Area Assessed: Strength and Consistency of Effort and Endurance for Resistive Tool Handling

Evaluation Tool; JAMAR Dynamometer Grip Strength Testing Description

A device called the JAMAR Dynamometer is used to measure full hand gripping strength in pounds or kilograms. There are five settings that can be used to measure grip at spans of 1-1/4", 1-3/4", 2-1/4", 2-3/4", and 3-1/4". This instrument should be checked for accuracy and recalibrated if necessary at least every 3 months.

Evaluates

1. Strength for applying gripping force with tools (involving primarily the large flexor groups of the fingers and thumb and wrist extensor groups for stabilization).

2. Forearm / upper arm / shoulder girdle / neck stability.

3. Consistency of effort (see Procedure Guidelines for RMA Maximum Voluntary Effort Analysis in MVE Software Manual).

Procedure for Testing Using the JAMAR Dynamometer

1. The evaluee should be sitting, as norms are based on seated subjects. The evaluee may stand if sitting tolerance is limited; this variation should be noted in the report.

2. The elbow of the hand being tested should be in a bent position, approximately 85 to 95 degrees of flexion. The shoulder may be in a neutral position or comfortably flexed. The JAMAR should not be held by the evaluee either straight out in front or straight down by the side.

3. Say to the evaluee, "This is a test of maximum grip strength. I would like you to grip this handle as hard as you can for about 2 seconds and then release it. You will not feel any movement in the handle as you squeeze, but I will be able to read the force of your grip on this dial. We will be taking several measurements of your grip on 5 different sized grip spans. The smallest grip setting may feel awkward, but please grasp it with your whole hand rather than your fingertips. Please try your best, and let me know if you are experiencing any discomfort with this task."

4. Starting with the smallest grip setting on the JAMAR, have the evaluee grip to maximum first with the right hand, and then with the left. Repeat, alternating from right to left, until a total of three measurements have been obtained for each hand at that grip setting. Repeat the sequence at each of the four remaining grip settings. It is permissible for the evaluee to briefly shake his or her hands, or rub them together, between settings to prevent muscle cramping.

5. Do not make comments about the strength readings until after the evaluation is completed. Do continue to encourage the evaluee to try his or her best.

6. Ideally, the evaluation should be completed with no more than a 2 minute break between grip settings. Should the evaluee exhibit significant symptomatic response to activity with this task, proceed as directed under the section, Procedure for Handling Symptomatic Response to Activity.

7. Record and score grip strength readings.

Observations

1. Grasping patterns, particularly avoidance of applying pressure on the thenar eminence or part of the palm, or avoidance of use of one or more fingers or thumb.

2. Apparent effort; noted contraction of muscle groups in the forearm, neck, or jaw or visible tightening of tendons indicating strong effort.

3. Pattern of grip strength from the smallest to the largest span: This normally follows a roughly bell-shaped curve if the individual being retested is performing at maximum strength capabilities. If pain, fear of pain, or lack of effort is a limiting factor, the curve pattern will be flattened or absent.

4. The size span at which maximum grip strength is demonstrated.

5. Co-contraction of hand and forearm muscles causing tremors with gripping. often observed in individuals who are not putting forth maximum effort but want to appear as if they are giving maximum effort.

Coefficient of Variation Cutpoints

Values represent one standard deviation above the mean.
Expressed as a percent coefficient of variation

Males

JAMAR Hand Dynamometer

Span	Dominant	Non-Dominant
1	14.42	15.24
2	9.46	10.30
3	9.39	9.27
4	10.07	9.73
5	10.81	12.50

BTE Work Simulator

Handle	Dominant Supination	Non-Dominant Supination	Dominant Pronation	Non-Dominant Pronation
302	12.20	10.50	11.90	9.30
502	11.80	13.80	12.10	10.20
503	8.70	11.40	9.60	8.60
601	9.90	8.90	11.20	9.40

BTE Work Simulator

Handle	Dominant Flexion	Non-Dominant Flexion	Dominant Extension	Non-Dominant Extension
701	10.40	9.90	8.50	10.10

Coefficient of Variation Cutpoints

Values represent one standard deviation above the mean.
Expressed as a percent coefficient of variation

Females
JAMAR Hand Dynamometer

Span	Dominant	Non-Dominant
1	11.40	12.00
2	8.60	10.70
3	8.30	8.00
4	9.20	8.20
5	9.10	9.00

BTE Work Simulator

Handle	Dominant Supination	Non-Dominant Supination	Dominant Pronation	Non-Dominant Pronation
302	16.30	13.00	12.40	8.80
502	11.50	12.70	13.60	9.90
503	13.30	13.20	14.10	9.80
601	11.70	12.70	12.30	12.40

BTE Work Simulator

Handle	Dominant Flexion	Non-Dominant Flexion	Dominant Extension	Non-Dominant Extension
701	11.00	7.60	10.30	12.40