CBIA 2016
Annual Safety & Health Conference

Ergonomics: Recent Trends and Topics

Marcy Sanders PhD MSOSH OTR/L CPE
Associate Professor
Quinnipiac University
Martha.sanders@Quinnipiac.edu
Recent Ergonomic Trends

- Sit-Stand MOVE
- Total Worker Health
- Stretching
- Participatory Ergo
Recent Trends Agenda

- Sitting is the New Smoking
- Stretching at Work
- Participatory Ergonomics
- Total Worker Health
2000’s Cancer Research
Sedentary Lifestyle and Cancer

IS SITTING

THE NEW SMOKING

There's no running away from it: The more you sit, the poorer your health and the earlier you may die, no matter how fit you are.

by SELENE YEAGER
PHOTOGRAPHED by Nick Ferrari
Sitting Is the New Smoking

14 Horrible things that can happen!

- Premature death
- Obesity
- Diabetes
- Heart disease
- Depression
- Cancers
  - colon, endometrial
  - Lung, prostate cancer

Prolonged Sitting

- Changes in fat metabolism
- More fat deposits
- Higher blood sugar
- More insulin
- Less oxygen to muscles
- Depression

Sitting and Cancer Risk

- 34% mortality for women sitting >6 compared to < 3 hrs.

- Risk increases with each 2-hrs in sitting time

- Independent of physical activity!!

J Natl Cancer Inst (2014) 106 (7)
A Sedentary Lifestyle Is Killing You!
Stand and MOVE!!
Active workstations

Pro’s
- Increase HR
- Energy expenditure
- Weight control

Con’s
- Productivity - decline in mousing and typing tasks
- Falls
- Cost
Standing All Day is not the panacea!

- Low Back Pain
- Leg pain
- Foot pain
- Fatigue
- Varicose Veins
- Discomfort
Sit-Stand Options

Desk Top Conversion

Adjustable Tables

Alternate Surfaces

http://www.posturite.co.uk/deskrite-500-writing.html
Choosing Sit-Stand Options

Considerations

- Space available
- Working surface needed
- Ease at adjusting
- Electric lift (not hand crank)
- Standing mat
- Keyboard/Monitor
- Cord management

http://www.ergobuyer.com/sit-stand-desks/
https://ergoweb.com/how-to-choose-a-standing-desk
Proper Use of Sit-Stand

Use of Sit-Stand Workstation

http://safetyservices.ucdavis.edu/article/sitting-standing-workstations
Make Time for Break Time

This graphic illustrates how different amounts of activity influence certain much-studied indicators of cancer risk. Other factors like eating smart, staying lean and not smoking also may lower cancer risk.

Types of activity:  
- Green: Moderate / Vigorous  
- Yellow: Break  
- Gray: Sedentary  

Cancer Risk

American Institute for Cancer Research
Build *frequent* movement into the workday

**HEDGE’S 3S’s IDEAL WORK PATTERN**

- **Move and gently stretch**
  - Every 30 minutes
  - 20 minutes sitting
  - 8 minutes standing
  - 2 minutes stretching

- **Stand in neutral postures**
- **Sit in neutral postures**

For a 7.5 hrs day this gives a total of:
- 5 hours/sitting
- 2 hours of standing
- 0.5 hours of moving
- 16 sit-to-stand transitions

(https://ergo.human.cornell.edu/CUESitStandPrograms.html)
“Moving” Innovations for Desk Workers

**Routine Short Breaks**
- Move every 30 mins
  - reduce discomfort
  - increase productivity
- 20% time away from desk = 10% inc in productivity
- Software/ alarm reminders
- Stand 2 hrs/day = 340 calories!!

**“Moving” Ideas**
- Take the stairs!
- Stand while on the phone
- Walk at lunch
- Visit rather than calling
- Walk and talk meetings
- Change work surfaces; try high table or counter.
- Drink Water!

Eye Fatigue
20-20-20 Rule

Americans spend an average of 7.4 hours in front of a screen.

Every 20 minutes, look 20 feet away for 20 seconds.

Protect your eyes. Follow the 20/20/20 rule.
Standing in Manufacturing, Service
A Different Story

- Low Back Pain
- Leg pain
- Foot pain
- Fatigue
- Varicose Veins
- Discomfort
Standing Activity

**Good Posture**
- Correct Head Posture
- Square Shoulders
- Centre of gravity of the body/S2
- Level Pelvis
- Sacrum

**Poor Posture**
- Headaches
- Neck Pain
- Back Pain

![Facet Joints and Disc Anulus](image)
Standing Workers should sit periodically

Standing Assists

- Anti-fatigue mats
- Foot stools
- Sit-stand stools
- Supportive footwear
- Stretching
Standing Assists

Ergo mats work!!

Foot rails

Sorbothane inserts
Stretching: Does it Work?

http://newyork.cbslocal.com/2016/03/28/altwork-station-desk/
Survey Says

Call Me Maybe
Perceived Benefits of Stretching
True or False?

