

CAT: Grip Measurements & Elbow Positioning

Clinical Bottom Line(s):

1. Higher maximum grip strengths are obtained with full elbow extension vs. elbow flexion.
2. Clinicians should be consistent in elbow positioning when using grip measurements to plan treatment programs or when they are used as a measure of therapeutic progress.

Citations(s):

Su CY. Lin JH. Chien TH. Cheng KF. Sung YT. **Grip strength in different positions of elbow and shoulder.** [Journal Article] *Archives of Physical Medicine & Rehabilitation.* 75(7):812-5, 1994 Jul.

Three/four part clinical question:

For healthy adult males and females, what position of elbow flexion/extension will result in the highest grip strength measured using a JAMAR dynamometer?

The study: Quantitative Research

Determine if shoulder position significantly affects grip strength.

Determine if grip strength in 90° elbow flexion significantly differs from grip strength in full elbow extension.

The study patients: 160 Chinese subjects (80 male, 80 female) from southern Taiwan.

Ages 20-69 years old.

Subjects in good health with no observable extremity abnormalities.

All right-hand dominant.

Control Group(s): None

Experimental Group 1: Shoulder 0° flexion, elbow 90° flexion

Experimental Group 2: Shoulder 0° flexion, elbow 0° flexion

Experimental Group 3: Shoulder 90° flexion, elbow 0° flexion

Experimental Group 4: Shoulder 180° flexion, elbow 0° flexion

The evidence:

| Outcome | Total | Males | Males |
|------------------------------|---------------|----------------|---------------|
| Grip strength scores: | (n = 160) | (n = 80) | (n = 80) |
| Group #1 | 82.2 +/- 27.3 | 104.8 +/- 18.1 | 59.7 +/- 11.9 |
| Group #2 | 84.6 +/- 28.1 | 107.8 +/- 18.4 | 61.4 +/- 12.6 |
| Group #3 | 85.7 +/- 27.5 | 108.0 +/- 18.8 | 63.5 +/- 12.8 |
| Group #4 | 87.6 +/- 29.2 | 111.7 +/- 18.9 | 63.5 +/- 13.7 |

*Significant differences exist between Group #1 & #2; Group #1 & #3; Group #1 & #4; Group #2 & #4; Group #3 & #4; No difference between Group #2 & #3 (male); No difference between Group #3 & #4 (female).

Comments:

1. Highest grip strength recorded with elbow fully extended and shoulder at 180° of flexion.
2. Lowest grip strength recorded with elbow flexed to 90° and shoulder at 0° of flexion.
3. Grip strength with the elbow in extension regardless of shoulder position was significantly higher than that for any measures with 90° elbow flexion. [Favor length-tension relationship of forearm muscles?]
4. Chinese sample. Do American norms differ from this population? And if so, is it important if these measures are only utilized to track individual progress?

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Kill or update by: