Al-Mustaqbal University university
Department of Biomedical Engineering

Limb Position and Grip Strength

Medical Measurements Lab 2

Fourth Stage

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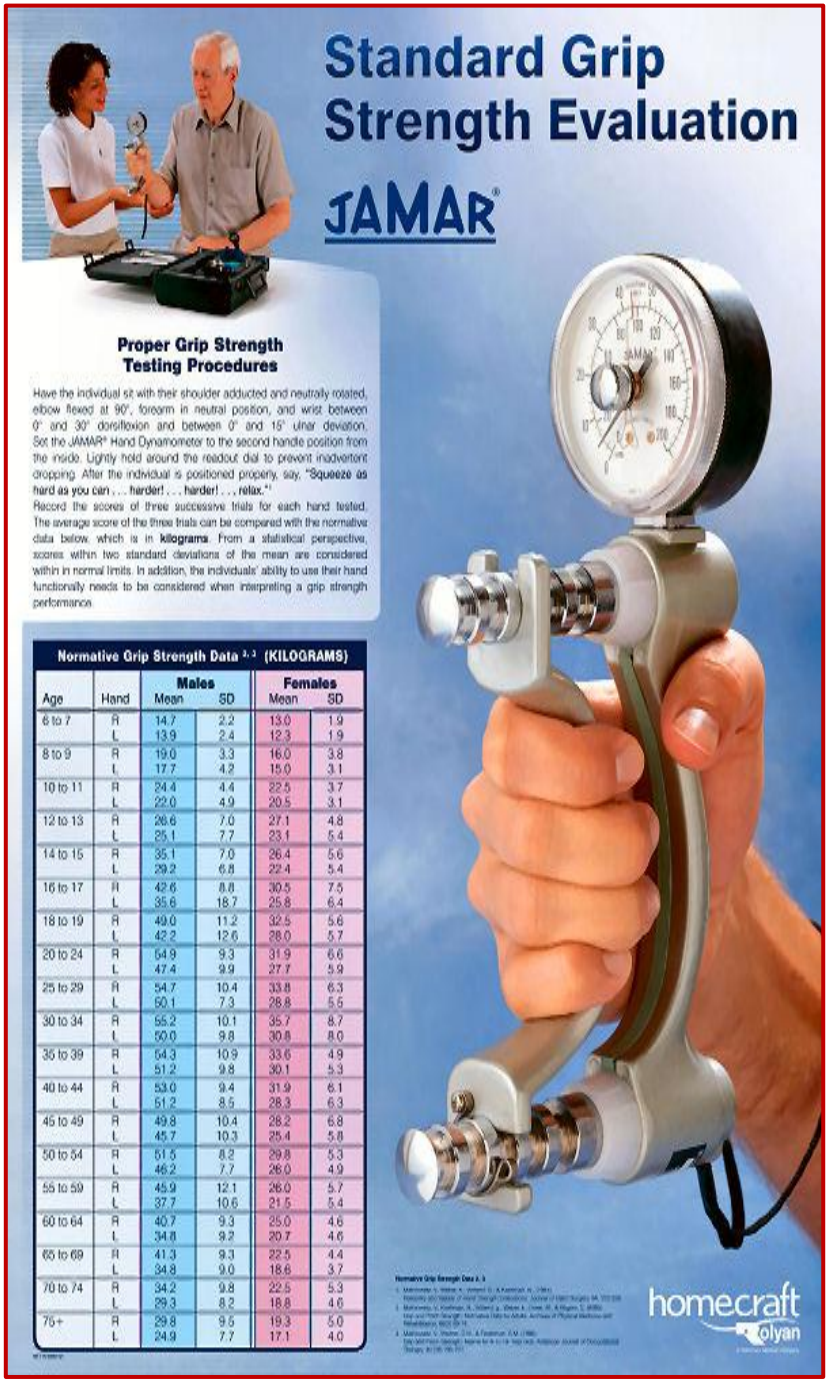
What is Grip Strength

Grip strength is a measure of muscular strength or the maximum force/tension generated by one's forearm muscles.

- It can be used as a screening tool for the measurement of upper body strength and overall strength. It is most useful when multiple measurements are taken over time to track performance.

- Research indicates that grip strength in midlife can predict physical disability in senior years and help evaluate a patient's overall health. All you need is a hand dynamometer and the handgrip strength norm tables.



Muscular strength concept

The result of the maximum muscle contraction, whether it is fixed or movable, and is controlled by the voluntary nervous system

Muscular strength is related to endurance, especially:

- **1. In physical activities that require continuing to perform strong muscular work such as boxing and wrestling.**
- **2. The strength of the back muscles protects against herniated disc**
- **3. The strength of the abdominal muscles increases the protection of pressure on the internal organs**

What is the types of muscle strength ?

