

Behavioral Ergonomics

SCAIHA/OCAIHA/OCASSE
Joint Technical Symposium 2005

Rani Lueder, CPE
Humanics Ergonomics Inc.
Austin, Texas
www.humanics-es.com

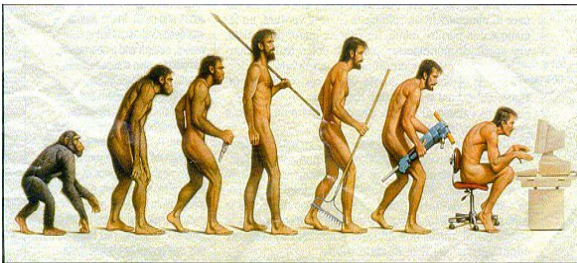


Ergonomics revisited

"Ergonomics is about 'fit': the fit between people, the things they do, the objects they use and the environments they work, travel and play in.

If good fit is achieved, the stresses on people are reduced. They are more comfortable, they can do things more quickly and easily, and they make fewer mistakes."

The Ergonomics Society (Europe)
www.ergonomics.org.uk



Somewhere, somehow, something went terribly wrong...



Bernardino Ramazzini

"Constant writing also considerably fatigues the Hand and whole Arm, on account of the continual ... Tension of the Muscles and Tendons.

I knew a Man who, by perpetual writing, began first to complain of an excessive Weariness of his whole right Arm, which could be remov'd by no Medicines, and was at last Succeeded by a perfect Pally of the whole Arm. That he might sustain as little Loss as possible by the Accident, he learn'd to write with his left Hand, which was soon after seiz'd with the same Disorder."

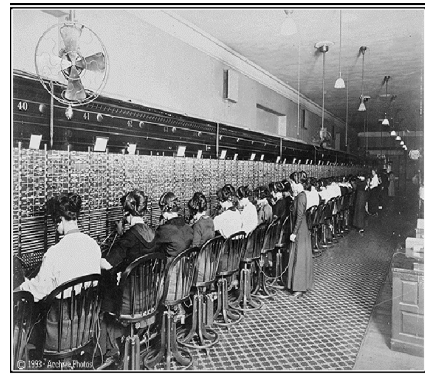
Ramazzini (1777)
Essai sur les Maladies de Disseus
Translated from Latin in "De Mortis Artificum" by M. De Foureau



