BASELINE® EVALUATION INSTRUMENTS

7-Piece Hand Evaluation Set

Instruction Manual

REF

12-0100 **Standard** Kit
12-0102 **LiTE®** Kit
12-0117 **HD®** Kit
12-0104 **Hi-Res®** Kit
12-0111 **ER™ Hi-Res®** Kit
12-0113 **ER™ Digital** Kit

ER™ Hi-Res® kit
(12-0111)

FEI
FABRICATION ENTERPRISES INC.

Manufacturer and Master
Distributor of Physical Therapy
and Rehabilitation Products

ver 0325

BASELINE® EVALUATION INSTRUMENTS

7-piece hand evaluation sets

2 year warranty

Standard Kit Includes (12-0100):

(1) **Standard** Hydraulic Hand Dynamometer (12-0240)
(1) 30 lb Mechanical Pinch Gauge (12-0200)
(1) 6" Stainless Steel Goniometer (12-1010)
(1) 2-point discriminator with 3rd point (12-1481)
(1) Wartenburg pinwheel (12-1450)
(1) finger circumference gauge (12-1220)
(1) functional finger motion gauge (12-1060)
(1) Protective Carrying Case

1 year warranty

LiTE® Kit Includes (12-0102)

(1) **LiTE®** Hydraulic Hand Dynamometer (12-0241)
(1) 30 lb Mechanical Pinch Gauge (12-0200)
(1) 6" Stainless Steel Goniometer (12-1010)
(1) 2-point discriminator with 3rd point (12-1481)
(1) Wartenburg pinwheel (12-1450)
(1) finger circumference gauge (12-1220)
(1) functional finger motion gauge (12-1060)
(1) Protective Carrying Case

5 year warranty

HD® Kit Includes (12-0117):

(1) **HD®** Hydraulic Hand Dynamometer (12-0221)
(1) 30 lb Mechanical Pinch Gauge (12-0200)
(1) 6" Stainless Steel Goniometer (12-1010)
(1) 2-point discriminator with 3rd point (12-1481)
(1) Wartenburg pinwheel (12-1450)
(1) finger circumference gauge (12-1220)
(1) functional finger motion gauge (12-1060)
(1) Protective Carrying Case

2 year warranty

ER™ Hi-Res® Kit Includes (12-0111)

(1) **ER™ Hi-Res®** Hydraulic Hand Dynamometer (12-0246)
(1) 60 lb Mechanical Pinch Gauge (12-0201))
(1) 6" Stainless Steel Goniometer (12-1010)
(1) 2-point discriminator with 3rd point (12-1481)
(1) Wartenburg pinwheel (12-1450)
(1) finger circumference gauge (12-1220)
(1) functional finger motion gauge (12-1060)
(1) Protective Carrying Case

Hi-Res® Kit Includes (12-0124):

(1) **Hi-Res®** Hydraulic Hand Dynamometer (12-0243)
(1) 30 lb Mechanical Pinch Gauge (12-0200)
(1) 6" Stainless Steel Goniometer (12-1010)
(1) 2-point discriminator with 3rd point (12-1481)
(1) Wartenburg pinwheel (12-1450)
(1) finger circumference gauge (12-1220)
(1) functional finger motion gauge (12-1060)
(1) Protective Carrying Case

Digital kit Includes (12-0113):

(1) **Digital** Hydraulic Hand Dynamometer (12-0247)
(1) 60 lb Mechanical Pinch Gauge (12-0200)
(1) 6" Stainless Steel Goniometer (12-1010)
(1) 2-point discriminator with 3rd point (12-1481)
(1) Wartenburg pinwheel (12-1450)
(1) finger circumference gauge (12-1220)
(1) functional finger motion gauge (12-1060)
(1) Protective Carrying Case

7-piece hand evaluation set

Hydraulic Hand Dynamometer

Standard Hydraulic Hand Dynamometer (12-0240)

Intended Purpose

The 7-piece hand evaluation set is a comprehensive medical/therapeutic device designed to measure grip strength, pinch strength, joint range of motion, sensory perception, finger circumference, and finger function for complete hand assessment and evaluation.

