



**Name:**

**Email:**

**Date 1:**

**Date 2:**

# Low Back Assessment

The low back assessment gives you an understanding if your posture, range of motion, movement, and core ability are within normal limits and if they could affect back health. Posture measures gives you an understanding if you have body balance and symmetry. Range of Motions measures allow an understanding if your joints move freely throughout a normal range of motion. Movement assessments are one of the best ways to gain an understanding of how you move. Core ability determines if there is sufficient endurance and balance in the musculature around your torso. Use these tests to determine a course of action on how to protect your back.

Performing various assessments can help you identify any compensation that causes you to deviate from proper postural or movement mechanics. If you present a deviation in posture, range of motion, movement, and core ability there are likely muscular imbalances (tight or weak muscle or muscle group) present and you can use that information to select strategies and exercises that will address them. Some deviations stem from factors that cannot be corrected through various techniques, but it is still helpful to be aware of these deviations.

There are certain physical keys when it comes to back health. Being too lordotic (excessive inward curve) or having a flat back (no curve) puts undue stress on the spine. Normal range of motion is the very protective when it comes to back health. Studies have suggested that being overly flexible or tight is not helpful when it comes to back health. The way one moves, such as squatting and bending forward, is also very important when it comes to back health. It is very important that when lifting an object you keep your back locked in a neutral position, hinge at the hips, and to bend at the knees when lifting where most of the muscular effort occurs at the gluteal muscles. A strong back is important, but more important is having the musculature around the back (known as the core) to be balanced and to have a high level of muscular endurance.

# 1) Posture and Back Health - Do you have good posture? It is essential for back health.

Good spinal posture is where all 3 spinal curves are present, but not exaggerated.

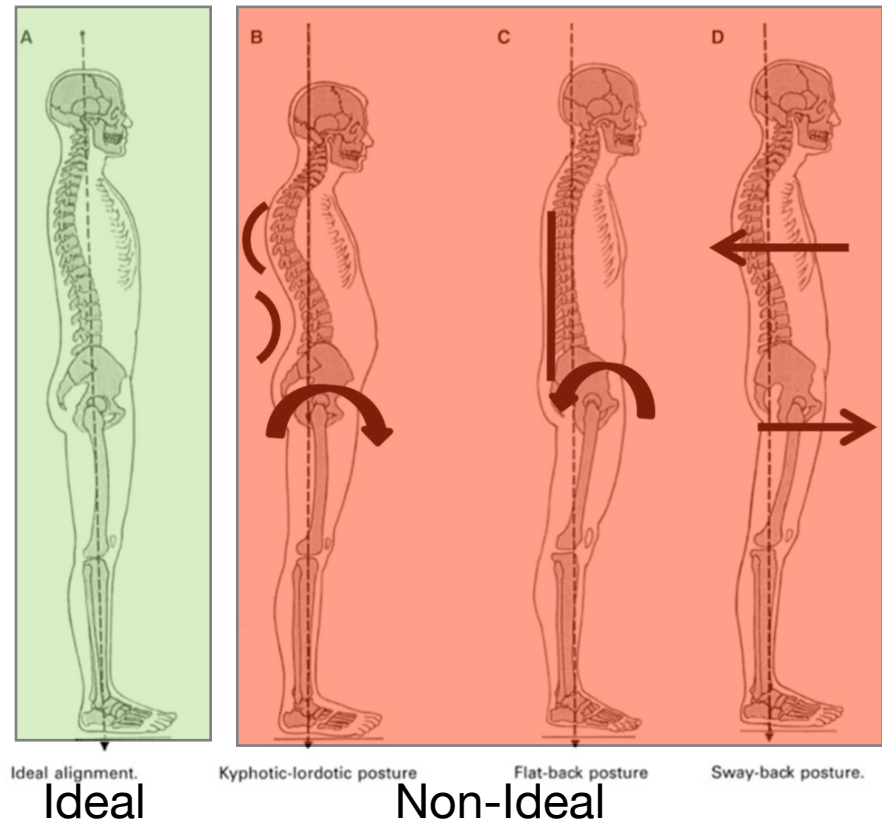
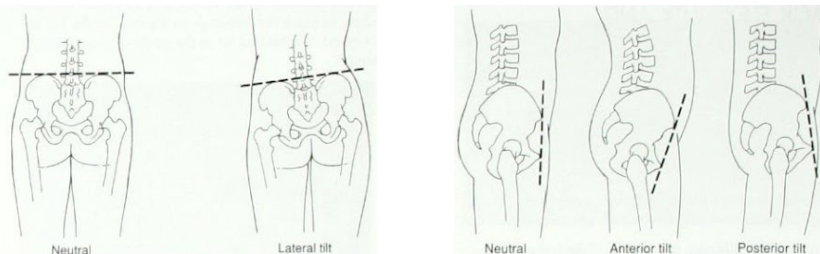
**Optimal Posture.** In optimal posture, a vertical line passes through the midline of the knee, the lumbar vertebrae, the shoulder joint, the cervical vertebrae and the earlobe.

