muscle strength testing

functional capacity evaluation

BASELINE® PUSH-PULL DYNAMOMETER

A simple, easy-to-use, ergonomically designed instrument that ***objectively*** measures push, pull and lift forces for manual muscle testing, functional capacity evaluation and job task evaluation at a remarkably ***affordable*** price. Because the instrument is lightweight, small and ***portable***, you can perform precise, objective evaluations in your office, at the client's location, or in the field. Ergonomically designed dynamometer is easy to grasp while testing small forces. The easy-to-attach single or dual grip handle can be used when measuring larger forces. Can be used with functional lift platform to perform lifting evaluations.

job task evaluation

- **Muscle strength measurement**
  This hand-held dynamometer lets you objectively measure manual muscle strength.
- **Job task analysis**
  Measure actual push, pull and lift forces needed to perform a particular task (function).
- **Functional capacity evaluation**
  Quantitatively evaluate an individual's push, pull or lift capacity to perform a given task (function).

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Introduction to Manual Muscle Testing (MMT)

General Testing Concepts

This instruction manual contains some standard test protocols to demonstrate the types of tests that can be performed using various Baseline® dynamometers. Refer to appropriate textbooks and manual muscle testing resources and guides for patient conditions suitable for dynamometry testing, further testing methods and protocols, and for evaluation of test data.

Reasons for Muscle testing:

Screening: measurement of the subject's strength against a know norm (i.e., grip strength of fireman) or against a benchmark value needed to perform a given task (i.e., ability to lift a box)

Comparative: to measure the subject's strength dominant side vs. non-dominant side (right hand against left hand) to ascertain extent of "impairment." To measure the subject's strength over time to ascertain the effectiveness of a treatment protocol.

Muscle testing methodology:

Positioning the subject: The angle of the joint during the test has a direct effect on the strength measurement result. If the objective is to simulate a given activity, then the joint angle should be as close as possible to the angle required by the activity to be performed.

Stabilizing the subject: The subject's body should be stabilized to ensure that the muscle or muscle group being tested is isolated.

Testing methodology:

Break test: The tester firmly holds the dynamometer and applies force against the subject's body until it begins to move. The reading represents the muscle strength "break" point at which the subject could not overcome the tester's force.

Make test: The subject initiates and exerts a force against the dynamometer (that is firmly held by the tester) until it begins to move. The reading represents the muscle strength "make" point at which the subject overcomes the tester's force of resistance.

Instrument test: The subject gradually (no sudden, jerky or abrupt movements) exerts force against the instrument until the strength or pain threshold in reached. The final result is not dependent upon the tester's resistance, only upon the instrument.

Consistent results: Regardless of the test, the subject should be made to perform the test three (3) times. If the individual readings are inconsistent, wait a few minutes and repeat the test. If possible, test the uninjured side first.

Baseline® Push-Pull Dynamometer

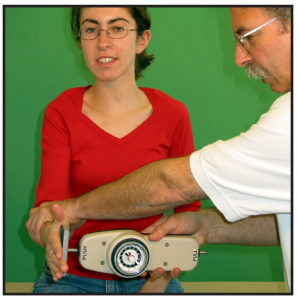
The heavy-duty dynamometer features the hydraulic system that is used in the industry accepted Baseline® and Jamar® hand dynamometers and pinch gauges. Hydraulic system ensures accurate readings. Much lighter (1½ lb. vs. 6lb.) and easier to use than spring push-pull dynamometers that are in common use today.

Dial continuously shows instantaneous force and holds the maximum force reading. This maximum reading should be manually recorded prior to resetting for the next test.

Available with either an analog (dial) or a digital (LCD) readout. Choose either 50 lb., 100 lb., 250 lb., or 500 lb. force capacity unit. Comes with 3 push pads (padded curved, padded straight, and 1cm2 circular), 1 pull hook and 1 snap-lock hook. Comes in cushioned carrying case with muscle test manual. 1 year warranty. CE certified.

digital or analog

comes in carrying case



use without handle

use with dual grip handle

use with functional lift platform base

optional accessories

Push-Pull Dynamometers and Accessories

analog (Dial) readout

12-0392 50 lb / 23 kg
12-0393 100 lb / 45 kg
12-0394 250 lb / 113 kg
12-0388 500 lb / 226 kg

digital (LCD) readout

12-0397 50 lb / 23 kg
12-0398 100 lb / 45 kg
12-0399 250 lb / 113 kg
12-0387 500 lb / 226 kg

handles

12-0385 single grip
12-0389 dual grip

functional lift bases

12-0406 regular (15”x 15”)
12-0407 large (24” x 24”)

