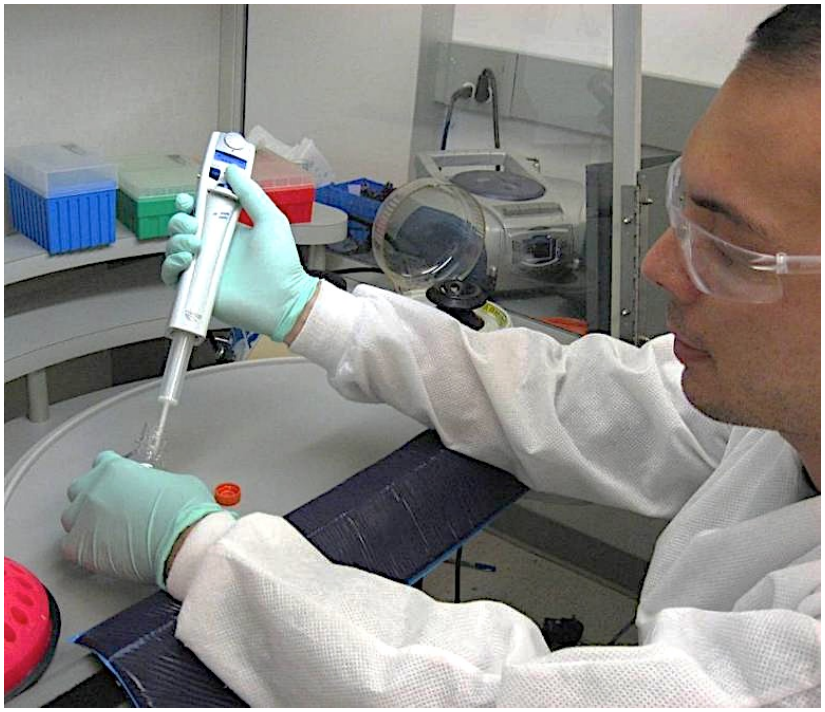
Before: Bent wrist

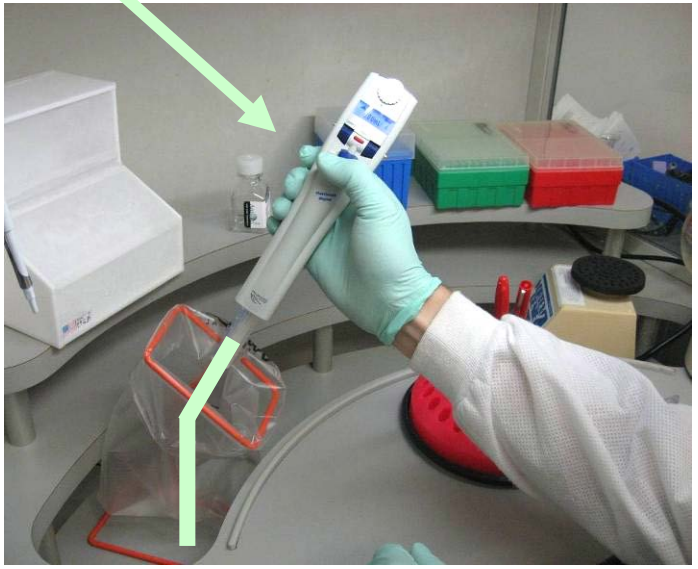
After: straight wrist

Bench top DNA Hood design

Ergonomic features:

1. Recessed area & tilted receptacles reduce awkward wrist postures
2. Padding protects elbows & forearms
3. Programmable pipette (Eppendorf Xstream) improves hand position, reduces force & repetitive movement





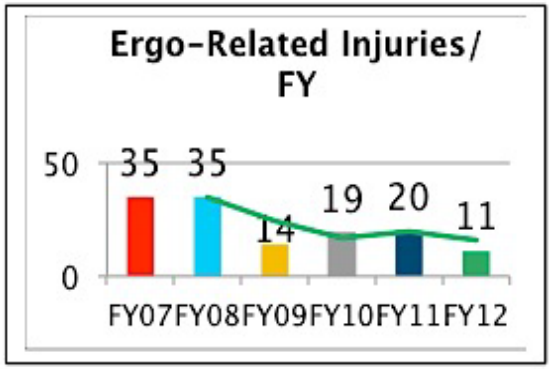
Awright!

www.jha-techspace.com

SOMA chair

Lawrence Berkeley National Laboratory Ergonomics Program Structure and Metrics: 2007 – 2013

Summary: The LBNL Ergo Program did not represent a net cost, but a savings of nearly $1,000,000 per year