The hand dynamometer can be used to measure grip strength. It is calibrated in pounds and kilograms of force.

The grip handle is adjustable to accommodate various hand sizes. Always use the same grip setting and dynamometer when evaluating a specific subject for hand trauma or disease.

Set the handle to the desired position. Have the subject hold the dynamometer in a comfortable position. The shoulder should be adducted and neutrally rotated, the elbow flexed to 90 degrees, and the forearm and wrist should be in a neutral position. Have the subject squeeze the handle using his/her maximum effort.

The red maximum pointer will remain at the subject's maximum reading until it is reset. The red maximum pointer must be reset before each grip test. Rotate the small knurled knob on top of the dial indicator in a counterclockwise direction until it rests against the black pointer at the zero marking. Each grip test should be repeated three times and the average result should be used.

Grip strength varies depending upon the size of the object being grasped. The adjustable handle allows for quantification of grip strength for different sized objects.

To determine whether a subject is exerting maximum effort use the following protocol:

- Take readings with adjustable handle in all five positions
- Test the normal hand and then the injured hand
- Repeat the test after five minutes

If maximum effort was exerted there should be approximately a 10% variation in the two sets of test results.

⚠ WARNING:

- Ensure proper hand position and posture during testing
- Clean grip surfaces between patients
- Do not exceed maximum force capacity
- Stop testing if patient reports pain
- Store in protective case when not in use
- Inspect for damage before each use
- Keep moving parts clean and free of debris
- Check hydraulic system for leaks

Mechanical Pinch Gauge

The finger pinch gauge can be used to measure pinch strength. It is calibrated in pounds and kilograms of force.

Apply pinch force at the pinch groove while holding the pinch gauge between your thumb and finger(s). When force is applied farther toward the tip the reading will be slightly higher. When force is applied farther toward the rear the reading will be slightly lower.

30 lb Mechanical Pinch Gauge (12-0200)

The gauge must be "zeroed" before each pinch test. Grasp the knurled ring of the dial indicator and rotate it until the zero on the dial indicator is directly under the black pointer.

The red maximum pointer must be reset before each pinch test. Rotate the small knurled knob on top of the dial indicator in a counterclockwise direction until it rests against the black pointer at the zero marking. The red maximum pointer will remain at the subject's maximum reading until it is reset.

Use the pinch gauge to perform the three basic pinch tests:

- ***Tip Pinch*** - thumb tip to index fingertip
- ***Key Pinch*** -thumb pad to lateral aspect of middle phalanx of index finger
- ***Palmar Pinch*** - thumb pad to pads of the index and middle fingers

Finger Goniometer

The finger goniometer can be used to measure active or passive joint range of motion (ROM). It measures joint flexion and hyper-extension. It is calibrated in degrees.

6" Stainless Steel Goniometer (12-1010)

Align the fulcrum of the goniometer with the anatomical fulcrum of the joint being measured. Place the flat arm of goniometer that is attached to the dial indicator on the center of the limb (or extremity) to be measured. Hold both arms of the goniometer and move the joint through its entire range-of-motion (this can be done actively by the subject or passively by the examiner). The range of motion can be read directly from the dial indicator

3-Point Aesthesiometer

The aesthesiometer is a sensory device that measures a subject's perception of the cutaneous two-point threshold. The third point makes it possible to alternate between single-and double-point stimulation without changing the distance setting. The device is very lightweight so as not to influence the touch and/or pain threshold. The tips are plastic to minimize the influence of temperature sensation.

Blindfold the subject or have the subject close his/her eyes. Set the two points close together (minimal distance reading). Lightly touch both points simultaneously to

2-point discriminator with 3rd point (12-1481)

the subject's skin. Ask the subject whether he/she feels one or two points. If the answer is one point then reset the two points farther apart and repeat the test until the subject reports that he/she feels two points. Read the two points' cutaneous threshold directly from the calibrated scale on aesthesiometer body.

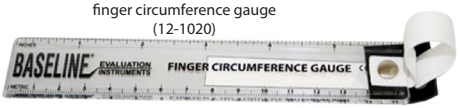
During the trial, as a check, one point only should be used to touch the skin on some trials. This can be done by using the convenient third point or by separating the two points so that only one point can be used.