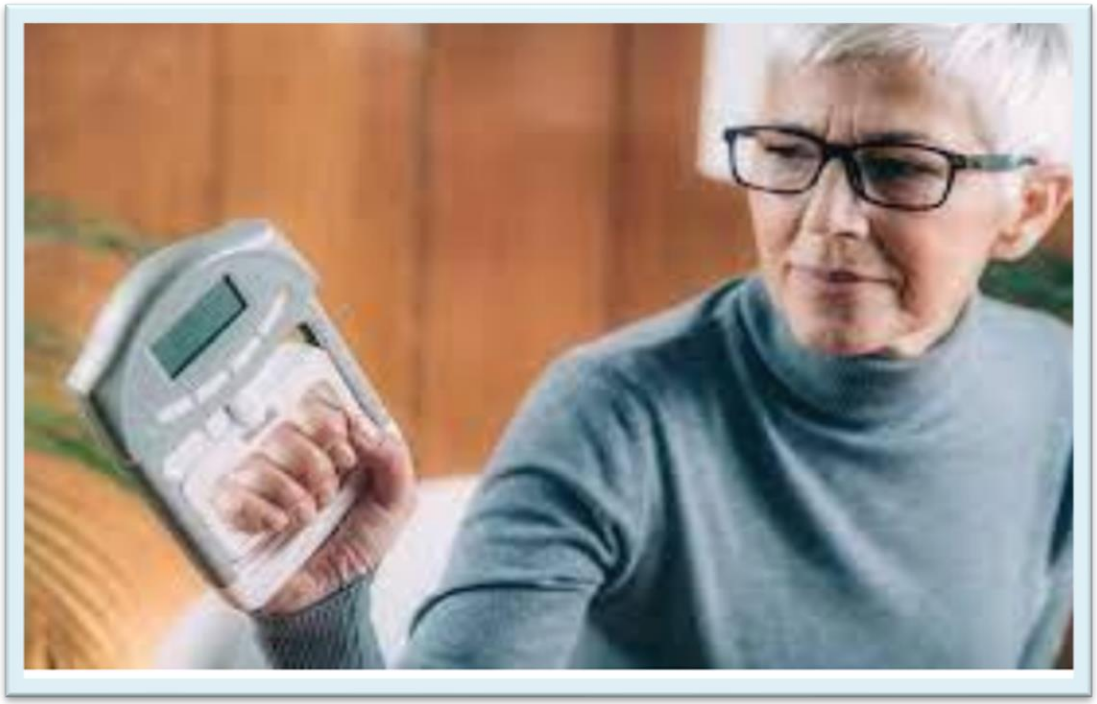
1. Maximum strength, referring to the ability of the neuromuscular system to
produce the maximum voluntary contraction.

2. Fast strength, which is associated with activities that require strong and fast movements at the same time, such as fast running.

3. Endurance of forces, which means the ability of the nervous system to resist a certain time as long as possible in order to face fatigue, such as rowing and swimming

What is the factor that effect on muscular strength ?

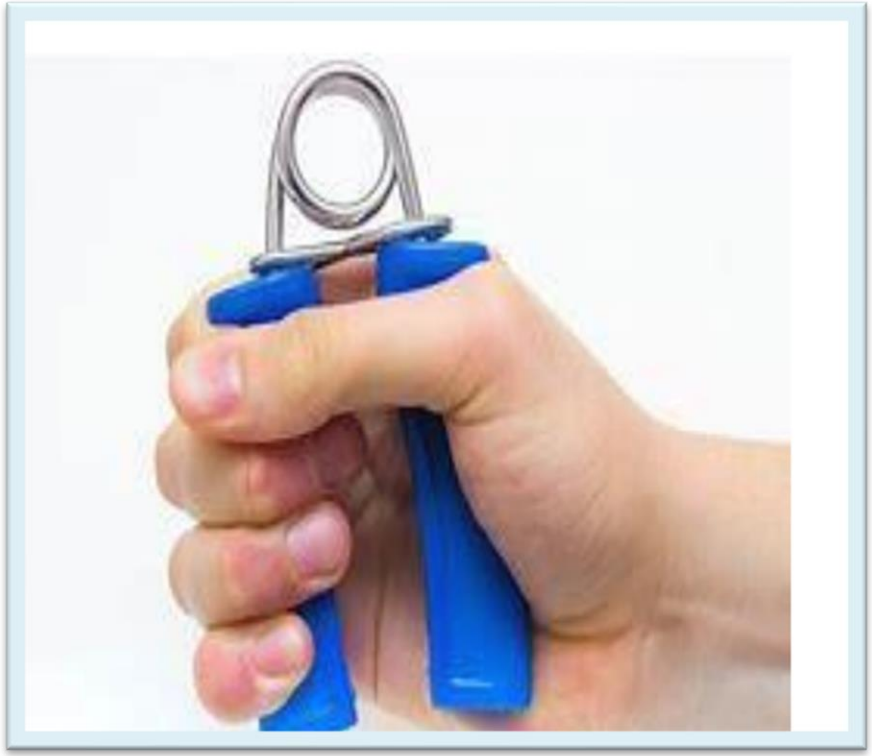
1. Age, as the lower the age, the greater the muscle strength.
2. Gender: Men have stronger muscles than women.
3. Muscle size varies from person to person.
4. In addition to the training period and body type, whether it is thin, fat or muscular.