Comparison of baseline (FY07) to FY12	FY07-FY08	FY09-FY12	Savings
Average Annual Ergo-Related Recordable Injuries	35	16	--
Annual Cost of Ergo-Related Recordable Injuries[1]	$700K	$320K	**$380K**

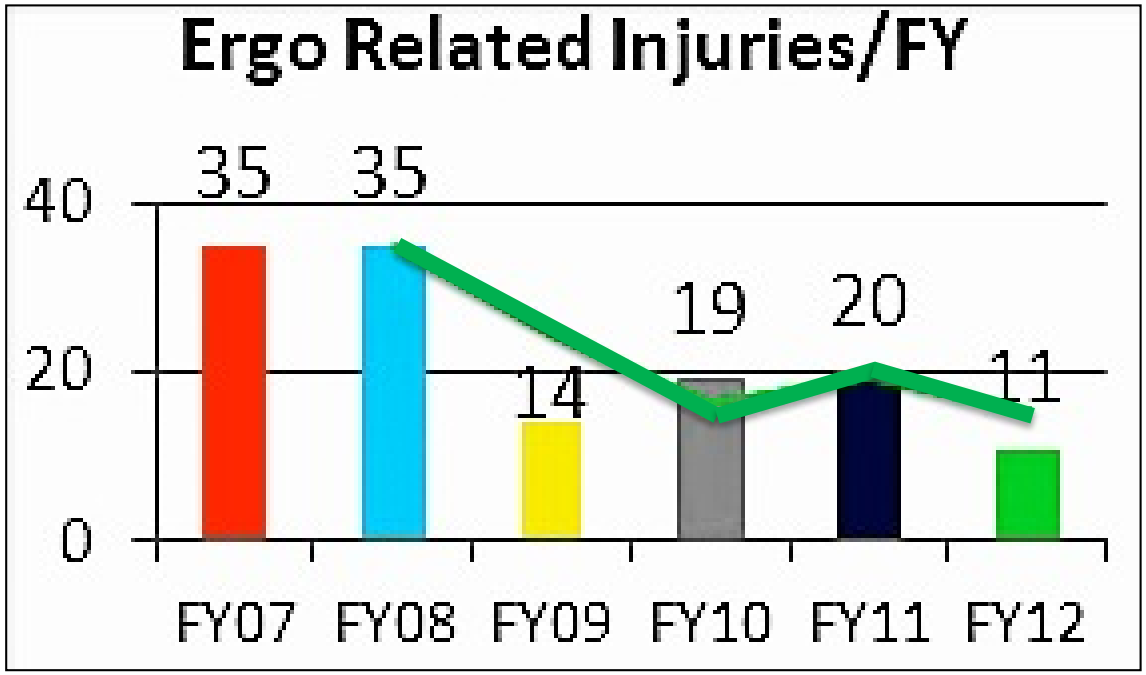
2007: Formation of Ergo Team: 2 FTE Ergonomists, .9 FTE Consultant, 1 Ergo Technician = **~4 FTEs**
2010-2011: Ergo Technician RIF, 3rd Ergonomist hired, Ergo consultants discontinued, = **~3 FTEs**
2013: Ira Janowitz retires, Ergo Team **= ~2 FTEs**

Current Metrics:

1. FY2012: Ergo evals 100% effective when used as first line of defense to PREVENT discomfort from progressing to RECORDABLE INJURY for 246 high-risk 'ees.
2. FY2012: 95% customers with discomfort indicated they maintained their WORK PERFORMANCE level after an ergo evaluation and quick-fix products. 12% Performance decrements are typical for employees with musculoskeletal discomfort[2] = **$560K Cost Avoidance per year**
3. FY 2009 to FY 2012: Increased MOVE EVALS resulted in an 86% reduction in related Recordable Injuries (6 to 1 injury/yr.) = **$120K Cost Avoidance/yr.**
4. FY2012: Partnership with Facilities to create Lab-wide Office Furniture Standards reduced cost/workstation by $600; ergo performance features were improved.
   During FY12: installation of 600 sit-stand workstations x $600 each = **$360K Savings**
5. FY2012: Lab-wide Office Furniture Standards created with the goal of moving people and their belongings vs. moving ergo desks and equipment. Savings per move =$800 - $480 = $320 x 600 moves/year with new Standard Furniture = **Projected annual savings of $192K**

Quality of Service Metrics (based on survey of high-risk evaluations)	**FY12**
Reduced discomfort… *effective to very effective*	94%
Ergo Eval & Quick Fix maintained work performance… *effective to very effective*	95%
Ergo Eval performed quickly… *within a few days*	88%
Overall Satisfaction with ergo services… *good to excellent*	100%

