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Hand Tool Use and Selection Principles

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Overview:

- The hands and wrists are made up of a variety of fragile bones, nerves, blood vessels, tendons and ligaments that can be easily damaged if they are misused.

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Overview:

The following are some of the conditions that can cause hand and wrist illnesses:

- Frequent or repetitive movement of the hand or wrist, usually associated with awkward wrist angulations
- Inappropriate tool and equipment design
- Vibrating knives and saws
- Poor work station design and arrangement
- Cold environments

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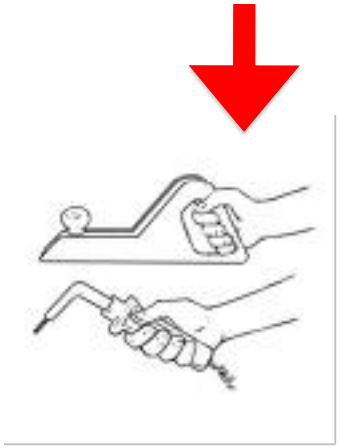
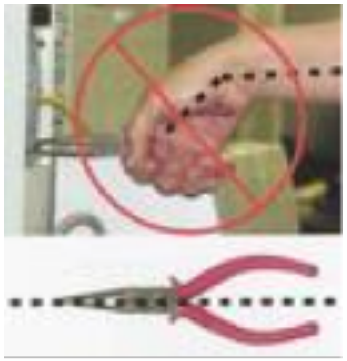
Neutral Wrist

- Maintain neutral (handshake) wrist position.

Straight wrist (Good)



Bent wrist (Bad)



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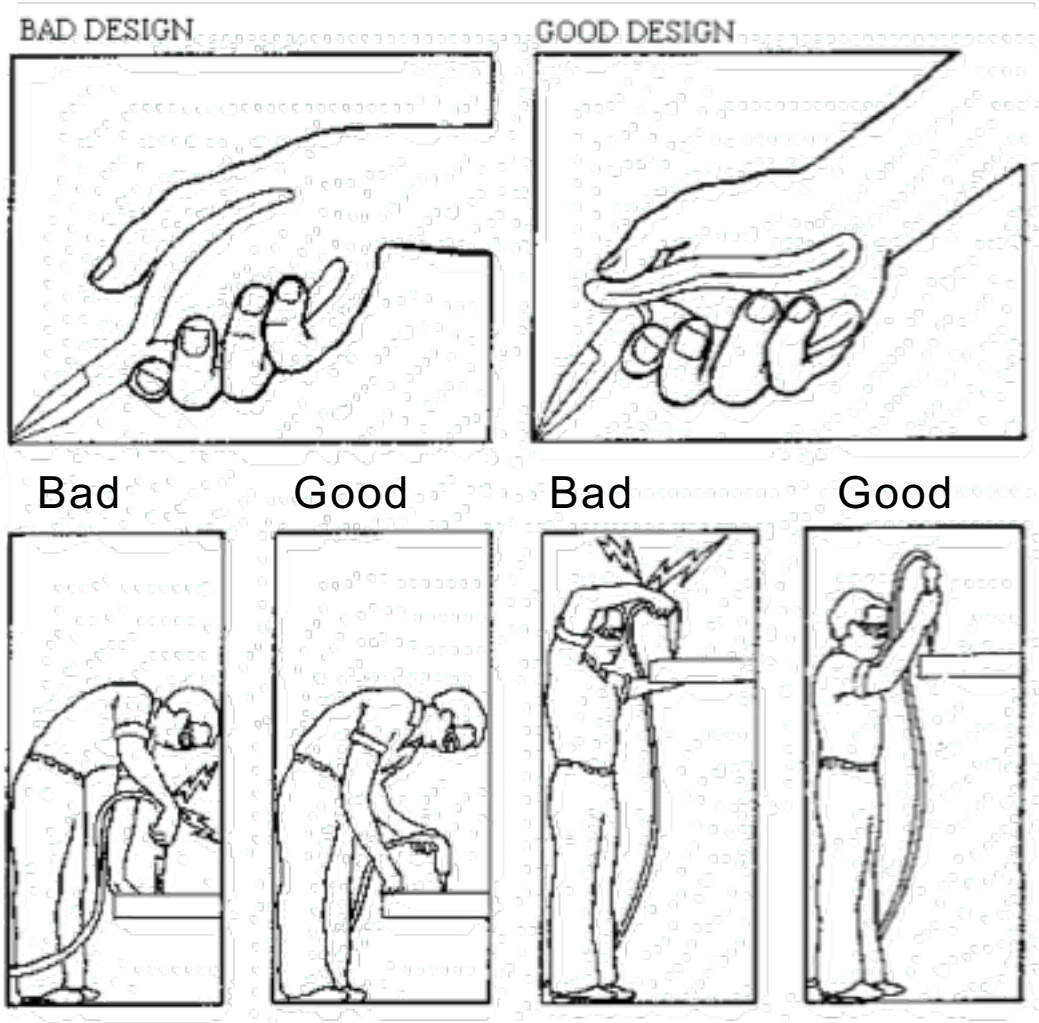
Neutral Wrist