- Increases blood flow
- Increase flexibility
- Prevents injury
- Decreases fatigue
- Improves productivity
- Improves morale
Survey Says
Physiology of Stretching

Stretching

- Lengthen tissue
  - Prevent tendon tightness
  - Prevent Imbalance

Increase Circulation
- More O2
- More energy
- Productivity

Increase joint flexibility
- Absorb loads
- Prevent Injury
Status of the “Industrial Athlete”

Delivery people

- Walking 4.5 m/day, Lift cumulatively, Carry distances.
Stretch for Different Reasons

Physical Activity
Flexibility to Absorb Loads

Static Positions
Fight Fatigue / Stiffness

Must be specific to the job/ worker
## Stretching for Office Jobs

### Research Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Intervention</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kietrys et al., 2005</td>
<td>72</td>
<td>Resistance ex, stretching, control, 4 wks</td>
<td>Neck pain ↓</td>
</tr>
<tr>
<td>Trujillo &amp; Zeng, 2006</td>
<td>19</td>
<td>Stop and Stretch, computer</td>
<td>Productivity ↑ Satisfied</td>
</tr>
<tr>
<td>Marangoni, 2010</td>
<td>68</td>
<td>Every 6 mins 1) computer program, 2) hard copy, 3) no stretch</td>
<td>Pain ↓ Both programs effective</td>
</tr>
<tr>
<td>Lacaze et al, 2010</td>
<td>65</td>
<td>Call center, 10 mins daily exercise v 10 mins rest, 10 wks</td>
<td>Pain ↓ Fatigue ↓</td>
</tr>
</tbody>
</table>
## Stretching for Physically Active Jobs

### Research Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Intervention</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holmstrom et al. (2005)</td>
<td>41</td>
<td>Construction: 10 mins warm-up, 3 mo</td>
<td>Trunk motion↑ Flexibility↑ (hamstrings, hips)</td>
</tr>
<tr>
<td>Moore, 1998</td>
<td>60</td>
<td>Pharm Manufacturing: 5X day, 5 mins, 3mos</td>
<td>Flexibility↑ Self perception↑ Physical conditioning↑ Overall self worth↑</td>
</tr>
<tr>
<td>Hilyerger, 1990</td>
<td>469</td>
<td>Firefighters: 30-min session</td>
<td>Sho, knee motion MSD injury Lower costs</td>
</tr>
<tr>
<td>DaCostat et al, 2008</td>
<td>65</td>
<td>Review</td>
<td>Flexibility may ↑ injury in high intensity jobs; not be used in isolation of other ergonomic programs</td>
</tr>
</tbody>
</table>
Stretching Sequence

Warm-up
- Step or walk for 3-5 min
- Increases blood flow to muscles, tendons

Implementation
- Slowly move into position
- Stretch until feel something
- Exhale
- Hold to count of 10
- Minimal discomfort
ACSM Recommendations

**Stretching**
- Warm up for 5 minutes
- Hold stretch 10-30 seconds
- 3-4 repetitions per muscle group
- Perform correctly, static stretches
- Emphasize tight muscles
- Mild discomfort only

**Instruction**
- Trained instructors should monitor classes
- Stretch regularly: 2-3 days/week, minimum
- Tailor to commonly performed job duties

**Management Commitment**
- Stretch at appropriate work times throughout the day
- Company must be committed to work time and program overhead costs
Engaging workers in decisions about their jobs

Workers are experts in their jobs

Organizational Benefits
  - Workers define the root causes, solution
  - Solutions are realistic
  - Worker ownership enhances adoption of change
  - Sustainability- “in house expertise”

Definition

Participatory Ergonomics

Worker benefits feed back to organization

Common Worker Stressors
- Low decision-making
- Little variety or learning
- High demands-low reward
- Low social support

Contribute to MSDs and chronic conditions

Positive “psychosocial” work environment
- Employee decision-making
- Employee problem-solving
- Employee confidence and self-efficacy
- Social support
- Recognition
Participatory Ergonomics

Insights derived from workers
### Participatory Ergonomics Processes

#### Team Involvement
- Ergonomic Committee
- Management (supervisors, HR, EHS)
- Worker representatives
- Unions reps
- End users
- Teams of workers
- Training

#### Decisions and choices
- Identify Problem
- Creative improvements or Solution
- Implement
- Re-evaluate
- Iterative process
Participatory Ergonomics Process
Auto Parts Manufacturer
A Sedentary Lifestyle Is Killing You!
Health and Safety Culture is the Bigger Picture

Promising

- Must be integrated into a larger strategy to combat the sedentary nature of the workplace

X

Work Culture

- Embraces movement/health
- Training

X

X
Total Worker Health

TWH is a strategy that integrates occupational health and safety protection with health promotion to prevent worker injury and advance well-being.

Risk factors in the workplace contribute to overall health

http://www.cdc.gov/niosh/twh/
Broad Range of TWH Interventions

Benefits

• Improved health contributes to improved productivity and reduction in healthcare costs
• Cost efficient resource utilization
• Common measures to measure safety and health
• Employee recruitment/retention

Ideas You Can Implement Right Now!

LUNCH & Learn

Healthy options embedded in the day
Advocate for a Healthy and Safe Work Culture!