

# Gardening Ergonomics



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Monday, October 21, 2013  
2:15pm-3:15pm C-2  
Palms E

# Oh My Aching... (fill in the blank) !

- #1 past time in the U.S.
- 84 million households garden on the weekends.



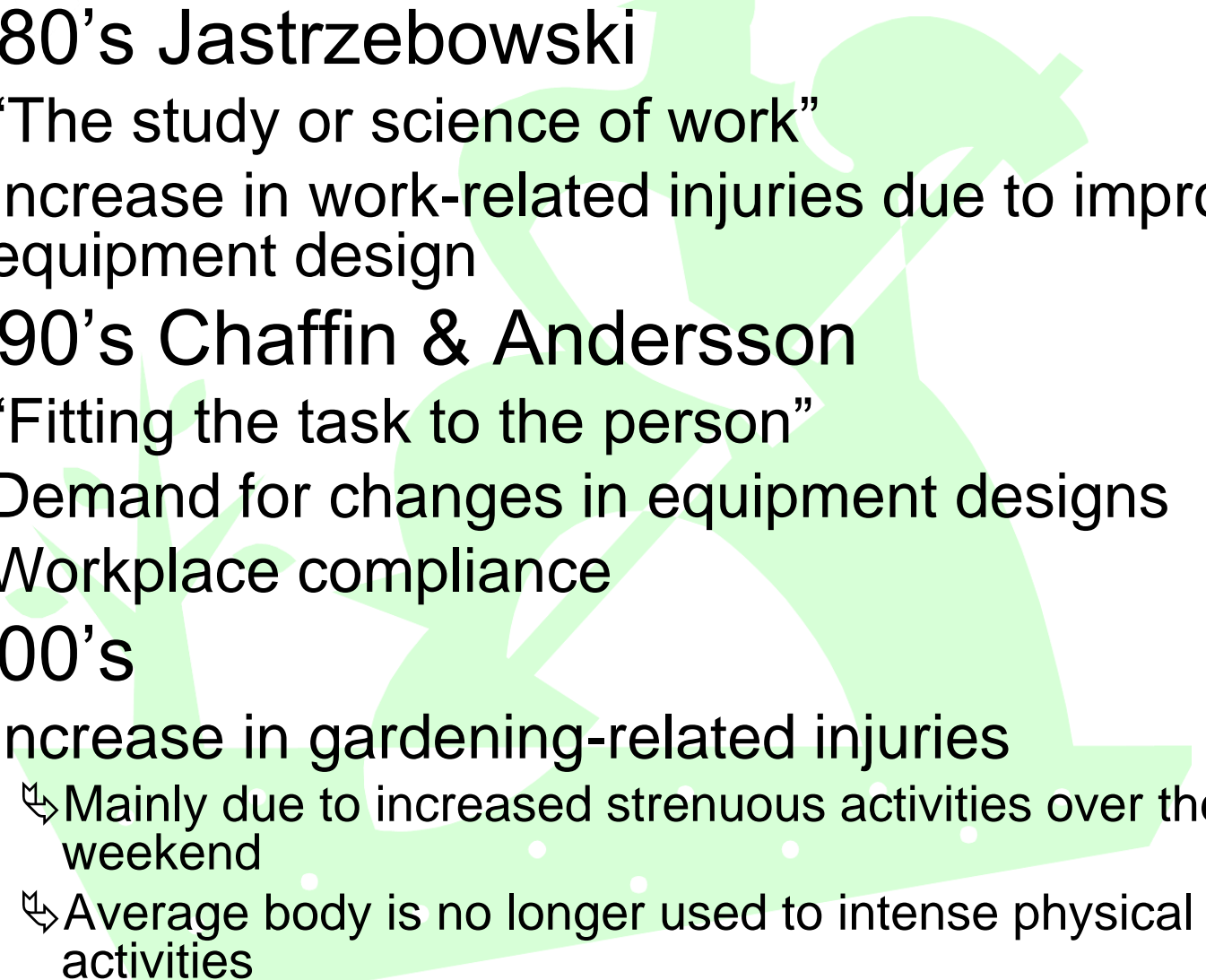
# Definition of Ergonomics

The application of scientific information concerning humans to the design of objects, systems and environment for human use.