Different areas of the skin have markedly different two-point thresholds. It is interesting to note that there is an increase in two-point cutaneous sensitivity brought about by practice and a transfer effect from one symmetrical skin area to another after practice on the first area.

Finger circumference gauge

The finger circumference gauge can be used to measure finger diameter and/or swelling associated with edema. It is calibrated in inches and centimeters.

finger circumference gauge
(12-1020)



Wrap the webbing around the finger to be evaluated. Thread the webbing through the eyelet on the ruler. Pull the webbing tough and read the finger circumference measurement directly from the ruler.

Pinwheel

Wartenburg pinwheel
(12-1450)

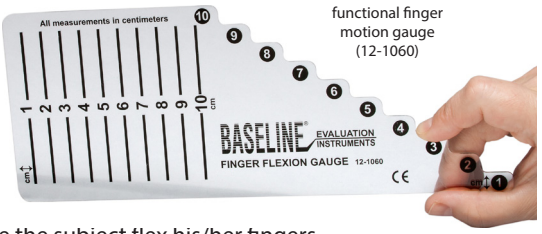
Use to elicit a subject's cutaneous sensory and/or pain perception. The test elicits a gross yes/no (on/off) response. There is no specific calibration unit.

Move the pinwheel over the skin area to be tested. Ask the subject whether he/she feels one or two points. If subject responds negatively the test may be repeated using more pressure on the pinwheel.

Functional finger motion gauge

Measures composite finger flexion and thumb-finger opposition. It is calibrated in centimeters.

functional finger
motion gauge
(12-1060)



Composite finger flexion:
Place the flat end of the plastic gauge on the subject's palmar crease and have the subject flex his/her fingers. Read the composite flexion of each finger directly from the gauge (distance from the palmar crease to the fingertip of the maximally flexed fingers).

Thumb and finger opposition:
Have the subject grasp the smallest step possible between the thumb and finger. Repeat for each finger (index, middle, ring and pinky).

norms for adult GRIP strength performance of all subjects (lbs)

		men			women		
age	**hand**	**mean**	**SD**	**low-high**	**mean**	**SD**	**low-high**
20-24	dominant	121.0	20.6	91-167	70.4	14.5	46-95
	non-dominant	104.5	21.8	71-150	61.0	13.1	33-88
25-29	dominant	120.8	23.0	78-158	74.5	13.9	48-97
	non-dominant	110.5	16.2	77-139	63.5	12.2	48-97
30-34	dominant	121.8	22.4	70-170	78.7	19.2	46-137
	non-dominant	110.4	21.7	64-145	68.0	17.7	36-115
35-39	dominant	119.7	24.0	76-176	74.1	10.8	50-99
	non-dominant	112.9	21.7	73-157	66.3	11.7	49-91
40-44	dominant	116.8	20.7	84-165	70.4	13.5	38-103
	non-dominant	112.8	18.7	73-157	62.3	13.8	35-94
45-49	dominant	109.9	23.0	65-155	62.2	15.1	39-100
	non-dominant	100.8	22.8	58-160	56.0	12.7	37-83
50-54	dominant	113.6	18.1	79-151	65.8	11.6	38-87
	non-dominant	101.9	17.0	70-143	57.3	10.7	35-76
55-59	dominant	101.1	26.7	59-154	57.3	12.5	33-86
	non-dominant	83.2	23.4	43-128	47.3	11.9	31-76
60-64	dominant	89.7	20.4	51-137	55.1	10.1	37-77
	non-dominant	76.8	20.3	27-116	45.7	10.1	29-66
65-69	dominant	91.1	20.6	56-131	49.6	9.7	35-74
	non-dominant	76.8	19.8	43-117	41.0	8.2	29-63
70-75	dominant	75.3	21.5	32-108	49.6	11.7	33-78
	non-dominant	64.8	18.1	32-93	41.5	10.2	23-67
75+	dominant	65.7	21.1	40-135	42.6	11.0	25-65
	non-dominant	55.0	17.0	31-119	37.6	8.9	24-61
ALL	dominant	104.3	28.3	32-176	62.8	17.0	25-137
	non-dominant	93.1	27.6	27-160	53.9	15.7	23-115

