Behavioal Ergonomics

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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

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 Palsy of the whole Arm. That he might sustain as little Loss as possible by the Accident, he learnt 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

Somewhere, somehow, something went terribly wrong...
Nor have the risk factors shifted paradigms... different blinders

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

Worksite findings

Discomfort ratings

Discomfort rates at the end of work
(Only moderate to severe discomfort is shown below)
Employees who say they see screen glare are more uncomfortable in every body part ($p < .001$)

Seeing "glare on the screen" assoc. with $2+-$ point gain discomfort

Willingness to identify themselves

Training
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
Often reflect national, cultural and gender differences.

Reflects nations, cultures & genders

Zazen sitting

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

Women are different

Women sitting
Men sitting

Courtesy of Cindy Burt, OTR, CPE

Seating

Courtesy of Sitmatic

One size fits all?

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

Behavioral Ergonomics
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

Eye height, sitting and standing

<table>
<thead>
<tr>
<th></th>
<th>Eye height, standing</th>
<th>Eye height, sitting</th>
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</tr>
<tr>
<td>95th male</td>
<td>69</td>
<td>54</td>
</tr>
<tr>
<td>99th male</td>
<td>70</td>
<td>55</td>
</tr>
</tbody>
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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!