Outcome: Projected Annual Cost Savings = $1,492,000 – ~$500,000 Program Cost = ~$992,000



Ergo Team Quality of Service Metrics

Responsiveness and Effectiveness	FY12
Reduced discomfort… effective to very effective	94%
Ergo Eval performed quickly… within a few days	88%
Ergo Eval & Quick Fix maintained work performance	95%

The Ergo Program = ~~n~~et cost, but is SAVING LBNL approximately $1,000,000 per year

Ergo Program Cost:Benefit = 1:3; ROI = 3:1

	Projected annual savings
Decreased Discomfort & Maintained Work Performance	**= $560K Cost Avoidance/yr.**
Cost of Ergo-Related Recordable Injuries (incl. Work Comp claims)	**= $380K Savings/yr.**
MOVE EVALS	**= $120K Cost Avoidance/yr.**
Roll-out new Office Furniture Standards (less $, lower risk)	**= $360K Savings** **= $192K Projected savings/yr.**
PROJECTED ANNUAL SAVINGS	**= $1,549,000 - $500K program cost**

Everything I learned about teamwork

I learned playing baseball:

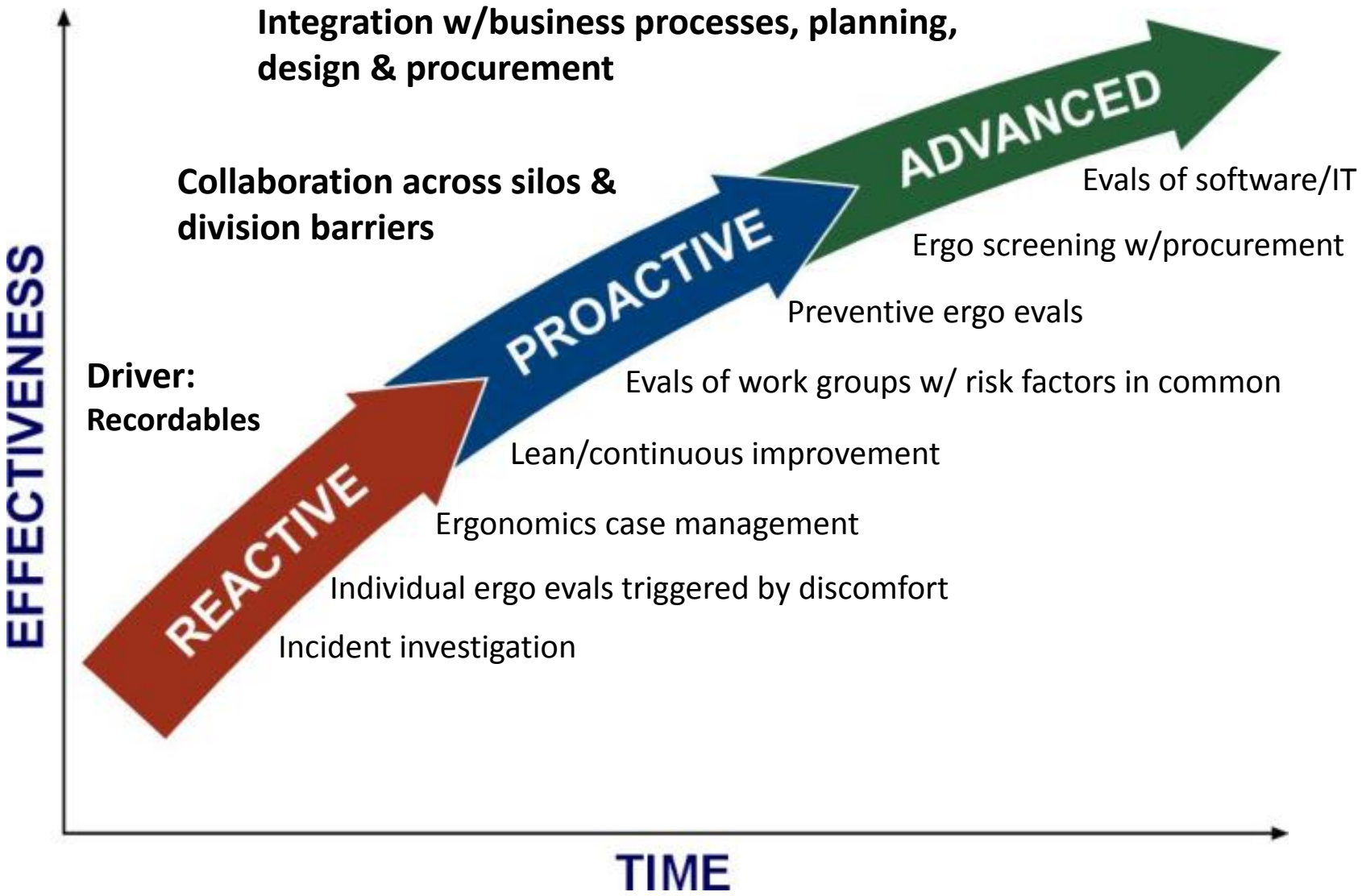
-Communication

-Feedback

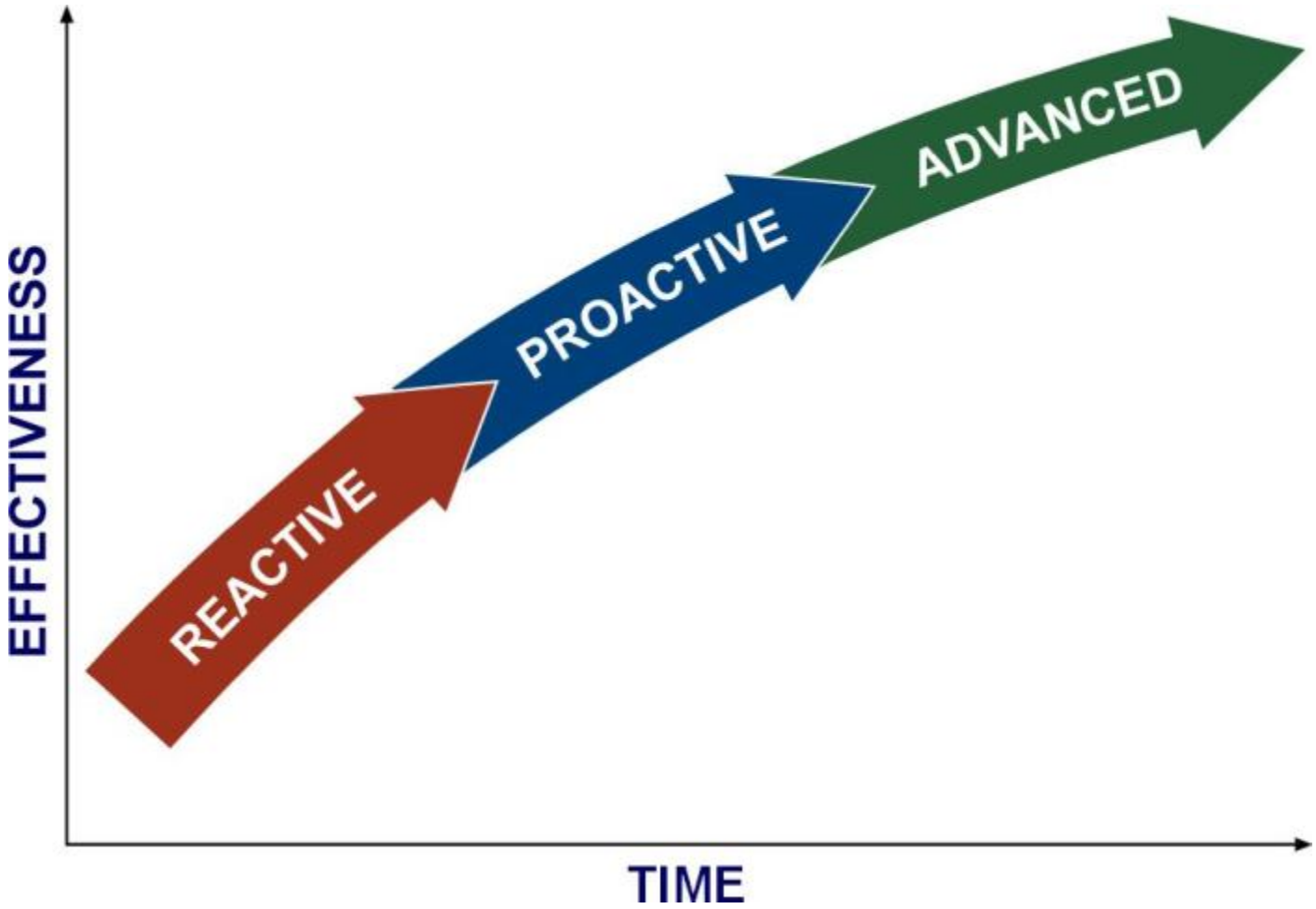
-Respect

-LISTENING !

Organizational Maturity



Where Does ***Your Organization*** Fall on This Curve?



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