Incorporates elements from anatomy, physiology, psychology and design ensuring products are comfortable, safe and efficient.

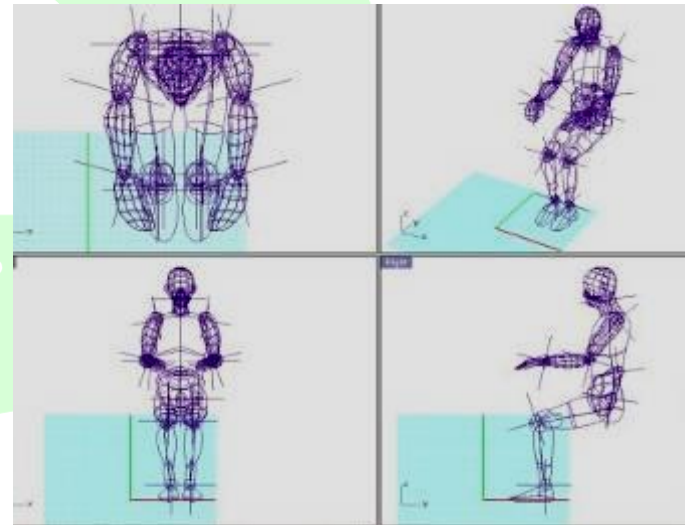
*Ergonomics Society*

# Development of Ergonomics

- 
- 1980's Jastrzebowski
    - “The study or science of work”
    - Increase in work-related injuries due to improper equipment design
  - 1990's Chaffin & Andersson
    - “Fitting the task to the person”
    - Demand for changes in equipment designs
    - Workplace compliance
  - 2000's
    - Increase in gardening-related injuries
      - ↳ Mainly due to increased strenuous activities over the weekend
      - ↳ Average body is no longer used to intense physical activities

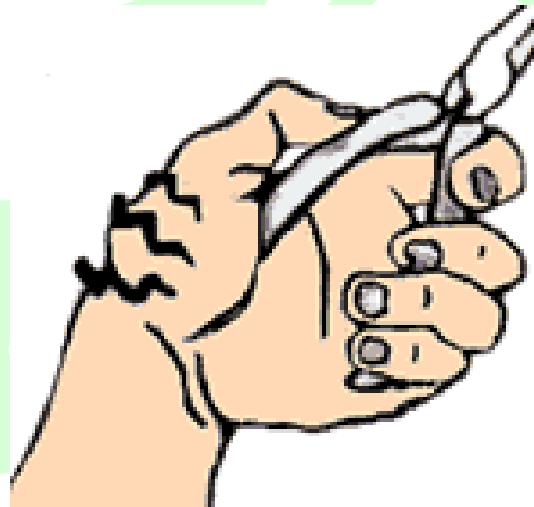
# Design of Ergonomic Tools

- ↓ required force or grip strength
- ↓ repetitive motion used with the tool
- ↓ vibration transmitted to hand & wrist
- ↓ awkward body postures or wrist positions



# Elements That Affect Force & Grip

- ✓ Handles with too wide opening.
- ✓ Handles that are too big.
- ✓ Handles that have a smooth surface.
- ✓ Handles that have sharp edges.



