Grip Strength:
unleash the secret to primal strength, injury prevention, and overall health

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Grip strength is the force applied by the hand to pull or suspend from objects and is a specific part of hand strength.
• Grip strength is correlated with the strength of the upper extremity, general strength of the body and some anthropometric measurements (Balogun et al., 1991)

• Grip power is the result of forceful flexion of all finger joints with maximum voluntary force that the subject is able to exert under normal biokinetic conditions (Koley et al., 2009).
Objectives

1. Recognize importance of grip strength for injury prevention, rehabilitation, and performance
2. Understand co-activation pattern, myofascial lines, and hyperirradiation
3. Identify reliable measures for testing grip strength
4. Recognize appropriate treatment interventions and proper progressions for your athletes, patients, and clients
Anatomy of the Hand

- Ext. Carpi Radialis Brevis
- Tendon of Ext. Pollicis brevis
- Ext. Carpi Radialis longus
- Thenar Eminence
- First Dorsal Interosseous Muscle
- Sheath of Extensor Tendons
- Tendons of Ext. of the Fingers
- Palmar Aponeurosis
- Hypothenar Eminence
- Stipals of Flexor Tendons

Tendon of Extensor Carpi Ulnaris
Extensor Digiti Minimi Tendon
Index
Middle
Ring
Little
Thumb
There is more than 17,000 mechanoreceptors in the hand!

Neuroscience. 2nd edition.
Purves D, Augustine GJ, Fitzpatrick D, et al., editors.
How does grip improve stability, strength, and force production?
1. Co-activation patterns
2. Myofascial lines via fascial tensioning
3. Hyperirradiation
Neurological connection of grip and RTC

Rehabilitation

• Improved joint centration
• “….Anterior and middle deltoid activity decreased by 2% MVE, while posterior deltoid, infraspinatus and trapezius activity increased by 2% MVE and biceps brachii activity increased by 6% MVE.”

Hyperirradiation

“a spreading and increased spread of a response”
Hyperirradiation

• The Law of Irradiation was discovered by Sir Charles Scott Sherrington

• "A muscle working hard recruits the neighboring muscles, and if they are already part of the action, it amplifies their strength. The neural impulses emitted by the contracting muscle reach other muscles and 'turn them on' as an electric current starts a motor".

• Increases neural drive

• Increased strength in UQ

Radiant Tension
Myofascial Arm Lines

Deep front line
Superficial front line
Deep back line
Superficial back line

Myofascial Arm Lines

**Deep Front Line**
- Pec Minor
- Biceps Brachii
- Thenar muscles

**Superficial Front Line**
- Pec Major and Lats
- Flexor group
- Carpal Tunnel

**Deep Back Line**
- Rhomboids and Levator
- Triceps brachii
- Hypothenar muscles

**Superficial Back Line**
- Trapezius
- Deltoid
- Extensor group
“Grip strength is a predictor of mortality, disability, complications, and increased length of hospital stay.”

Assessments

• Men 50# DB in each hand x 30 sec
• Women and kids #35 DB in each hand x 30 sec
  – Loaded posture, breathing, compensations
• Dynamometer
Dynamometer

- Quantified by measuring the amount of static force that the hand can squeeze around a dynamometer.
- The Jamar dynamometer has been found to give the most accurate and acceptable measures of grip strength.
Standardized testing protocol

• Seated with the shoulder adducted and neutrally rotated, the elbow flexed at 90 and forearm in neutral and the wrist between 0 and 30 degrees extension and between 0 degrees and 15 degrees ulnar deviation (Fess & Moran, 1981).

• Small changes in body position can result in altered grip strengths.
Grip Types

• Crushing Grip
• Pinch Grip
• Open Hand Grip
How do you effectively train grip?
Hanging!!
Treatment

- Kettlebell holds, screwdrivers, arm bars, TGU
- Block weights
- Hook Grip Kettlebell Swinging
- Thick bar dumbbells (2.5” diameter)
- Pinch plates
- Sledgehammers
Summary

• Grip strength is widely accepted indicator of nutritional status, bone mineral content, muscular strength and functional integrity of upper extremity.

• The assessment of grip strength plays a vital role in determining the efficacy of different treatment strategies of hand, elbow, shoulder, and core.

• Unleash this secret of primal strength, injury prevention, and longevity.
References


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PNF course. Institute of Physical Art. April 2013


Roberts LV, Stinear CM, Lewis GN, and Byblow WD. “Task-Dependent Modulation of Propriospinal Inputs to Human Shoulder.” Journal of Neurophysiology 100.4 (2008): 2109-114. - See more at:


