

## Quick Capacity Evaluation (QCE) (Staff Responsibilities)

Prior to the QCE the patient should compete and if necessary, the staff should score the following questionnaires:

- Physical Limitations Form (P-X)
- Occupational Factors Questionnaire (P-Y)
- Pain Drawing Interpretation (*form PD-IW-3*)
- Oswestry Low Back Pain Questionnaire (*form OLBPQ-IW-4*)
- Pain Avoidance Behavior FABQ Questionnaire (*form FABQ-IW-6*)
- Three-Question Quick Screening (*form 3Q*)
- Pain Catastrophizing Scale (*form PCS-EN*)
- Pain Catastrophizing Scale (*form PCS-IEQ*)
- Modified Zung Depression Questionnaire (*form IW-9*)
- Modified Work APGAR (*form IW-7*)

Additionally, the physician should review the results of the above questionnaires, perform the non organic tests, and the Waddell's Signs before beginning the functional testing of the injured worker. The physician should read the physical demands of the injured worker's job, to assess the actual current ability to perform the specific functional tests. This will give the physician the information to determine risk or capacity deficits to create a return to work plan. The Questionnaires, non-organic tests, and Waddell's Signs will identify pain intolerance. This process will assist in making the determination regarding return to work, not being capable of working, assist in establishing limitations that the employer will need to accommodate the injured worker whose current ability does not meet or exceed the physical demands of the job. This process will also assist in the determination of risk to self or others.

Visual Analogue (VAS) Scale is used in conjunction with Functional Testing.

This scale will be the standard pain scale used throughout the QCE. The following chart demonstrates a pain scale utilized by the McKenzie Institute and others.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

This method of recording pain related to each functional test will help to understand pain related to the physical demands of the job and modify the results of the QCE test to the patient's specific or unusual job demands.

## Quick Capacity Evaluation (QCE) (Staff Responsibilities) *cont...*

### Medically Unexplained Symptoms and Findings of Embellishment or Psychological Overlay

When the results of standard orthopedic and neurological tests elicit findings that are inconsistent with known anatomical nerve distribution or the known physiological responses, the physician should note these unusual findings and clearly state that the test result is nonorganic (*non-anatomic or non-physiological*) in origin. As the injured worker is examined, always watch for any subtleties in atypical test results.

- **Burn's Bench Test**
- **Tenderness to Skin Pinch**
- **Hoover's Sign**
- **Flip Test**
- **Bechterew's Test**
- **Flexed Hip Test**
- **Libman's Test**
- **Mannkopf's Test**
- **Magnuson's Test**

### Waddell's Non-Organic Signs

These signs should all be tested before beginning the functional test (*see page 74-77*)

### Waddell's Signs (Form WS - PD-3) Nonorganic Physical Signs in Low back Pain<sup>(32)</sup>

Category	Test	Comments
1 Tenderness	Superficial Palpation	Inordinate, widespread sensitivity to light touch to the superficial soft tissue over the lumbar spine suggests amplified symptoms.
2 Simulation	Axial Loading	Light pressure to the skull of the patient while standing should not significantly increase symptoms.
	Rotation	Physician should rotate the standing patient's pelvis and shoulders in the same plane. This does not move the lumbar spine and should not increase pain.
3 Distraction	Comparison of Supine and Sitting Straight Leg Raising Test	Physician asks the seated patient to straighten the knee. Patients with true sciatic tension will arch backward and complain. These results should closely match those of the traditional recumbent straight-leg test.
4 Regional	Collapsing, Weakness, or Non-Dermatomal Deficits	Diffuse motor weakness or bizarre sensory deficits suggest functional regional disturbances if they involve multiple muscle groups and cannot be explained by neuroanatomy principles.
5 Overreaction	Inappropriate Responses	Excessive and inappropriate grimacing, groaning, or collapse during a simple request is disproportionate.

## Quick Capacity Evaluation (QCE) (Staff Responsibilities) *cont...*

### Waddell's Non-Organic Signs

There are five Waddell non-organic signs, and three of the five signs must be positive to support the conclusion that non-organic or unexplained low back pain exists. There are two tests included within three of the five signs (eight total tests exist within the five signs). In those signs where there are two tests (numbers 1, 2, & 4), only one of the two tests has to be positive to constitute a positive sign. The nonorganic signs, pain behavior, and pain avoidance behavior usually improve as the function is restored, and the patient begins to self manage the pain. An improvement in fear avoidance / nonorganic behavior (when comparing an initial QCE to a follow-up QCE) indicates the patient is making progress in the psychosocial domain. These results typically correlate closely with improved physical performance as observed during the other QCE tests.

The Waddell non-organic pain tests (*numbers 4, 5, 10, 13, & 18a*) are non-provocative tests. Do not try to provoke a pain response such as when performing standard orthopedic provocative tests. If a pain response occurs, this constitutes a positive (+) response. Determine if there is a physiological explanation and repeat the test as many times as needed to ensure evaluator objectivity.

### Waddell Sign (*Waddell Sign 1*)

Work this test into your standard orthopedic examination from a standing position. If either superficial pain or deep and non-anatomical pain are reported, the sign is positive.

#### Doctor Position:

Standing or sitting behind the patient.

#### Patient Position:

Sitting, standing, or lying (*usually standing*).

#### Technique:

**Test 1:** Superficial — lightly pinch the lumbar skin.

**Test 2:** Deep — a non-anatomical, wide area of pain not localized to one structure.

**Observe:** Disproportionate, exaggerated response (*"jump sign," verbal response, facial grimacing, and so forth*).

**Reporting:** Document as + or -.

## Quick Capacity Evaluation (QCE) (Staff Responsibilities) *cont...*

### Simulation (*Waddell Sign 2*)

Work this test into your standard orthopedic examination from a standing position. If either of these tests elicits pain the second Waddell sign is positive.

**Doctor Position:** Standing.

**Patient Position:** Standing.

### Technique:

**1.Axial Loading:** Low back pain (LBP) is created by mild downward pressure on the skull.

**2.Trunk Rotation:** Create LBP by mild rotation of the trunk.

**3.Axial Compression Testing:** A positive sign of non-organic LBP is a low back pain response to cervical compression testing. This author recommends that downward pressure on the shoulders be utilized in cases when cervical spine problems exist. This modification can also be utilized in equivocally positive cases.

**4.Trunk Rotation Testing:** The arms can also be "pinned" to the patient's sides to guard against twisting the upper body on the pelvis. More specifically, do not allow the lumbar spine to rotate greater than the hips. Add progressively greater rotation until a pain response is provoked. Repeat several times and determine if the pain occurs within reasonable physiological limits or if it is clearly non-organic LBP.

**5.Observe and Caution:** Produce LBP with minimal downward pressure and rotation (*exaggerated response*). Neck pain may occur with axial loading (*looking for LBP, not neck pain response*). Trunk rotation can reproduce spinal nerve root pain physiologically, thus representing a false positive (+) response. If either test is positive, this constitutes a positive Waddell Sign 2.

Reporting: Document as + or -.

### Sitting vs. Supine SLR / Distraction (*Waddell Sign 3*)

Work this test into your standard orthopedic examination from a sitting position. **Step A** is a "sitting," and **Step B** is a "supine straight-leg test." Perform **Step B** later in the exam.

**Sitting "Distracted Technique":** Compare the sitting and supine SLR tests. Perform sitting SLR while distracting the patient by the performance of a superficial plantar reflex with rapid extension of the knee.

**Note:** If positive nerve tension signs exist, be cautious as to the speed at which the SLR is performed (*both sitting and supine*).

## Quick Capacity Evaluation (QCE) (Staff Responsibilities) *cont...*

**Supine "Undistracted Technique":** Compare the sitting and supine SLR tests. The test is positive if the pain in a sitting SLR is < the non-distracted supine SLR test (+ "*flip*" test). A disproportionate response may occur (*tremor, outcry, collapse*) during the supine non-distracted SLR, compared to the distracted sitting SLR.

Note: Only report as "+" if there is an exaggerated increase in LBP or leg pain compared to the sitting distracted SLR. Complete the distracted Waddell test when performing the supine SLR.

Reporting: Document as + or -.

### **Regional Neurology** (*Waddell Sign 4*)

Work this test into your standard orthopedic and neurological examination from a sitting position.

Doctor Position: Perform a standard segmental neurological exam (*deep tendon reflexes, muscle strength, sensory perception*).

Patient Position: Sitting, standing, and lying.

### **Exaggeration / Overreaction** (*Waddell Sign 5*)

Work these observations into your standard orthopedic and neurological examination from a sitting position.

**Patient Position:** Sitting, standing, or lying. Note exaggeration at any time during the consultation or examination.

**Observe:** Exaggerated characteristics or disproportionate response, such as tremor, crying out, or collapse.

**Reporting:** Document as + or -.

## Quick Capacity Evaluation (QCE) (Functional Testing)

Choose those tests that specifically address the physical demands of the injured worker's job. Using the results of the "Tests for Physical Limitations" (*form P-X*) and the "Occupational Indicators" (*form P-Y*), you will be able to note specific limitations related to the physical demands of the patient's job. Additional physical demands may need to be assessed. Some of the functional tests listed below may need to be modified by the information obtained by the P-Y and P-X forms to assure the tests are replicating the actual physical demands of the job.

### Three-Minute Step Test

Use an "Informed Consent for Cardiovascular Fitness Testing" form.

#### Technique:

- Check the patient's pre-test pulse (*30 seconds and multiply by 2. If the pulse rate is >100 b/m STOP*).
- Patient steps up and down using a 12-inch bench at the rate of 24 steps-per-minute for three minutes. (*Metronome 96 b/m*) "Upright, up left, down right, down left." Repeat.
- Immediately (*within 5 seconds*), have the patient sit. Then, re-check the patient's pulse for a full minute and compare to the normative data.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

### Lumbar Inclinator Spinal ROM (*Range Of Motion*)

Use an "Informed Consent for Cardiovascular Fitness Testing" form.

**Technique:** The end points of movement are recorded at both the T12 and S2, and the difference is calculated using the equation: T12-S2= lumbar range of motion. If the average of three consecutive readings falls within five or ten percent of the average, the highest of the three readings is recorded.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

Physician's Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

## Quick Capacity Evaluation (QCE) (Functional Testing) *cont...*

### Horizontal Side Bridge

**Patient Position:** Resting on the side with the foot of the upper leg crossed in front of the lower leg, and propped up on the elbow.

**Note:** If the patient cannot do the test, modify it by starting from the knees rather than the feet.

**Technique:** Raise the hip off the floor, keeping the long axis of the body in a straight line. The test is timed in seconds and ends when the pelvis hits the floor or cannot maintain a straight line. There is a tendency for the pelvis to sag towards the floor as fatigue begins. Encourage the patient not to let the pelvis sag. The test ends when the pelvis contacts the floor or the patient cannot return to a straight line with the long axis of the body.

**Note:** This test is the first of several strength and endurance tests. This test evaluates the endurance of the quadratus lumborum, the lateral trunk stabilizing muscles (*side closest to the floor*). The normative data chart below was calculated using healthy young adult subjects, and the side bridge is compared to the flexor and extensor trunk stabilizers.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

### Gastrocnemius / Ankle Dorsiflexion Test

This test measures the length of the gastrocnemius muscle. The provider must differentiate between a muscular contraction and an articular block (*such as arthritis*).