Grip Strength concept

- Hand grip strength results from the combined contraction of extrinsic and intrinsic hand muscles , this leads to flexion of the hand joints.

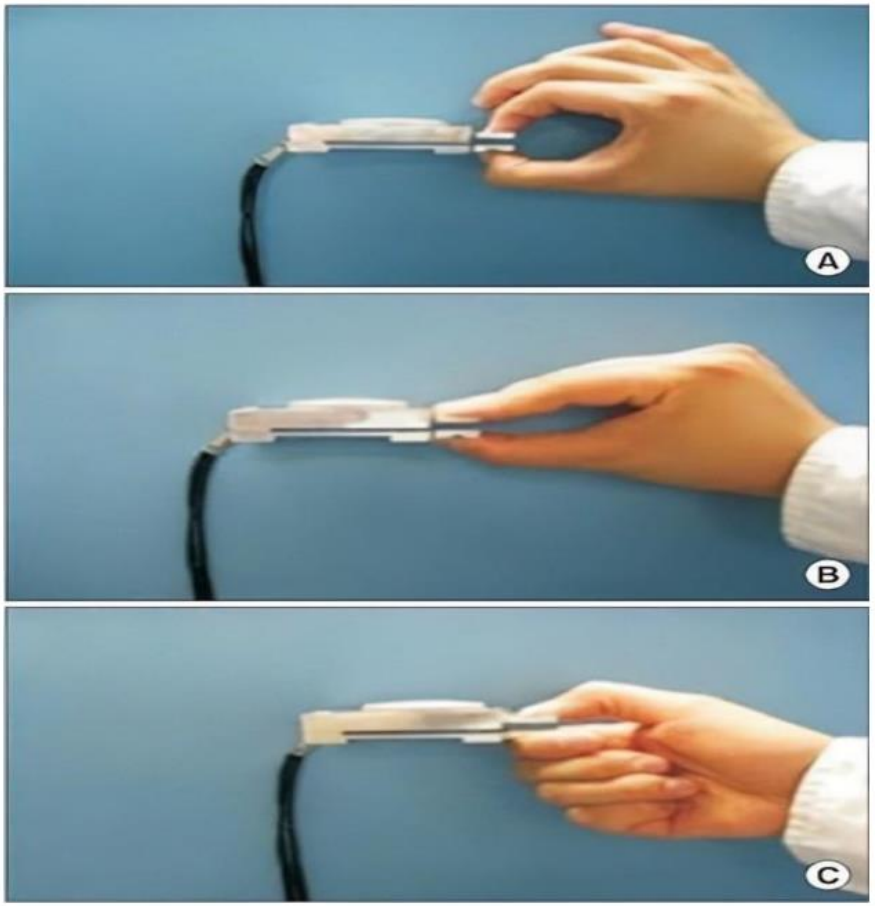
- The body and upper limb positions can affect its strength Many daily functions and sports events require high activity of hands



Pinch strength concept

Pinch strength is a way for occupational therapists to measure loss of fine-motor strength in the thumb, fingers, and forearm.

It is useful for analyzing the extent of an injury and the outcome from surgery or therapy



What is the usage of the grip and pinch strength test ?

- Grip strength can also be used to diagnose neuromuscular problems such as People suffering from arthritis or hand injury
quickly appreciate the difficulty of performing even simple tasks with reduced grip strength.

- Valid evaluation of hand strength can provide an objective index of general upper body strength.

- The power grip is the result of forceful flexion of all finger joints with the maximum voluntary force that the subject is able to exert under normal biokinetic conditions

Dynamometer

The best tool for evaluate overall health and muscle strength is the dynamometer, since every movement of the body is supported by muscle strength.

- In the medical terminology, hand-held dynamometers are used for routine screening of grip and hand strength, and the initial and ongoing evaluation of patients with hand trauma or dysfunction. They are also used to measure grip strength in patients where compromise of the cervical nerve roots or peripheral nerves is suspected.

- Use In the rehabilitation , kinesiology , and ergonomics realms, force dynamometers for measuring the back, grip, arm, and/or leg strength of athletes, patients, and workers to evaluate physical status, performance,
and task demands

Contraindications

- Hand lacerations
- Active inflammation of the hand or wrist
- Severe Carpal Tunnel Syndrome.

THANK YOU FOR YOUR ATTENTION