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norms for adult PINCH strength (Tip Pinch strength) performance of all subjects (lbs)

		men			women		
age	**hand**	**mean**	**SD**	**low-high**	**mean**	**SD**	**low-high**
20-24	dominant	18.0	3.0	11-23	11.1	2.1	8-16
	non-dominant	17.0	2.3	12-33	10.5	1.7	8-14
25-29	dominant	18.3	4.4	10-34	11.9	1.8	8-16
	non-dominant	17.5	5.2	12-36	11.3	1.8	9-18
30-34	dominant	17.4	6.7	12-25	12.6	3.0	8-20
	non-dominant	17.6	4.8	10-27	11.7	2.8	7-17
35-39	dominant	18.0	3.6	12-27	11.6	2.5	8-19
	non-dominant	17.7	3.8	10-24	11.9	2.4	8-16
40-44	dominant	17.8	4.0	11-25	11.5	2.7	5-15
	non-dominant	17.7	3.5	12-25	11.1	3.0	6-17
45-49	dominant	18.7	4.9	12-30	13.2	3.0	9-19
	non-dominant	17.6	4.1	12-28	12.1	2.7	7-18
50-54	dominant	18.3	4.0	11-24	12.5	2.2	9-18
	non-dominant	17.8	3.9	12-26	11.4	2.4	7-16
55-59	dominant	16.6	3.3	11-24	11.7	1.7	9-16
	non-dominant	15.0	3.7	10-26	10.4	1.4	8-13
60-64	dominant	15.8	3.9	9-22	10.1	2.1	7-17
	non-dominant	15.3	3.7	9-23	9.9	2.0	6-15
65-69	dominant	17.0	4.2	11-27	10.6	2.0	7-15
	non-dominant	15.4	2.9	10-21	10.5	2.4	7-17
70-75	dominant	13.8	2.6	11-21	10.1	2.6	7-15
	non-dominant	13.3	2.6	10-21	9.8	2.3	6-17
75+	dominant	14.0	3.4	7-21	9.6	2.8	4-16
	non-dominant	13.9	3.7	8-25	9.3	2.4	4-13
ALL	dominant						
	non-dominant						

norms for adult PINCH strength (Key Pinch strength) performance of all subjects (lbs)

		men			women		
age	**hand**	**mean**	**SD**	**low-high**	**mean**	**SD**	**low-high**
20-24	dominant	26.0	3.5	21-34	17.6	2.0	14-23
	non-dominant	24.8	3.4	19-31	16.2	2.1	13-23
25-29	dominant	26.7	4.9	19-41	17.7	2.1	14-22
	non-dominant	25.0	4.7	19-39	16.6	2.1	13-22
30-34	dominant	26.4	4.8	20-36	18.7	3.0	13-25
	non-dominant	26.2	5.1	17-36	17.8	3.6	12-26
35-39	dominant	26.1	3.2	21-32	16.6	2.0	12-21
	non-dominant	25.6	3.9	18-32	16.0	2.7	12-22
40-44	dominant	25.6	2.6	21-31	16.7	3.1	10-24
	non-dominant	25.1	4.0	19-31	15.8	3.1	8-22
45-49	dominant	25.8	3.9	19-35	17.6	3.2	13-24
	non-dominant	24.8	4.4	18-42	16.6	2.9	12-24
50-54	dominant	26.7	4.4	20-34	16.7	2.5	12-22
	non-dominant	26.1	4.2	20-37	16.1	2.7	12-22
55-59	dominant	24.2	4.2	18-34	15.7	2.5	11-21
	non-dominant	23.0	4.7	13-31	14.7	2.2	12-19
60-64	dominant	23.2	5.4	14-37	15.5	2.7	10-20
	non-dominant	22.2	4.1	16-33	14.1	2.5	10-19
65-69	dominant	23.4	3.9	17-32	15.0	2.6	10-21
	non-dominant	22.0	3.6	17-28	14.3	2.8	10-20
70-75	dominant	19.3	2.4	16-25	14.5	2.9	8-22
	non-dominant	19.2	3.0	13-28	13.8	3.0	9-22
75+	dominant	20.5	4.6	9-31	12.6	2.3	8-17
	non-dominant	19.1	3.0	13-24	11.4	2.6	7-16
ALL	dominant	24.5	4.6	9-41	16.2	3.0	8-25
	non-dominant	23.6	4.6	11-42	15.3	3.1	7-26