**Patient Position:** Standing upright, feet parallel. Fix (*Velcro*) the inclinometer above lateral malleolus and "0" in an upright standing position. If using a mechanical inclinometer, "0" the inclinometer on the anterior tibia and measure the end range of motion.

**Technique:** Knee straight: Lean forward against a wall or table. Before the measurement, lower the heel down to the point of maximum ankle dorsiflexion. Take the measurement.

**Normals:** 22.5; SD 0.7. Intra-assay CV 2.2%; Inter-assay CV 2.5%.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

Physician's Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_



## Quick Capacity Evaluation (QCE) (Functional Testing) *cont...*

### Soleus / Ankle Dorsiflexion Test (*Knee Flexed*)

This test measures the length of the soleus muscle. The provider must differentiate between a muscular contraction and an articular block (such as arthritis).

#### Patient Position:

**Option 1:** Standing with one leg on the floor and resting the other foot on a bench.

**Option 2:** Patient takes a half step back and lunges downward as if to approximate the knee to the floor without raising the heel.

**Technique:** Knee flexed: Maintain heel to bench contact at maximum ankle DF (kneeling position).

**Normals:** 24.9; SD 0.8. Intra-assay CV 2.2%; Inter-assay CV 2.6%.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

### One-Leg Balance Test (*Proprioception Test*)

This test measures the proprioception skills of the patient. When the eyes are closed, the sensory-motor loop (dorsal columns, cerebellum, inner ear, and joint proprioceptors) is challenged more than when the eyes are open. This test provides excellent biofeedback for the patient, helping them understand that proprioception exercises (balance board, shoes, gym ball, and so forth) are necessary.

#### Patient Position:

**Eyes Open:** Standing on one leg. Count in seconds to a maximum of 30 seconds. The test ends when the patient loses balance and touches the floor with the non-weight bearing foot.

**Eyes Closed:** Standing on one leg and count the time in seconds. The test ends when the patient loses balance and touches the floor with the non-weight-bearing foot.

Age	Eyes Open in Seconds	Eyes Closed in Seconds
20 - 59	29 - 30	25 average
60 - 69	22.5 average	10
70 - 79	14.2	4.3

Physician's Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_



## Quick Capacity Evaluation (QCE) (Functional Testing) *cont...*

### Repetitive Squat Test

**Patient Position:** Standing with the feet shoulder-width apart.

**Technique:** Patient squats until thighs are horizontal with the floor, and then he returns to upright position. The rate is one rep / 2-3 seconds. Repeat to the maximum.

**Observe:** Count the number of reps. (*Maximum 50 reps*)

**Reporting:** Use the following chart to determine the "normal" for the subject being evaluated.

Average for all ages from 14 - 26 repetitions. (*standard deviation is relative high*)

### Pinwheel Exam

**Observe:**

**Motor:** Many muscle groups may be weak (*a cogwheel or "giving way"*). Often, there is no segmental consistency when this test is positive.

**Sensory:** A non-dermatomal dysesthesia (*DD Sclerotomal pain*); that is, inconsistent, non-anatomical neurological findings.

**Reporting:** Document as + or -.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

### Supine Tests

#### Repetitive Sit-Up

**Patient Position:** Supine, knees flexed 90 degrees, ankles fixed.

**Technique:** Patient sits up until touching the thenar pad of the hand to the patella and curls back down to the supine position. The rate is one rep / 2-3 seconds. Repeat to the maximum.

**Observe:** Count the number of repetitions (*maximum 50*). The average number of repetitions for all ages ranged from 11 - 27 with a high standard deviation.