WalSlide™ wall anchor

slides and locks to any position along 6’ system
10-5094 adjustable anchor

hardware

12-0443 chain (per foot)
12-0445 snap oval (pair)
12-0446 threaded oval (pair)

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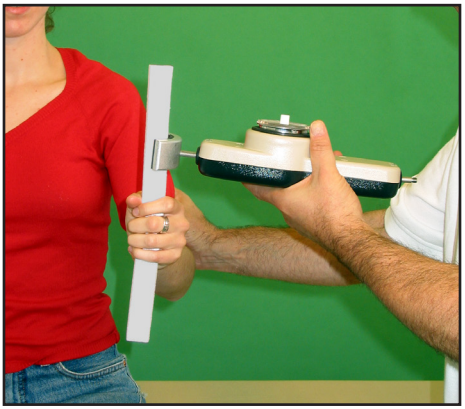
Testing Protocol: Elbow and Forearm

elbow flexion

elbow extension



forearm rotator

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
FLEXION (RIGHT/LEFT)	• seated • shoulder flexed 45° • elbow flexed 45° • palm up	On the inside of the arm just above the wrist of the arm being tested	Hand not holding dynamometer stabilizing underneath the upper arm of patient.	Break test - exert force to push arm downward.
EXTENSION (RIGHT/LEFT)	• seated • shoulder flexed 45° • elbow flexed 45° • palm up	On the outside of the arm just above the wrist of the arm being tested.	Hand not holding dynamometer stabilizing on the front of the upper arm of patient.	Break test - exert force to push arm upward.
FOREARM ROTATOR	• seated • shoulder flexed 45° • elbow flexed 45° • palm in	On the outside of rod held by hand.	Hand not holding dynamometer stabilizing on the front of the upper arm of patient.	Break test - exert force on rod to push arm inward.

Testing Protocol: Wrist

wrist flexion

wrist extension

ulnar deviation

radial deviation

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
FLEXION (RIGHT/LEFT)	• seated with arm stabilized on table edge. • palm in, wrist slightly flexed and fingers relaxed.	On the palm of the hand being tested just below the bed of the fingers.	In front of patient, stabilizing patient's forearm against table.	Break test - exert force to push hand out.
EXTENSION (RIGHT/LEFT)	• seated with arm stabilized on table edge. • palm down, wrist slightly extended and fingers relaxed.	On the back of the hand being tested just below the bend of the fingers.	In front of patient, stabilizing patient's forearm against the table.	Break test - exert force to push hand down.
ULNAR DEVIATION (RIGHT/LEFT)	• seated with arm stabilized on table edge. • palm down, wrist flexed slightly towards the ulna.	On the outside of the hand being tested just below the bend of the little finger.	In front of patient, stabilizing patient's forearm against table.	Break test - exert force to push hand in.
RADIAL DEVIATION (RIGHT/LEFT)	• seated with arm stabilized on table edge. • palm down, wrist flexed slightly towards the radius.	On the inside of the hand being tested just below the bend of the index finger.	In front of patient, stabilizing patient's forearm against table.	Break test - exert force to push hand out.

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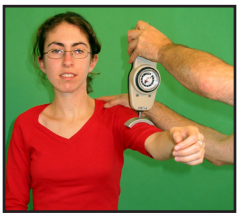
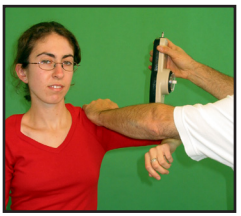
Testing Protocol: Shoulder



