Ergonomics in Pruning

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Overview and Objectives

• Understand early signs and symptoms of musculoskeletal injuries (MSI)
• Identify and assess potential risk factors
• Discuss risk factors control methods

Ergonomic (MSI) Requirements
What is an MSI?

- MSI = Musculoskeletal Injury
- Defined as an injury or disorder of the muscles, tendons, ligaments, cartilage, nerves, blood vessels and bursae
- Examples: carpal tunnel, back strain, tendonitis

How MSIs Occur...

**Excessive Force:**
This type of injury can occur from a single event, where the loads or forces are so great they exceed tissue tolerances and cause an immediate injury.

**Excessive Repetition:**
This type of injury can occur from repeated loading, weakening tissues to the point of failure. It progresses slowly to the point where a small load can cause an injury.
How MSIs Occur…

Excessive Duration:
This type of injury can occur constant loading, weakening tissue to the point of failure. This type of injury is more common with tasks that require workers to adopt static or awkward postures for extended periods.

Early Intervention

Possible Signs and Symptoms

• Pain, tingling, numbness
• Sore or stiff muscles and joints while working or at the end of the day
• Limited movement
• Swelling, redness
• Weakness, tenderness

REPORT SIGNS & SYMPTOMS EARLY!
What puts us at risk of MSIs?

Risk Factors

↑ risk factors present = ↑ overall risk

- Awkward postures
  - Poor working heights and excessive reaches
  - Wrist postures
- Repetition and Duration
  - Per cycle / per day
- Force
  - Vine pulling
  - Closing loppers, pruning shears

Risk Factors

- Static loading
  - Prolonged postures
  - Local contact stress (direct pressure)
- Environmental factors
- Stress, psycho-social factors
- Lack of training / unaccustomed activities
- Pre-existing conditions
Awkward Postures

- Back
- Neck
- Shoulders/ Elbows
- Wrists
- Legs

Discs and Vertebrae

Ergonomics in Pruning
Awkward Postures – Back/ Neck

- Stooping combined with lifting poses extreme stresses on the back.
- Stooping at a right angle is the equivalent of lifting a 30Kg. weight.

Twisting the Trunk

- Twisting the trunk when lifting increases the stress on the discs of the back.
- Think basketball:
  - keep yourself square i.e. hips and shoulders facing in the same direction.
- Pivot feet instead of twisting.

Awkward Postures - Shoulder

- Positions that move the shoulder away from the body.
- Out to the side of the body (abducted).
- In front of the body (flexed).
- Behind the body (extended).
Awkward Postures – Wrist

Any position that is not straight

Awkward Postures - Wrist

Any position that is not straight

Repetition

- Repetitive movements of specific muscle groups over prolonged periods
- With repetitive movement, local muscle fatigue can occur quickly and there is little time for recovery
Force - Load Characteristics

- Which muscles are applying the force?
- Distance from the trunk
- Vine pulling
- Grip force
- Load characteristics
  - heavy or bulky?
  - Contents likely to shift?
  - Handling points on the load?
  - Footing?

Static Loading

- Work undertaken by a muscle to support a limb which is not moving
- Results in
  - Increased fatigue
  - Decreased circulation
  - Increased intramuscular pressure

Contact Stress

- Decrease circulation
- Decrease mobility
- Increase intramuscular pressure
- Prolonged constriction of joints (i.e., back of the knees)
- Prolonged resting of tools within the hand
Environmental Conditions

- Temperature
- Ventilation / air quality
- Lighting
- Vibration

What can you do to work safely?

Risk Control
Eliminate or Minimize Risks

- Engineering controls
  - Use a trellis with growth between hip (of taller people) and shoulder height (of shorter people)
  - Have a variety of tools available for different thicknesses of wood as well as fit within hands
  - Power tools
  - Others…
Various styles of tools – not an endorsement


Risk Control

- Administrative controls
  - Safe work procedures e.g. cut more tendrils before pulling to reduce the force of the pull.
  - Scheduled preventative tool maintenance
  - Alternate hard wood/soft wood varieties, pruning shears, loppers, electric tools
  - Alternate pruning and pulling tasks
  - Warm ups
  - Micro breaks
  - Education/Training
Work Practice Controls

- Stand as close as possible and align shoulders, hips and feet
- Use hip flexion maintaining S-curve in spine
- Keep wrists straight while working
- Arms as close to the body as possible

Ergonomic (MSI) Requirements

4.47 Risk Identification
4.48 Risk Assessment
4.50 Risk Control
4.51 Education & Training
4.52 Evaluation
4.53 Consultation
Policy & Procedure

For more information

- BC Wine Grape Council  
  www.bcwgc.org
- FARSHA  http://www.farsha.bc.ca/
- WorkSafeBC  www.worksafebc.com

For ergonomics, go to Safety at Work by topic
References


