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Ergonomics of Sit-Stand Stations

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Presentation Overview

- Ergonomics of Sit-Stand Stations
 - The scientific research behind sit-stand stations and dynamic workstations
 - Overview of sit-stand and dynamic equipment options and their pros and cons
 - Q&A

Office Occupational Ergonomics

- Occupational Ergonomics vs. Human Factors
- Main purpose
 - Reduce MSDs
 - Improve worker health and comfort
 - Improve productivity
- How
 - Eliminate risk factors
 - Awkward postures
 - Repetition
 - Force

Which is more Ergonomic?



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Why is Prolonged Sitting Bad?

- Office workers spend 77% of their time sitting
- After just 1 hour of sitting biochemical changes occur which store fat rather than use it
- Prolonged sitting is associated with:
 - Heart disease
 - Diabetes
 - Obesity
 - Cancer
 - Premature mortality – being sedentary is responsible for 7% of premature deaths
 - MSD pain with 10-20% loss of productivity

Is Standing the Answer?

- Standing:
 - Is more tiring
 - Increases risk of varicose veins, still have blood pooling
 - Increases strain on circulatory system (10 bpm more)
 - Increases LBP (50%)
 - Decreases fine motor skills
 - Have been ineffective at promoting movement
 - Increases calorie burn by .7kcal/min or 42/hour - Uses more energy
 - Decreases blood glucose levels
 - Increases worker productivity

What is the Answer?

- Move more
- Get up and walk
- Do calf raises
- Go talk to a co-worker
- Stop spending 55% (8.8 hours) of your waking hour sitting
- Get your blood pumping
- Dr. James Levine from the Mayo Clinic would say increase your N.E.A.T. any way you can

"Take a Stand" Project 2011

- Ergotron and HealthPartners
- Sit-stand device review
- Results
 - Increase standing 66 min/8 hours
 - Participates reported
 - More energy, comfort, focus and productivity, better mood and less discomfort

“Ergonomics in Design” 2015

- HFES Journal
- Research literature review findings:
 - Energy expenditure is minimal with standing
 - Sit stands ineffective at promoting movement
 - Changing posture from sitting to standing every 30 minutes does not decrease productivity, if the change is done in 10 seconds
 - Less discomfort - low back, shoulder, wrist, elbow
 - Too much standing can cause pain in back, legs, knees and feet
 - Traditional breaks are not enough to control discomfort
 - Workers can spend 20% (1.8 hours) of the day away from their work area and productivity is same
 - Even 60 second breaks are effective
 - Must provide instruction, support, and reminders for sit-stand desks to be effective
 - Recommend 50-50 split between sitting and non sedentary activities for workday
 - Many studies were too small, lacked control group and had limited duration

Sit-Stand Crank Desks

- **Pros**

- Simple to use
- Reliable, no complicated parts
- Less expensive than most EHA desks (\$600-900)

- **Cons**

- Can be heavy and cumbersome to move
- Can be hard to crank
- Speed of adjustment is slow
- Does not go low or high enough for everyone
 - Common Range 26" – 39.25" or 29" to 42"



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Sit-Stand Desks – The Counterbalance

- **Pros**

- Simple operation through a lever release
- Good reliability
- Requires no electrical supply

- **Cons**

- Cost ~\$1500
- Light load capacity, 100lbs maximum
- Larger units hard to alter & control height
- Limited height range
 - Available height range – 28-49"
 - Does not fit shorter population



Sit-Stand Desks – EHA

- **Pros**

- Lots of room on desk
- Very easy to use, push button controls
- Quick and effortless speed of adjustment
- Pre-set memory positions
- Very low power consumption
- Excellent height ranges 22-48", 26-51"
 - Will fit almost everyone

- **Cons**

- The most expensive option
 - But they are coming down in cost
 - \$500-\$2000
- Requires an electrical power point close to the desk
- Heavy to move



Ergotron Desk Mount

- Pros

- ~\$500
- Goes below the desk
- Easy to adjust & install
- Good height range (13-14" above desk)
- Fits good % of people

- Cons

- Lose desk space
- Limited room for paperwork
- Fixed monitor distance
- Tension adjustment
 - Can be an issue



Task Mate Desk Mount

- Pros

- ~\$500
- Goes below the desk
- Easy to adjust & install
- Good height range (14" above surface)
- Fits good % of people

- Cons

- Lose desk space
- Limited room for paperwork
- Mouse platform low
- Tension adjustment
 - Can be an issue



Workrite Solace Desk Mount

- Pros

- ~\$600
- Goes below the desk
- Easy to adjust & install
- Excellent height range (22" above desk)
- Fits 5th percentile seated women to 95th percentile standing man
- Can move it out of the way for more desk space

- Cons

- Limited room for paperwork
- Monitors need to be light weight
- Tension issues



Table Top Units

- Pros
 - Cost less than EH desks
 - Very easy to install
 - Good amount of work surface
 - No need to attach monitors
- Cons
 - Issue with awkward postures to raise and lower
 - Can require good deal of strength to raise
 - Does not go below desk
 - Limited height range



Varidesk 15.5" above desk



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Other table top units



ESI Ergorise 13" above desk



Humanscale Quick Stand 18" above desk



Kangaroo 16.5" above desk



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The Dynamic Work Environment

- The creation of active workplaces must be intentional by design to insure positive outcomes:
 - Facilitates movement and activity among workers
 - Reduces prolonged sitting
 - Has positive effect on health marke
 - Enhances mood
- Involves
 - Equipment
 - Work environment
 - Work structure, task allocation

Movement Tools



Hovr Swing \$100-200 Two Versions



Fluidstance \$200-500



Pedal Pusher
or Under Desk
Elliptical
\$12.99-200.



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The Bicycle Desk



Cost: \$200-\$2000



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Treadmill Desks

- 1-2 MPH
- Decrease keyboard activity
- Cardio-metabolic benefits
- Decrease body weight
- Decrease waist size
- Can create dizziness due to head movement
- Not sure if decreases MSD pain
- May improve cognitive and psych function
- Expensive! \$1200-\$3000



HFES Summary Table

Intervention Type	Results
Sit-stand workstations	Reduced sitting time, improved mood, improved work performance, increased HDL cholesterol, reduce musculoskeletal discomfort
Walking workstations	Increased overall energy expenditure, increased total number of step per day
Cycling workstations	Increased overall energy expenditure
Portable and elliptical stepping devices	Increased overall energy expenditure
Portable pedal exercise machines	Increased overall energy expenditure
Physical activity breaks	Reduced sitting time, improved mood, improved work performance, reduce neck, low back, forearm wrists, hand and eyes and overall discomfort
Prompting software	Reduced sitting time
Skip-stop elevators	Increased overall energy expenditure



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Q&A

Thank You



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