

Experiment #3: Strength evaluation system

Description:

This experiment is designed to Measure isometric strength of the body muscles in a standing position; using the Jackson strength evaluation system a simple and accurate method of measuring maximum body strength. The system is widely used by rehabilitation professionals to physical ability of applicants for physically demanding work tasks.

Flexibility is described as the ability to bend without sustaining any injury. Muscles are strongest nearest at the beginning of contraction and weaken as they extend.

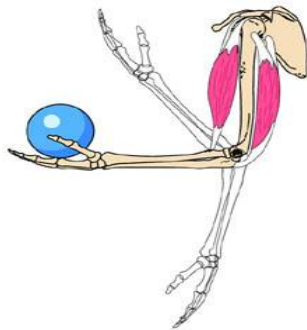


Figure3.1: Position where you have the greatest mechanical advantage.

Muscle Endurance the ability of a muscle to sustain repeated contractions over a period of time without becoming exhausted.

Static muscle work requires longer recovery times than dynamic work it requires more than 12 times longer than the original contraction-duration for complete recovery from fatigue. When muscles contract, there's little or no blood flow, Build up of waste products (lactic acid) in muscle tissue creates discomfort/pain.

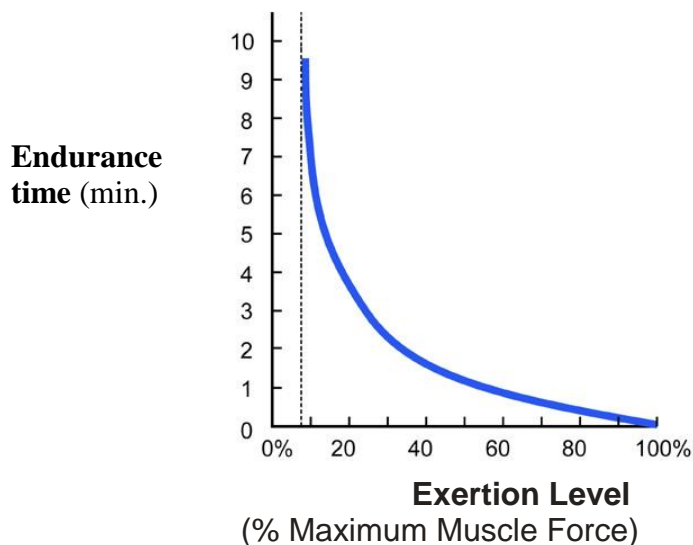


Figure3.2: endurance limit

Apparatus:

Jackson strength evaluation system is used in this experiment. The system features an electronic load cell for accurate and reliable measurements of isometric strength. See Figure 3.3.



Figure 3.3: Jackson strength evaluation system

Experiment procedure:

User stands on a platform and pulls a T- bar or a handle attached to a chain on the platform.

1. Demonstrate the test position to the person.
2. In proper position, the subject stands on the platform with arms at his/her elbows at a right angle (90 degrees). Adjust the cable/chain attachment that places the elbow at 90 degrees in the test position. To set the height of the lift bar or handle:
 - a. Unsnap the bar or handle from the chain.
 - b. Raise the chain to the desired height.
 - c. Snap the lift bar or handle back into the chain at the proper link.
 - d. The unused portion of the chain should hang beneath the bar or handle.
3. Have the subject hold the handle with the palm up.
4. The purpose of this test is to measure the lifting strength of the body. The person is not allowed to lean back or grasp the handle in the ulnar direction. The force is correctly exerted by lifting with the hand palm.
5. Instruct the subject to grip the handle with full strength for the adjusted time on the Jackson unit load cell (5 sec).
6. Record the amount registered for the lifting capacity for each student (the average value).
7. A weight less than the maximum lifting capacity required to be lifted by the subject (percentage of the maximum lifting capacity).(9kg,4.5kg)
8. The time spent in lifting the loads without sustaining any discomfort is recorded for each subject.

Important notes:

- Allow the person to assume a feet placement width that is comfortable with the natural posture of a standing position.
- The cable should be at a right angle to the base.
- Move forward or backward to obtain a right angle between the cable and the base.

- Do not allow the subject to apply a sudden jerky move in lifting the handle or load when implementing the experiment.
- The peak and the average records on the Jackson unit cell should be the same otherwise take the records of the average values only.

Scoring and requirements:

1. The score consists of the peak and average values by each person on Jackson strength evaluation system.
2. The time spent in lifting the loads.
3. Percentage of the maximum lifting capacity of each subject.
4. Plot the time Vs the percentage of the maximum muscle exertion.
5. Discuss endurance limit for each student.
6. Discusses the gender affect on the endurance limit.