**Kypholordotic Posture.** The head is held slightly forward, often becoming the most anterior segment of the body. The pelvis tends to tilt anteriorly with an increase in lumbar lordosis (inward curve).

**Flat-Back Posture.** The pelvis has a posterior tilt with very little normal inward curvature of the lumbar spine. The knee joints are often hyperextended. The head is sometimes tilted slightly forward. The thoracic spine may be flexed forward a bit.

**Swayback Posture.** The pelvis is gradually becoming the most anterior segment of the body, and there is an increase in lumbar lordosis. The knee joints tend to be hyperextended. Abdominal obesity worsens this posture. If you have poor posture stretching and strengthening may help.

Low/Hip Back	Test	ReTest
Lower Back - Ideal	Yes	-----
Lower Back - Lordotic	No	-----
Lower Back - Flat	No	-----
Lower Back - Swayback	No	-----
Hips - Iliac Crease - Level Posterior View - Level	Level	-----
Gluteal Fold Level - Posterior View	Level	-----
Pelvic Tilt (ASIS and PSIS)- Anterior View	No	-----
Hip List	No	-----



## 2) Flexibility and Back Health

**Being overly flexible or overly tight is not beneficial for back health.** An adequate (normal) and balanced (ie. symmetry: side vs side / right vs left) amount of flexibility is preferred. Tests: All motion should be without compensation or catching and should be pain free. Pain could be a sign of dysfunction. If you have pain seek medical consultation. Perform tests slowly.

\*Loss of low back range of motion might be an early indicator of developing osteoarthritis. especially if pain is present.

### Trunk Extension Test

To test the extension of the lumbar spine, lean backwards as far as possible. The amount of extension is measured from the trunk line and vertical line. Normally, 20–30 degrees of extension is possible without pain. Normal 20-30 degrees. Pain with this test could be a sign of early osteoarthritis.

### Trunk Flexion Test

Seated with feet flat on floor and knees at 90 degrees. Bend forward as much as you can in seated position. Normal is being able have chin come a few inches from knees or less.

### Trunk Rotation Test

Keeping your torso straight rotate torso to one side without moving your hips and then repeat to other side. Normal is 20-35 degrees from a vertical line that bisects your body into two halves.

### Trunk Lateral Flexion Test

Keeping your torso straight bend torso to one side and then repeat to other side. Normal is 35 degrees from a vertical line bisecting your body into two halves.

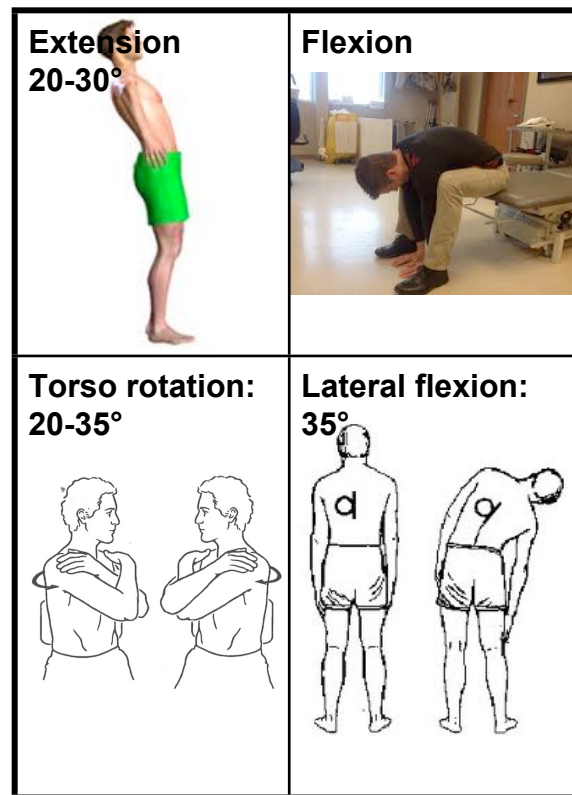
### Hamstrings Test

Standing with a leg straight in front, heel on floor, and toe up reach forward with both hands to first resistance barrier note position; repeat other side. Both sides should be equal where you should almost be able to touch your toes or be within a few inches.

Alternate Test: Lying on floor raise leg to first resistance barrier. with opposite leg straight. Normal 80 degrees. Tight hamstrings could cause a posterior pelvic tilt, which may lead to low back pain and the potential for a bulging disc..