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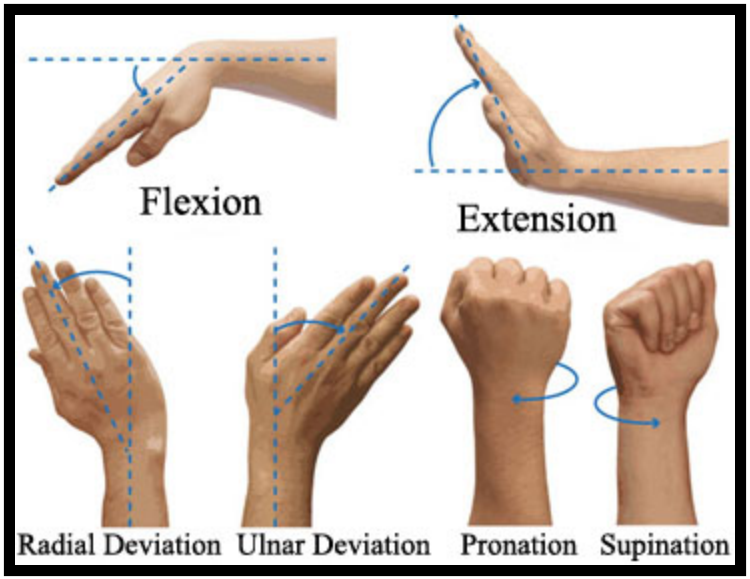
Reduce Flexion or Deviation of Wrist

- Design tasks and select tools to reduce extreme flexion or deviation of the wrist



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Bend the tool, not the wrist

Bent Handled Tool Examples

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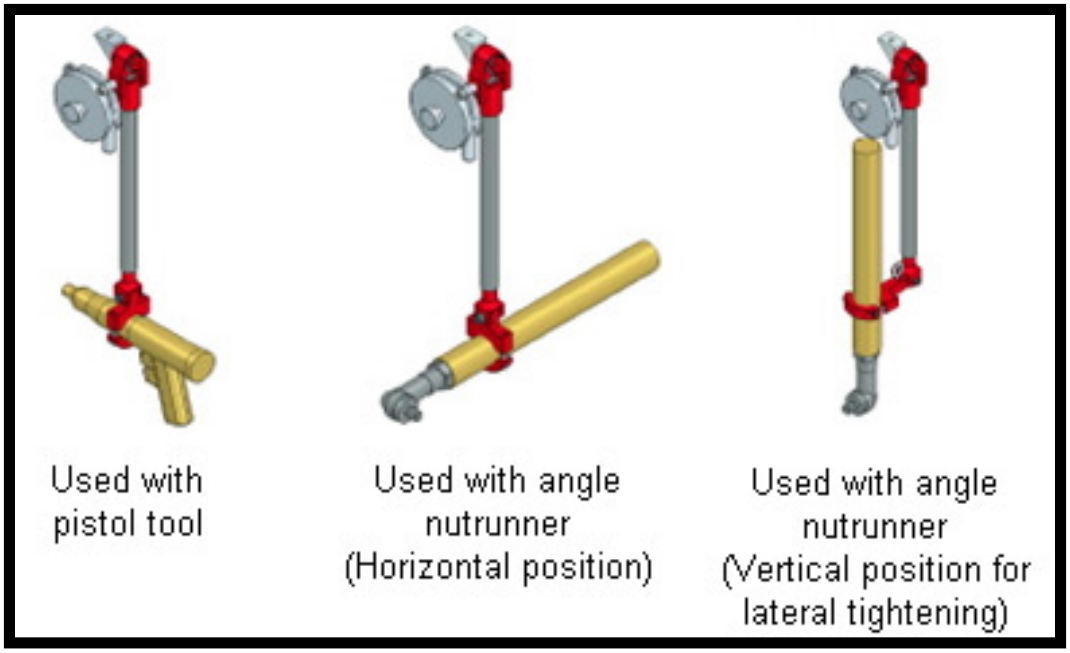
Reduce Weight of Tools