shoulder flexion

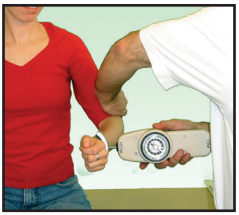
shoulder extension

shoulder adduction



shoulder abduction

internal rotation



external rotation

upper trapezius

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
FLEXION (RIGHT/LEFT)	• seated • shoulder flexed to 90° • elbow straight • palm facing in	Slightly above elbow of test arm.	At patients side, opposite hand on shoulder of test arm.	Break test - exert force to push arm downward.
EXTENSION (RIGHT/LEFT)	• prone w/ head to side • arms at sides w/ arm being tested slightly extended & straight • palm facing in	Slightly above elbow of test arm.	To the side of test arm, opposite hand stabilizes test shoulder.	Break test - exert force to push arm downward.
ADDUCTION (RIGHT/LEFT)	• standing • arm being tested out to side 8-10" from body • palm facing in	Slightly above elbow on inside of test arm.	To the front-side of patient, with opposite hand on patient's hip.	Break test - exert force to push arm out.
ABDUCTION (RIGHT/LEFT)	• seated • arm out to side at 90° • elbow flexed 90° • palm facing down	Slightly above elbow of test arm.	Behind and to the side of patient with the opposite hand on test shoulder.	Break test - exert force to push arm downward.
INTERNAL ROTATION (RIGHT/LEFT)	• seated • arms at sides with 90° elbow flexion • palm facing in	Slightly above wrist on inside of test arm.	In front of patient with other hand stabilizing the outside of elbow.	Break test - exert force to push arm out.
EXTERNAL ROTATION (RIGHT/LEFT)	• seated • arms at sides with 90° elbow flexion • palm facing in	Slightly above wrist on outside of test arm.	In front of patient with other hand stabilizing the inside of elbow.	Break test - exert force to push arm in.
UPPER TRAPEZIUS (RIGHT/LEFT)	• seated • arms at sides • test shoulder shrugged slightly	On top of test shoulder.	Behind patient, stabilizing non test side shoulder.	Break test - exert force to push shoulder downward.

Testing Protocol: Hip

hip flexion

hip extension

hip abduction

hip abduction

internal rotation

external rotation

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
FLEXION (RIGHT/LEFT)	• Supine with knees bent and feet flat • hip of test leg flexed to about 90°	Slightly above knee of test leg.	To the side of test leg.	Break test - exert force to push leg downward.
EXTENSION (RIGHT/LEFT)	• prone w/ arms at side • test leg is bent at knee with hip extended and knee off table	Slightly above knee on back of test leg.	To the side of test leg.	Break test - exert force to push leg downward.
ADDUCTION (RIGHT/LEFT)	• lye on side w/ test (bottom) leg touching table, in line w/ trunk. • top leg in step position to allow movement.	Slightly above knee on inside of test leg.	To the side of patient.	Break test - patient lifts lower leg slightly off table, then exert force to push leg out.
ABDUCTION (RIGHT/LEFT)	• lye on side w/ test leg on top, in line with trunk. • bottom leg bent to stabilize body.	Slightly above knee on outside of test leg.	To the side of patient.	Break test - patient lifts upper leg slightly off table, then exert force to push leg down.
INTERNAL ROTATION (RIGHT/LEFT)	• seated w/ legs over edge of table • knees bent 90° • hip rotated in slightly	Slightly above ankle on outside of test leg.	In front of patient with non-testing hand on inside of patient's knee.	Break test - exert force to push leg in.
EXTERNAL ROTATION (RIGHT/LEFT)	• seated w/ legs over edge of table • knees bent 90° • hip rotated out slightly	Slightly above ankle on inside of test leg.	In front of patient with non-testing hand on outside of patient's knee.	Break test - exert force to push leg in.

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Testing Protocol: Ankle

plantar flexion

dorsi flexion

inversion

eversion

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
PLANTAR-FLEXION (RIGHT/LEFT)	• prone with feet of end of table. • foot in neutral position.	On ball of test foot.	Non-dynamometer hand stabilizes lower leg against table.	Break test - exert force to push down foot.
DORSI-FLEXION (RIGHT/LEFT)	• supine • test leg straight • ankle in neutral position	On top of foot positioned below toe.	Non-dynamometer hand stabilizes lower leg against table.	Break test - exert force to push down foot.
INVERSION (RIGHT/LEFT)	• supine • test leg straight • ankle inverted slightly	On inside of foot positioned below toe.	Non-dynamometer hand stabilizes lower leg against table.	Break test - exert force to push out foot.
EVERSION (RIGHT/LEFT)	• supine • test leg straight • ankle everted slightly	On outside of foot positioned below toe.	Non-dynamometer hand stabilizes lower leg against table.	Break test - exert force to push in foot.

Testing Protocol: Knee

knee flexion

knee extension

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
FLEXION (RIGHT/LEFT)	• prone • test leg flexed 90° • non-test leg straight	On the back of leg slightly above ankle.	Aside patient. Non-dynamometer hand stabilizes thigh.	Break test - exert force to push leg down.
EXTENSION (RIGHT/LEFT)	• sitting with legs over the table edge • test leg extended slightly	On the front of leg slightly above ankle.	In front of patient. Non-dynamometer hand under knee of test leg.	Break test - exert force to push leg down.