# Elements That Decrease Force & Grip

- ✓ Changing the tool handle through
  - Thicker handles give more surface for grasping
  - Longer handles generate more leverage with less force
  - Cushioned grips provide slip resistance & reduced grip force
  - Finger grips improved slip resistance\*



# Repetitive Strain Injuries (RSI)

- Injuries that affect muscles, tendons, nerves & joints
- Typically in the hand, arm shoulder, neck and back
- Caused by a combination of applied force, poor posture & repetitive nature of task





# Elements That Decrease Repetitive Motion

- ✓ Change type of tool
- ✓ Change to a power tool
- ✓ Proper operating methods
- ✓ Redesign the work area or task
- ✓ Use tools with spring-loaded returns



# Elements That Affect Vibration

- ❖ Usually associated with power tools
- ❖ Can increase the risk of chronic disorders
- ❖ Can cause temporary sensory impairments
- ❖ Amount of vibrations can be influenced by tool's weight, design and attachments.

# Elements That ↓ Vibration

- ✓ Proper Maintenance!
  - ✓ Redistribute the workload.
  - ✓ Use an external tool support.
  - ✓ Redesign process and/or work environment.
- 

# Elements That Decrease Vibration

- ✓ Designed with anti-vibration materials and/or mounts/handles.
- ✓ Special gloves that decrease effect of vibration.



"Personal lawn-craft."

# Elements That Affect Awkward Postures



- Body positioning depends on individual job
- Influenced by:
  - ✦ location of job
  - ✦ Location of body
  - ✦ force needed for job
  - ✦ positioning or moving limbs
  - ✦ gender, body size, age, training
  - ✦ direction of tool travel (push vs pull)

# Elements That Decrease Awkward Postures

- ✓ Check body alignment
- ✓ Change position often
- ✓ Warm body and limbs up
- ✓ don't stretch to reach something



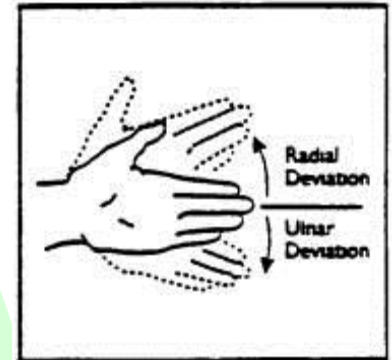
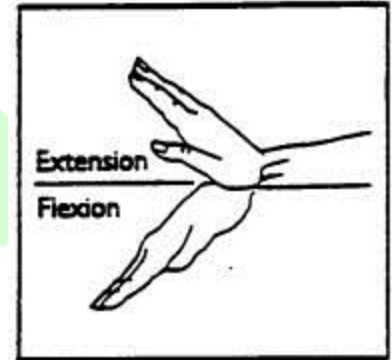
# Elements That Decrease Awkward Postures

- ✓ Redesign job to be accomplished
  - ⊗ Raised garden beds
  - ⊗ Table top gardens
- ✓ Wear properly fitting clothing and apparel
- ✓ Take frequent breaks and drink lots of water



# Elements That Cause Awkward Wrist Positions

- © Incorrect use of tool
- © Incorrect tool for job
- © Poor wrist positioning
  - ▶ Extension losses 23% GS
  - ▶ Flexion losses 27% GS
  - ▶ Radial losses 17% GS
  - ▶ Ulnar losses 14% GS
- © Tool too heavy for user
- © Incorrect body position









# Proper Tool to Wrist Positioning



# Elements That Decrease Awkward Wrist Positions

- ✓ Use tools that keep wrists in a natural position (like a handshake).
- ✓ Do hand strengthening exercises (only if you currently do not have any pain).
- ✓ Warm up by gently stretching wrist back (fingers up) and down.
- ✓ Hold objects with a light grasp don't grip hard.

# Proper Tool Maintenance

-  Will help decrease stress & strain.
-  Reduce the amount of effort extended.
-  Save time, energy & money.
-  Extend the life of the tool.