- One way to reduce weight is to use an articulating arm or counter-balance.



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Reduce Weight of Tools

http://www.globalspec.com/FeaturedProducts/Detail/Feather_Lite_Ergonomic_Tool_Balancing_System/26982/0?deframe=1

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Don’t Raise or Extend Elbows with Heavy Tools

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Avoid Stress on Soft Tissues

- Stress concentrations result from poorly designed tools that exert pressure on the palms or fingers.

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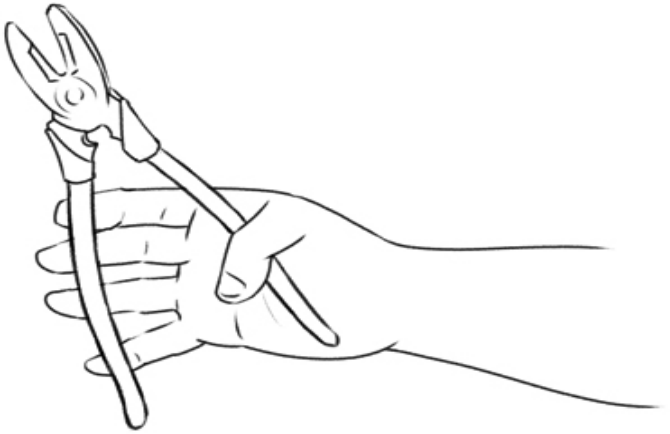
Reduce Grip Force Requirements

- Optimum grip spans for pliers, scissors, or tongs, measured from the fingers to the base of the thumb, range from 2.3 to 3.5 inches.

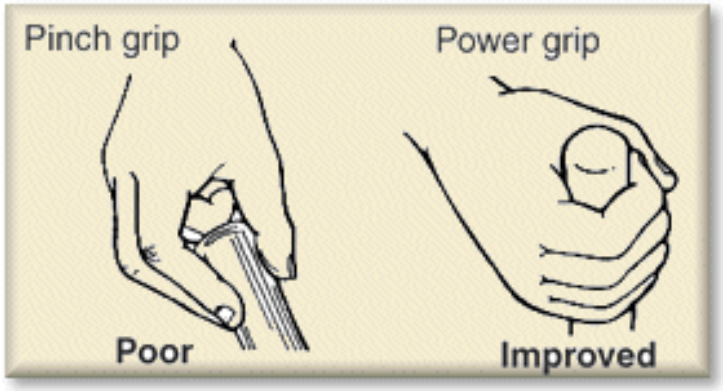


Evaluate Gripping Surface

- A compressible or larger gripping surface may reduce grip force requirements.

Use Power Grip

- Design tasks so that a power rather than a pinch grip can be used to grasp materials.
  - A pinch grip is five times more stressful than a power grip.
  - The greater the effort to maintain control of a hand tool, the higher the potential for injury.



