ADVANCED
Consulting & Ergonomics
a Division of Advanced Physical Therapy

Hand and Power Tool Guidelines

Over the years, tools have changed many times, creating new challenges involving complex interactions between users and their tools. Choosing the wrong tool for the job has been known to result in injuries, variable quality of work and decreased efficiency and productivity. Using the right or wrong tool incorrectly can cause musculoskeletal disorders. Musculoskeletal disorders are injuries to the muscle, tendons, joints and nerves that generally manifest over a period of time. Risk factors that are associated with this are awkward hand/wrist postures, static muscle loading, mechanical stress, vibration, noise, torque, temperature and pinch points.

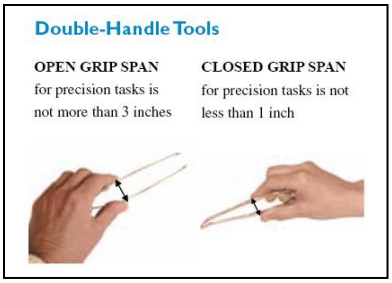
IDEAL Tool Characteristics:

Tool Weight:
One arm work should be close to 3lbs. For precision work it should be close to 1lb.
Handles:
The handle should be designed to be held with a power grip, that requires the operator to align the fingers so they work together rather than against. The exception is tools for precision work that uses pinch grip.
Shape:
Determine the handle shape after considering the task. Then select the handle so that it doesn't require wrist flexion, extension or any deviation, It should allow the wrist to be in a neutral position.
Diameter:
Handles should be cylindrical or oval. The diameter for power grip recommended at 1.5inches with a minimum of 1.2 inches and a max of 1.8 inches. For a pinch grip the minimum is .3inches, ideal .4inches, and max .5 inches.
Length:
Recommended handle length is 5.5inches with a minimum of 4 inches.
Span:
For two handled tools like pliers the recommended span is 3 inches with the minimum of 2inches and max of 4inches. Spans that are smaller or larger will reduce the grip strength.
Material:
Handle should be made of non-slip, non conductive and compressible material. Avoid glossy coated or highly polished.
Power Tool:
Tool triggers should be at minimum 1 inch to allow for variable finger operation.
Vibration:
Try to reduce by increasing distance between user and tool, utilize anti-vibration gloves and covers

Contact Stress:
Forces should not exceed 22 pounds/inch squared

Top 10 tips for injury reduction:

1. Keep the wrists straight.
2. Avoid standing still in one place.
3. Avoid stressing soft tissue.
4. Avoid tools that require a lot of grip force.
5. Avoid tools requiring finger grip.
6. Avoid tools with sharp edges and pinch points.
7. Avoid tools require trigger-finger action to operate.
8. Keep hands free from heat and cold.
9. Avoid excessive vibration.
10. Wear gloves that fit.



Symptoms of possible poor tool fit:
Tingling- Swelling in the joints-Decreased ability to move- Decreased grip strength- Pain- Continual muscle fatigue- Sore muscles- Numbness- Change in skin color of your hands or fingertips
These may not appear immediately because they develop over weeks, months, or years. At that time there maybe damage. Take action before you notice any symptoms.

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Four steps for reducing injury:

1. Know your Job
2. Look at your work space
3. Improve your work posture
4. Select your tool wisely

The best tool is one that..

- Fits the job you are doing.
- Fits the work space available.
- Reduces the force you need to apply.
- Fits your hand.
- Can be used in a comfortable work position.

Special instructions:_____

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