# Proper Tool Maintenance

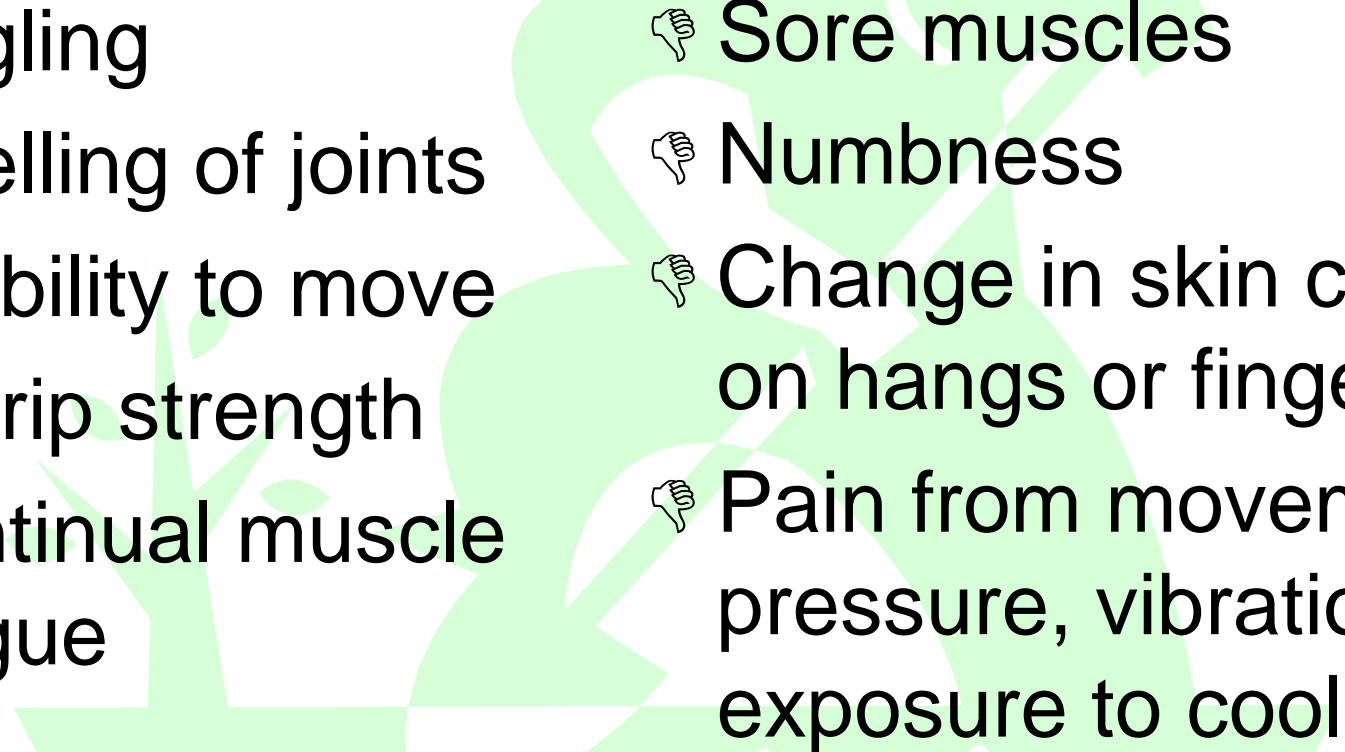


- ✓ Replace broken parts ASAP.
- ✓ Clean and dry all tools after use.
- ✓ Keep tools sharp & in good shape.
- ✓ Put mineral oil on tools after cleaning and wipe dry again.

# Proper Tool Maintenance

- ✓ Put linseed oil on unfinished wood handles to prevent splintering.
- ✓ Sand and refinish tools again when they become rough with age or use.
- ✓ Store tools properly in a covered area to avoid accidents and to extend life of tool.

# Symptoms of a Problem

- 
- 👉 Tingling
  - 👉 Swelling of joints
  - 👉 ↓ ability to move
  - 👉 ↓ grip strength
  - 👉 Continual muscle fatigue
  - 👉 Sore muscles
  - 👉 Numbness
  - 👉 Change in skin color on hands or fingertips
  - 👉 Pain from movement, pressure, vibration exposure to cool

# Ergonomic Gardening Tools



- ✓ Will reduce the chance of injury (when used properly!)
- ✓ Let you work in correct posture without force.
- ✓ Help finish more work in less time.
- ✓ Increase your normal capabilities (gardening Super Hero).
- ✓ Enjoy gardening more.