Equipment has changed



But people have not



● ● ● Nor have the risk factors

INDEPENDENT FOR THE VERMONT STATE

● ● ● Shifting paradigms

...different blinders

Cooper-Hewitt, National Design Museum film-artistic photo advertisement

● ● ● Topics

- Worksite findings
- Training
- Sitting postures
- Seating
- Facilities

● ● ● Worksite findings

● ● ● Discomfort ratings

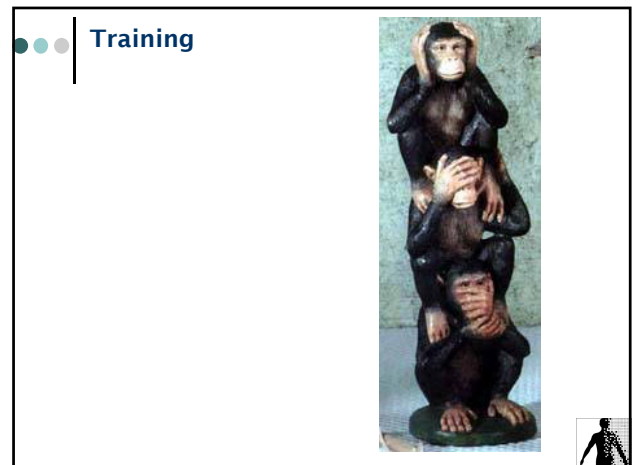
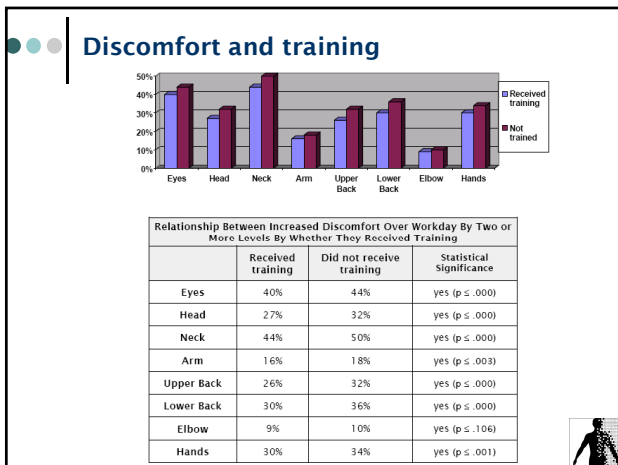
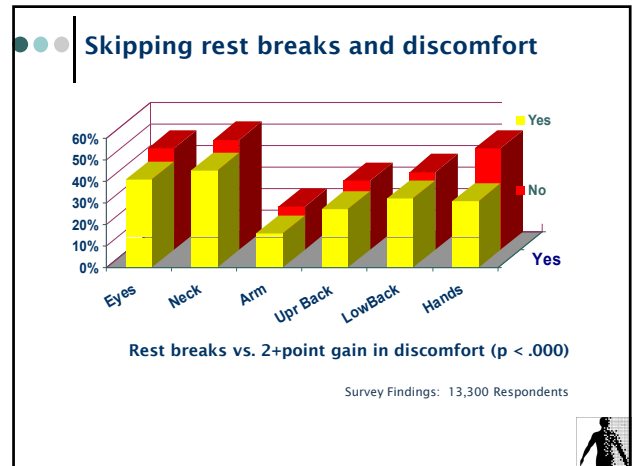
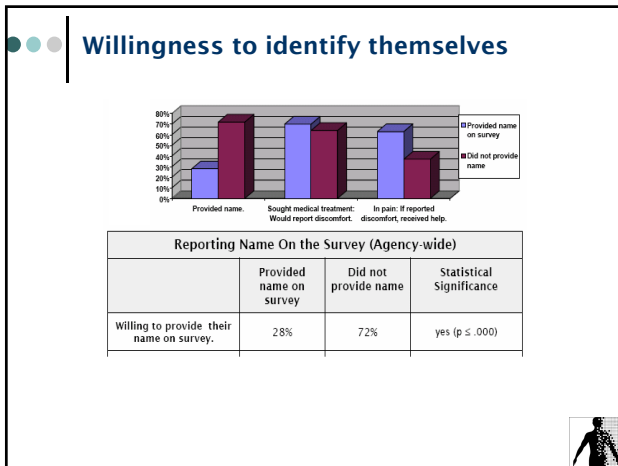
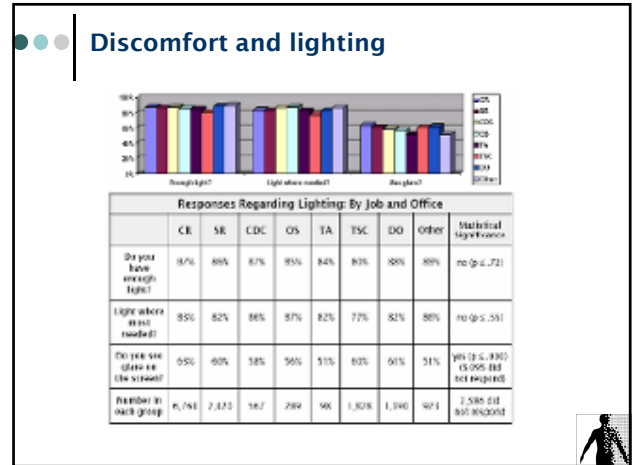
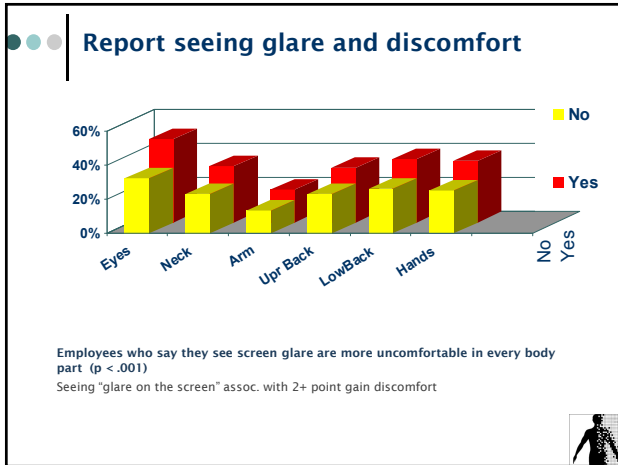
	Beginning	End
Eyes	-----	-----
Head	-----	-----
Neck/Shoulder	-----	-----
Arm	-----	-----
Upper Back	-----	-----
Elbows	-----	-----
Low Back	-----	-----
Hands/Wrist	-----	-----