norms for adult PINCH strength (Palmar Pinch strength) performance of all subjects (lbs)

		men			women		
age	**hand**	**mean**	**SD**	**low-high**	**mean**	**SD**	**low-high**
20-24	dominant	26.6	5.3	18-45	17.2	2.3	14-23
	non-dominant	25.7	5.8	15-42	16.3	2.8	11-24
25-29	dominant	26.0	4.3	19-35	17.7	3.2	13-29
	non-dominant	25.1	4.2	19-36	17.0	3.0	13-26
30-34	dominant	24.7	4.7	16-34	19.3	5.0	12-34
	non-dominant	25.4	5.7	15-37	18.1	4.8	12-32
35-39	dominant	26.2	4.1	19-36	17.5	4.2	13-29
	non-dominant	25.9	5.4	14-40	17.1	3.4	12-24
40-44	dominant	24.5	4.3	17-37	17.0	3.1	10-23
	non-dominant	24.8	4.9	15-37	16.6	3.5	14-25
45-49	dominant	24.0	3.3	19-33	17.9	3.0	12-27
	non-dominant	23.7	3.8	8-33	17.5	2.8	12-24
50-54	dominant	23.8	5.4	15-36	17.3	3.1	12-23
	non-dominant	24.0	5.8	16-36	16.4	2.9	12-22
55-59	dominant	23.7	4.8	16-34	16.0	3.1	11-26
	non-dominant	21.3	4.5	12-25	15.4	3.0	11-21
60-64	dominant	21.8	3.3	16-28	14.8	3.1	10-20
	non-dominant	21.2	3.2	15-27	14.3	2.7	10-20
65-69	dominant	21.4	3.0	15-25	14.2	3.1	8-20
	non-dominant	21.2	4.1	14-30	13.7	3.4	8-22
70-75	dominant	18.1	3.4	14-27	14.4	2.6	9-19
	non-dominant	18.8	3.3	13-27	14.0	1.9	10-17
75+	dominant	18.7	4.2	9-26	12.0	2.6	8-17
	non-dominant	18.3	3.8	10-26	11.5	2.6	6-16
ALL	dominant	23.4	5.0	9-45	16.3	3.8	8-34
	non-dominant	23.0	5.3	10-42	15.7	3.6	6-32

Tolerances:

The 200 lb. hydraulic hand dynamometer is tested for accuracy at 20, 60, 100, 140, 180 and 200 lbs. TOLERANCES (Based on 3% through 1st 1/4 of range, 2% through 2nd and 3rd 1/4 of range and 3% through 4th 1/4 of range).

The extended range 300 lb. hydraulic hand dynamometer is tested for accuracy at 40, 80, 120, 150, 180, 220, 260 and 300 lbs. TOLERANCES (Based on 3% through 1/3 of range, 2% through 2/3 and 3% through 3/3)

The digital extended range 300 lb. hydraulic hand dynamometer is tested for accuracy at 40, 80, 120, 150, 180, 220, 260 and 300 lbs. TOLERANCES (Based on 2% through entire range).

The 30 lb mechanical pinch gauge has an accuracy of ±1 lb.

The 60 lb mechanical pinch gauge has an accuracy of ±2 lb.

The finger goniometer measures inches and centimeters with a tolerance of ±0.04 inches (±1 millimeter) and degrees with a tolerance of ±1 degree.

The finger circumference gauge measures inches with a tolerance of ±0.04 inches.

The functional finger motion gauge measures centimeters with a tolerance of ±1 millimeter.

Disposal Method

Dispose of item in accordance with the local/regional/national/ international regulations.

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