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Avoid Repetitive Trigger-Finger Actions

- “Trigger-finger” happens when one of your fingers or your thumb catches in a bent position. The finger or thumb may straighten with a snap.
- It’s caused by the narrowing of the tendon sheath when repetitive gripping actions are performed.

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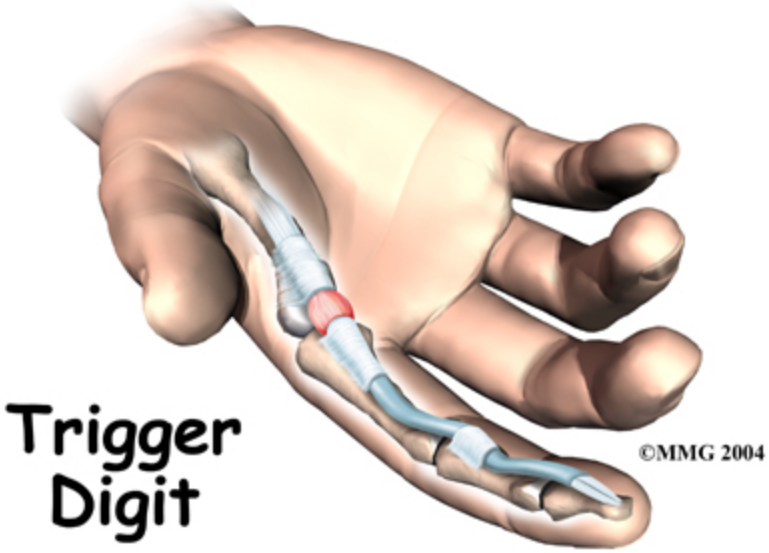
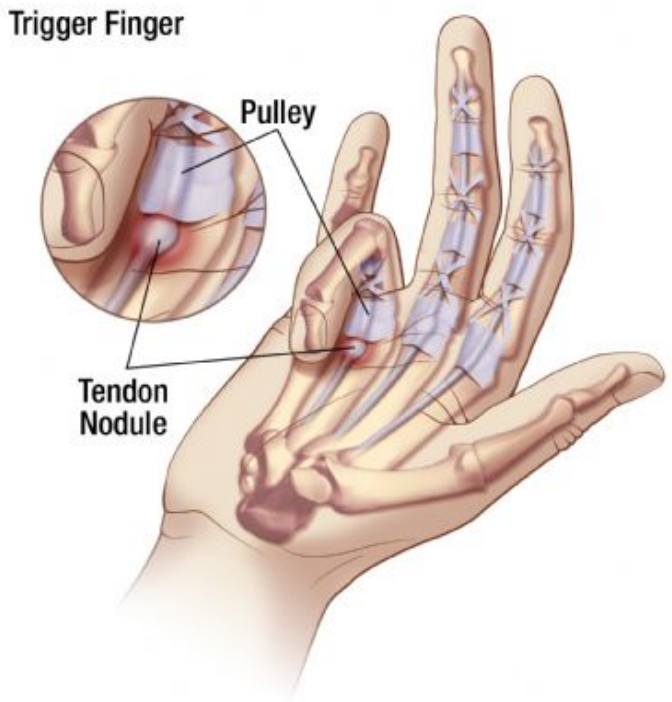
Avoid Repetitive Trigger-Finger Actions

- Tendons in the finger joints can swell due to overuse, “locking” the finger into a fixed position.





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Avoid Repetitive Trigger-Finger Actions

- Select “triggers” that allow two or three fingers to activate.

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Isolate Hands from Heat and Cold

- Heat and cold can cause loss of manual dexterity and increased grip strength requirements.

Heat resistant glove made of Kevlar protects up to 1000°F

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Isolate Hands from Heat and Cold

- The choice of gloves has never been more extensive, due to developments in glove materials that are less bulky but provide better protection.

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Isolate Hands from Vibration

- Excessive vibration can cause reduced blood circulation and cause white-finger syndrome.

White-finger syndrome

Anti-vibration gloves

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Thank you for taking the time to learn about safety and health and how to prevent injuries and illnesses.