● ● ● Discomfort rates at the end of work
 (Only moderate to severe discomfort is shown below)

Body Part	Moderate	Strong	Extreme Pain
Eyes	30%	15%	10%
Neck/sh	25%	20%	10%
Arm	10%	10%	5%
Up'r Back	15%	15%	5%
Low back	20%	15%	10%
Hands	20%	15%	10%


Neck/shoulder (54%) Eyes (48%) Hands/wrists (40%)
 Lower back (42%) Upper back (34%)

Survey Findings: 13,300 Respondents



Revisiting Training

- Is training the problem?
- Is it what they need to know?
- Can they do what you say?
- Can they hear what you tell them?




Missing and wrong content

Missing content:

- Backrest tension
- Lighting and glare
- Work design


Bad information:

- Monitor screen at arm's length
- Mousing on the right
- Posture doesn't matter as long as you're moving




Training effects

- Practice effect
- Order effect
- Direction of adjustment
 - Seat height: Down, then up then down
 - Back height: Down, then up, then down
 - Seat tension: Low, then high, then down




Best time to train...


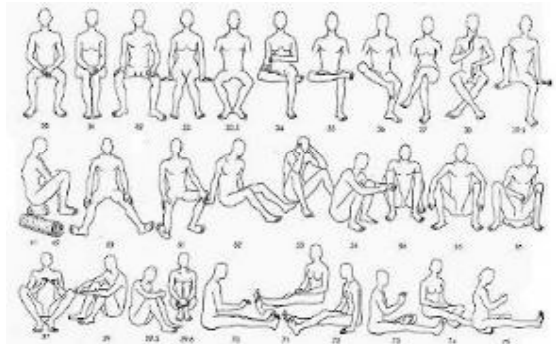
- ASAP
- When the new furniture arrives
- When moving / starting a job

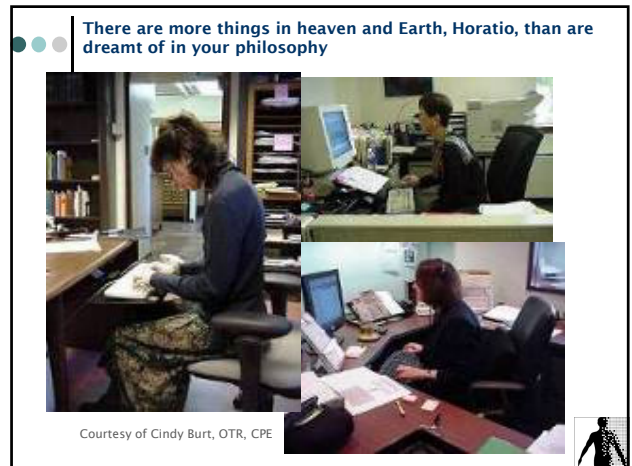
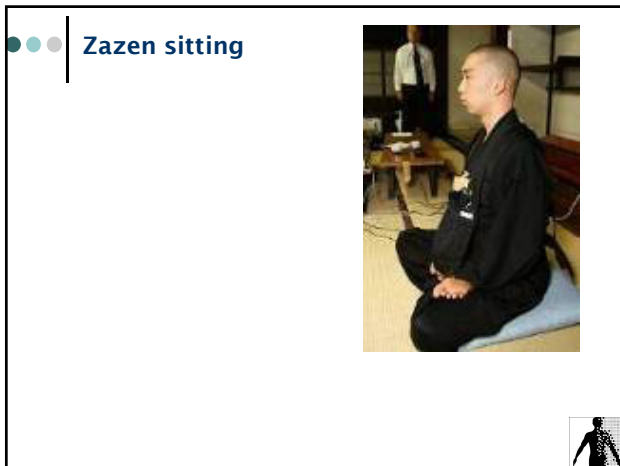
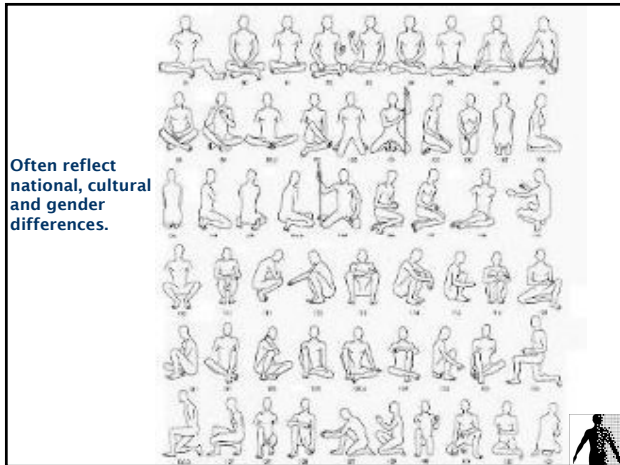