Physician's Signature: \_\_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_

## Quick Capacity Evaluation (QCE) (Functional Testing) *cont...*

### Modified Thomas / Hip Extension Test (*Iliopsoas Length Test*)

#### Patient Position:

**Step 1:** Position patient supine on the bench and obtain "0" reading on the inclinometer.

**Step 2:** Move the patient to the end of the bench (*use a piece of plywood over the exam table secured by straps if the table is soft*) with the contralateral knee / hip flexed to the chest (*to eliminate lumbar lordosis*). Lay the patient back to a supine position and test the hip by passively flexing to 90 percent. The inclinometer reads "0." Lean into the patient's foot to assure maximum posterior pelvic tilting.

**Step 3:** The testing limb is then maximally extended, followed by relaxation, allowing the leg to hang passively towards the floor, and the measurement is recorded.

**Observe:** Record the angle when the homolateral leg is hanging freely, fully relaxed, hip extended, and lumbar lordosis is removed.

**Normals:** 83.5%, SD 1.1; Intra-assay CV 0.7%; Inter-assay CV 1.2%.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

### Undistracted Straight Leg Raise Test

#### Patient Position: Supine

**Technique:** Perform supine SLR and compare to "Sitting SLR" test. If no pain is reported in the distracted sitting SLR and the undistracted supine SLR test is significantly more painful, = + Waddell Test #3 (*Distraction test*).

**Observe:** "+" = pain with a sitting "distracted" SLR is less than the non-distracted supine SLR test (+ "*flip*" test). Note: If positive nerve tension signs exist, be cautious as to the speed at which the sitting SLR is performed. A disproportionate response may occur (*tremor, outcry, collapse*) during the supine / undistracted SLR, especially when compared to the distracted sitting SLR.

**Reporting:** Document as + or -.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

Physician's Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

## Quick Capacity Evaluation (QCE) (Functional Testing) *cont...*

### Static Back Endurance Test

**Doctor Position:** At tableside, holding the patient's ankles (*strap is ideal*).

**Patient Position:** Prone with the inguinal region at the end of a table. Arms at sides, ankles fixed, holding the horizontal position.

**Technique:** Patient maintains the horizontal position as long as possible.

**Observe:** Time the duration the position can be held (Maximum: 240 seconds).

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

### Knee Flexion Test / Nachlas

**Doctor Position:** To the side of the patient.

**Patient Position:** Prone

**Technique:** Place inclinometer on the lower leg and adjust to "0." Strap the pelvis down. Passively flex the knee.

**Observe:** Record the angle at the moment hip flexion starts. Normal = 148 degrees.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

### Hip Internal and External ROM (*IR, ER*)

**Doctor Position:** At the foot end of the table.

**Patient Position:** Neutral is starting position.

**Technique:** Place inclinometer on the anterior lower leg and adjust to "0" with the knee flexed 90 degrees.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

Physician's Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

## Quick Capacity Evaluation (QCE) (Functional Testing) *cont...*

### Repetitive Arch-Up Test

**Doctor Position:** At the end of the table holding the patient's ankles (strap is less work and preferred).

**Patient Position:**

1. Starting position (*support weight with the elbows*).
2. Slowly lower the body down to 45 degrees.

Prone with the inguinal region at the end of a table. Arms at sides, ankles fixed, holding 45-degree trunk flexion angle.

**Technique:** Patient rises to a horizontal position and backs down to a 45-degree angle.

**Observe:** Count the number of repetitions, moving one repetition at 2-3 seconds to a maximum of 50 times.

A	+1	= the pain worsens with movement and if peripheralization occurs =	+2
B	0	= no change in pain occurs =	0
C	-1	= the pain improves and if centralization occurs =	-2

Following the initial QCE, the physician discusses return to work with the injured worker. If there are no risks of re-injury or harm to others and the physical limitations can be accommodated, the patient is returned to work (*see Chapter 3 "Return to Work" for a detailed description of making this decision*). If the patient's functional deficits prevent return to work, the physician keeps the patient focused on the importance of returning to work at the earliest safe point. The injured worker should be advised that he will be functionally retested to determine the point at which he can safely return to work.

Finally, seek agreement from the patient.

Physician's Signature: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_