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Testing Protocol: Cervical (Neck)

flexion

lateral flexion

rotation

extension

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
FLEXION	• supine • head mid-line • chin slightly tucked • knees bent & feet flat	On forehead.	Aside the patient.	Break test - have patient lift head slightly while keeping chin tucked. Exert force to push head down.
EXTENSION	• prone • head mid-line • arms at sides • chin slightly tucked	On back of head (occipital).	Aside the patient.	Break test - have patient lift head slightly while keeping chin tucked. Exert force to push head down.
LATERAL FLEXION (RIGHT)	• supine • head turned to left • chin tucked slightly • knees bent & feet flat	On right temple.	Aside the patient.	Break test - have patient lift and keep head turned and chin tucked. Exert force to push head down.
ROTATION (RIGHT)	• prone • head turned to right • arms at side • chin tucked slightly	Above and behind the ear on the right temporal area.	Aside the patient.	Break test - have patient lift and keep head turned and chin tucked. Exert force to push head down.

Testing Protocol: Lumbar

lumbar flexion

lateral flexion

lumbar extension

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
FLEXION	• supine • knees bent • feet flat • arms resting at side • head mid-line	On the sternum at the center of the chest.	Above and to side of patient.	Break test - patient's arms are relaxed and head + shoulders lifted off table, exert force to push down head.
EXTENSION	• prone • arms resting at side • head mid-line	At the inferior angle of the scapulae on the center of the back between the shoulder blades.	Above and to side of patient.	Break test - patient's arms are relaxed and head and chest lifted off table, exert force to push down body.
LATERAL FLEXION (RIGHT)	• seated on table • back laterally flexed to right • arms resting in lap • head mid-line	Under the arm of the rib cage (right side).	In front of and to side of patient with non-dynamometer hand isolating the left hip.	Break test - have patient lean right slightly with buttocks on table, exert force to push patient inward.

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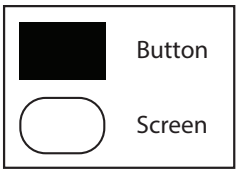
Using the Digital (Hydraulic) Push-Pull Dynamometer Display



How to turn on/off unit:

Press **ON ENTER**

- Press ON/ENTER to switch ON and OFF.

How to zero out unit:

Hold **MENU** ▶ Zero Screen **ZERO UNIT** ▶ Hold **ON ENTER**

- Display "____" on the LCD. Zero the unit and save the Zero Offset.

How to view max:

Hold **MENU** ▶ Zero Screen **ZERO UNIT** ▶ Press **MENU** ▶ Max Screen **MAX** ▶ Hold **ON ENTER**

- Exit without changing anything.

How to clear max:

Hold **MENU** ▶ Zero Screen **ZERO UNIT** ▶ Press **MENU** ▶ Max Screen **MAX** ▶ Hold **ON ENTER** ▶ Max Clear Screen **MAX CLR**

▼

Hold **ON ENTER** ▶ Confirm Clear **CLR YES?** ▶ Hold **ON ENTER**

- Display "____" on the LCD. Clear MAX to 0 and save the MAX value.

How to switch between LB and KG:

Hold **MENU** ▶ Zero Screen **ZERO UNIT** ▶ Press **MENU** ▶ Max Screen **MAX** ▶ Hold **ON ENTER** ▶ Max Clear Screen **MAX CLR**

▼

Press **MENU** ▶ Select Unit Screen **LBKG SEL** ▶ Hold **ON ENTER** ▶ Press **MENU** ▶ Hold **ON ENTER**

- Switch the weight unit (LB and KG)
- Display "____" on the LCD. Save the weight unit.

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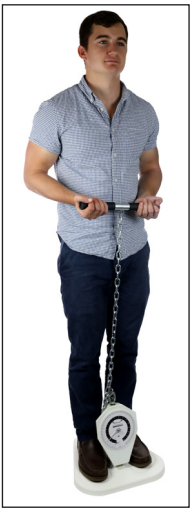
Baseline® Lift (Back-Leg-Chest) Dynamometer

Baseline® Back-Leg-Chest Dynamometer

Measure strength of back, leg and chest. Base provides sure footing. Chain length is adjusted to accommodate for height differences or to vary the point of force application. Shows pounds and kilograms. Pointer remains at maximum until reset. Comes with specified base.

12-0403	large base, 660 lb. adult
12-0400	regular base, 660 lb. adult
12-0401	regular base, 330 lb. adolescent
12-0402	regular base, 165 lb. child



Back-Leg-Chest Hardware Accessories

Complete with 5 foot chain, snap hook and threaded oval.

functional lift bases

12-0406	regular bases (15x15”)
12-0407	large base (24x24”)

Baseline® Push-Pull Dynamometers with Lifting Accessories

Dial (analog) hydraulic

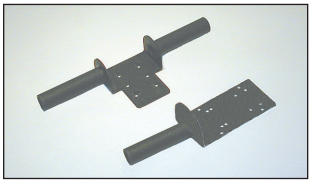
12-0392	50 lb./22.5 kg.
12-0393	100 lb./45 kg.
12-0394	250 lb./115 kg.
12-0388	500 lb./225 kg.