Sitting postures



People sit in many different ways





Courtesy of Cindy Burt, OTR, CPE



Men sitting

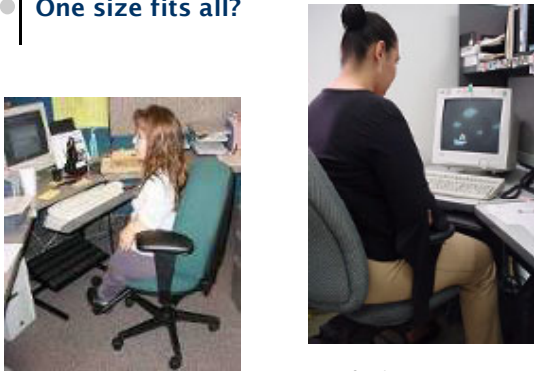


Courtesy of Cindy Burt, OTR, CPE

Seating




One size fits all?



Courtesy of Sitmatic


Courtesy of Cindy Burt, OTR, CPE

Comfortable ≠ best




← Healthy ligament
Damaged ligament (below)


Provenzano et al (2001)
Microstructural morphology in the
transition region. *Connective Tissue
Research*. 42, p123-133.



Spinal degeneration



- Spine degeneration begins at 20
- 20% - 50% adults do not experience symptoms, despite radiographic evidence of pathology



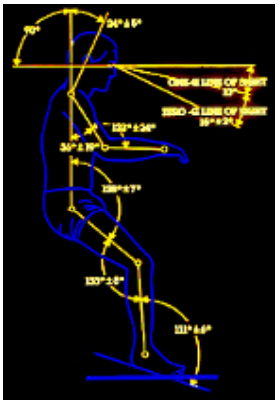
Symptoms complicated



What's that all about?

Holding joint in non-neutral positions near end of range

- Places muscles out of balance
- Increase physical demands
- Adds stress to body




Products we use



Facilities

Products and places



"Ergonomic equipment" ≠ ergonomic



Screw up one thing, screw up everything!



Band-aid fixes often → more problems

Courtesy of Cindy Burt, OTR, CPE




● ● ● **When products don't fit spaces**





● ● ● **Left or right-handed station?**




Most consider this a right-handed station



● ● ● **There are more things in heaven and Earth, Horatio, than are dreamt of in your philosophy**




Courtesy of Cindy Burt, OTR, CPE



● ● ● **Eye height, sitting and standing**


	Eye height, standing	Eye height, sitting
1st female	54	44
5th female	56	45
95th male	69	54
99th male	70	55

Tallest male (99th pc, seated) looks into the eyes of the smallest female client (standing)



● ● ● **Sample Installation Guidelines**

- Initial default panel-hung WS at 28.5", then set for user.
- All panel-hung work surfaces flush and at same height.
- Place the CPU under the work surface.
- Keyboard / keyboard tray directly in front of the screen.
- Keyboard tray bolted so adjusts over the full range.
- Mouse can be set next to keyboard on preferred side.
- Cords long enough to adjust equipment over full range.
- Phone cord long enough to move between tables.
- Paper flow support does not obstruct.



● ● ● **Questions or comments**

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●●● | Thank you!



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