# Decrease Grip Force or Strength





# Lighten Your Load



# Extenders



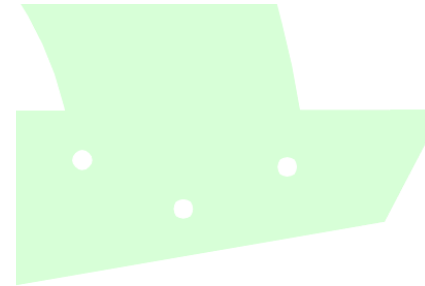
# Decrease Repetitive Motion



# Decrease Vibration



**Bionic Gardening Gloves**



# Decrease Awkward Positions



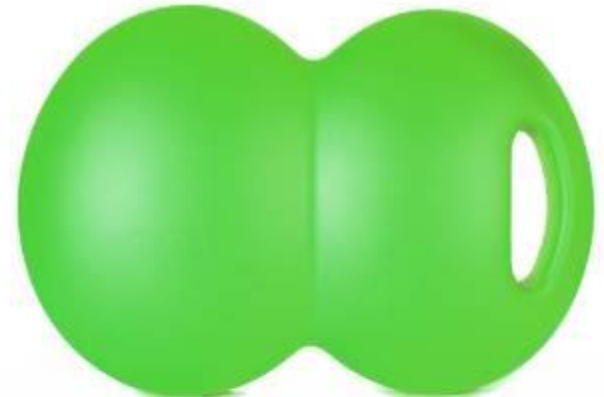
Stout's Back Saver Grip





**Tools that Reduce  
Stress and Add FUN!**

# Kneelers



# Seats

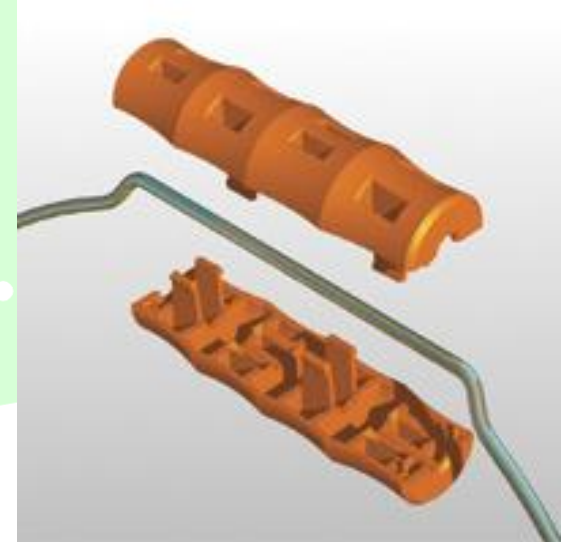




# Waterers & Buckets



Push button tap adapters



# Different Designs

Tools by RADIUS



HerShovel from  
Green Heron Tools



Botanic Niche (Australia)



# Furniture



# Websites for More Info & Tools

- ✓ Gardener's Supply Company [www.gardeners.com](http://www.gardeners.com)
- ✓ Radius Garden [www.radiusgarden.com](http://www.radiusgarden.com)
- ✓ Amazon [www.amazon.com](http://www.amazon.com)
- ✓ Stout's Grip [www.backsavergrip.com](http://www.backsavergrip.com)
- ✓ The Wright Stuff [www.arthritissupplies.com](http://www.arthritissupplies.com)
- ✓ Hand Helpers [www.handhelpers.com](http://www.handhelpers.com)
- ✓ Independent Living Center [www.ilcnsw.asn.au](http://www.ilcnsw.asn.au)
- ✓ Green Heron Tools (for women)  
[www.greenherontools.com](http://www.greenherontools.com)



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place to relax in!

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