Digital (LCD) hydraulic

12-0397	50 lb./22.5 kg.
12-0398	100 lb./45 kg.
12-0399	250 lb./115 kg.
12-0387	500 lb./225 kg.

Electronic

12-0340	50 lb./22.5 kg.
12-0341	100 lb./45 kg.
12-0342	250 lb./115 kg.
12-0343	500 lb./225 kg.



Baseline® push-pull handles

Handle system screws onto push-pull dynamometer body. Allows for a variety of tests. Fits Baseline® hydraulic and electronic push-pull dynamometers.

12-0385	Single Grip Handle
12-0389	Dual Grip Handle

Baseline® pull accessories

Attachments can be used for a variety of tests.

12-0377	Medium Hook
12-0376	Small Hook
12-0379	Oval Snap Hook
12-0371	curved push pad
12-0370	straight push pad
12-0372	small circular tip
12-0373	large circular tip

Back-Leg-Chest Hardware Accessories

chains/straps

12-0443	chain (ft)

ovals

12-0445	snap oval (pair)
12-0446	threaded oval (pair)

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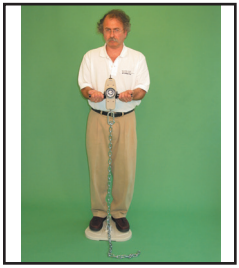
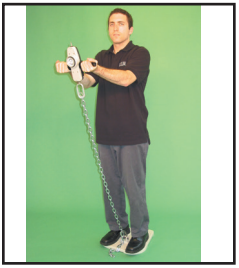
Testing Protocol: Lift Tests (Physical Capacity Tests)



arm lift



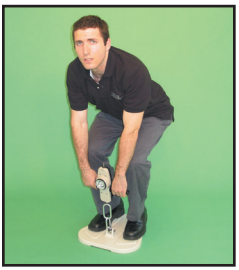
high far lift

high near lift

torso lift

hydraulic push-pull with base

leg lift



floor lift

	PATIENT START POSITION	PLACEMENT OF DYNAMOMETER	POSITION OF THERAPIST	TEST
ARM LIFT (CERVICAL/UPPER EXTREMITY)	• Stand on base with feet shoulder width apart • Relax knees • Elbows at 90° • Palms facing up	Set correct start position by adjusting chain length and ensuring chain is perpendicular to base.	In front of and aside patient. Hand on patient hip to isolate movement.	Patient should pull straight up and hold - without leaning back.
HIGH FAR LIFT (CERVICAL/UPPER EXTREMITY)	• Stand on base with feet shoulder width apart • Relax knees • Elbows at 90°, palms up • Shoulders flexed to 45°	Set correct start position by adjusting chain length and ensuring chain is perpendicular to base.	In front of and aside patient. Hand on patient hip to isolate movement.	Patient should pull straight up and hold - without leaning back.
HIGH NEAR LIFT (CERVICAL/UPPER EXTREMITY)	• Stand on base with feet shoulder width apart • Relax knees • Elbows at 45°, palms up • Shoulders flexed to 45°	Chain length same as with high far lift. Ensure chain is perpendicular to base.	In front of and aside patient. Hand on patient hip to isolate movement.	Patient should pull straight up and hold - without leaning back.
TORSO LIFT (LUMBAR/LOWER EXTREMITY)	• Stand on base with feet shoulder width apart • Relax knees • Arms straight, palms down • Torso bent at hips	Set correct start position by adjusting chain length and ensuring chain is perpendicular to base.	In front of and aside patient. Hand on patient hip to isolate movement.	Patient should pull straight up and hold - without leaning back.
LEG LIFT (LUMBAR/LOWER EXTREMITY)	• Stand on base with feet wider than shoulder width apart and knees bent • Shoulders/head up • Arms straight, palms down	Chain length same as with torso lift. Ensure chain is perpendicular to base, and bar is gripped at mid to lower thigh height.	In front of and aside patient. Hand on patient hip to isolate movement.	Patient should use his legs to pull straight up and hold - without leaning back.
FLOOR LIFT (LUMBAR/LOWER EXTREMITY)	• Stand on base with feet wider than shoulder width apart and knees bent • Feet flat • Torso straight, palms down	Remove chain, and attach handle grip bar directly to gauge. Ensure gauge is aligned perpendicular to base.	In front of and aside patient. Hand on patient hip to isolate movement.	Patient should use his legs to pull straight up and hold - without leaning back.

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