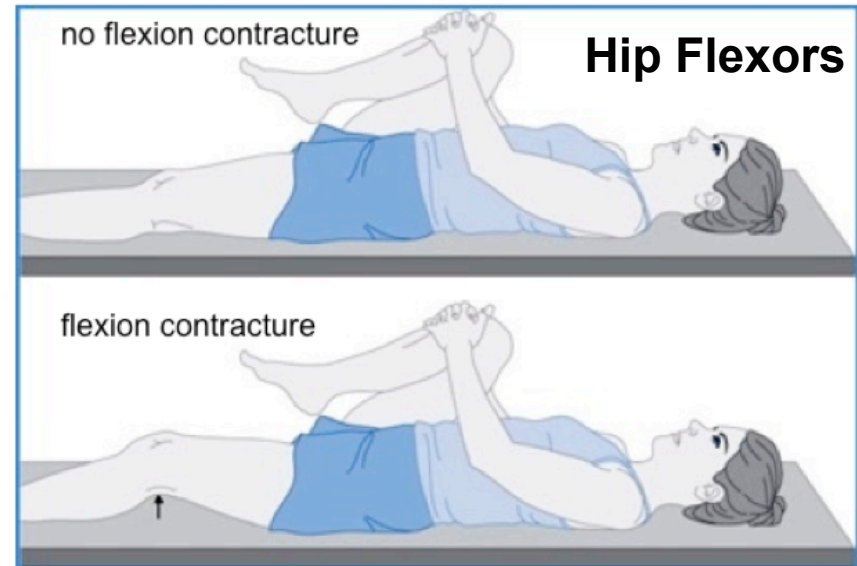
### Hip Flexors Test

Lye on back and keep natural curve to your spine. Pull one knee into chest while keeping natural curve to your back. This motion should not cause opposite (straight leg) to rise. If the opposite leg rises it could be a sign of an overly tight hip flexor to that leg. Normal is where the leg remains in contact to the floor. Tight hip flexors could cause a anterior pelvic tilt and accentuate lower back lordosis, which may lead to low back pain.



### Range of Motion Tests

Trunk Extension	Normal	-----
Trunk Flexion	Normal	-----
Trunk Rotation	Normal	-----
Trunk Lateral Flexion	Normal	-----
Hamstrings	Normal	-----
Hip Flexors	Normal	-----
Gluteals	Normal	-----



### LORDOTIC POSTURE



### Tightness

**Create Balance:** If you were tight in any of these areas perform stretches daily to these muscles groups. Each stretch should be done 1-3 x a day for 30-45 seconds each. Seek out a trainer to learn how to stretch a particular area. All of these tests can be used as stretches.

### Hip Flexors and Hamstrings Importance to Back Health

The hip flexors originate on the body of each lumbar vertebrae. Tightness in the hip flexor will cause a pull on the lumbar vertebrae causing an anterior pelvic tilt which may accentuate lower back lordosis. Part of the hamstring musculature originate on the posterior hip. Tightness in the hamstrings will cause a pull on the posterior pelvis causing an posterior pelvic tilt which may flatten the low back. Studies have shown that people with excessive lumbar lordosis or flat back have an increase risk of low back pain. See diagram to left of LORDOSIS. The hip flexor test is an easy way to determine tightness in the hip flexor. If you have tight hip flexors incorporate stretches specific to the hip flexor. Sitting for long periods can cause tightness to the hip flexors.

### 3) Movement and Back Health

#### Squat Movement Assessment

**How we squat, bend, push, pull, and move can impact our back. Therefore having an assessment of back specific movements can be helpful.**

**Squat and Lift:** This is one of the most common movements. Improper execution while squatting can ultimately lead to injury. Evaluation of squat mechanics is helpful towards proper back care programming. There are several key motions in the squat. Any error in motion may lead to injury.

1. *Ankle Mobility* - In the squat motion the ankle should bend 15 degrees (Ideal). Incorporate flexibility exercises if you exhibit less than 15 degrees of mobility at the ankle.
2. *Hip Mobility* - You should be able to properly initiate hinging at the hip when executing the squat movement (Ideal)(i.e., shifting the pelvis posteriorly). Proper hip flexion reduces stress on the knee joint and shifts the center of gravity towards the spine reducing spinal stress. In a proper hinge motion the buttocks are beyond the ankles and the knees are not past the toes.
3. *Lumbar Stability* - Your head should be up and the natural curves to the spine should be kept, especially at the low back, where the lumbar area is locked. and natural curve is kept (Ideal). Proper lumbar stability and thoracic mobility is paramount in squat movements, specifically when external load is added. Poor lumbar stability and thoracic mobility leads to excessive lumbar lordosis. Injury may result while loading the spine when the back is flexed (Flat or Rounded).
4. *Gluteal engagement* - You should feel that most of the work in the squat motion is being done by the gluteal (buttock) muscles and less from the quadriceps (muscles around the knee) (Ideal). If you feel that your knee muscles are doing most of the work you could have gluteal amnesia. If that is the case you need to strengthen the gluteal area.
5. *Total Body Position - Figure 4 Position* - When you are squatting or lifting an object you should make a figure 4 position (Ideal)(see diagram; see how the low back is in a neutral locked position). Most of the work should be done by the gluteal muscles.

Area	Test	ReTest
Ankle	Ideal	-----
Hip	Ideal	-----
Lumbar	Ideal	-----
Glutes	Ideal	-----
Figure 4	Ideal	-----
Head	Ideal	-----





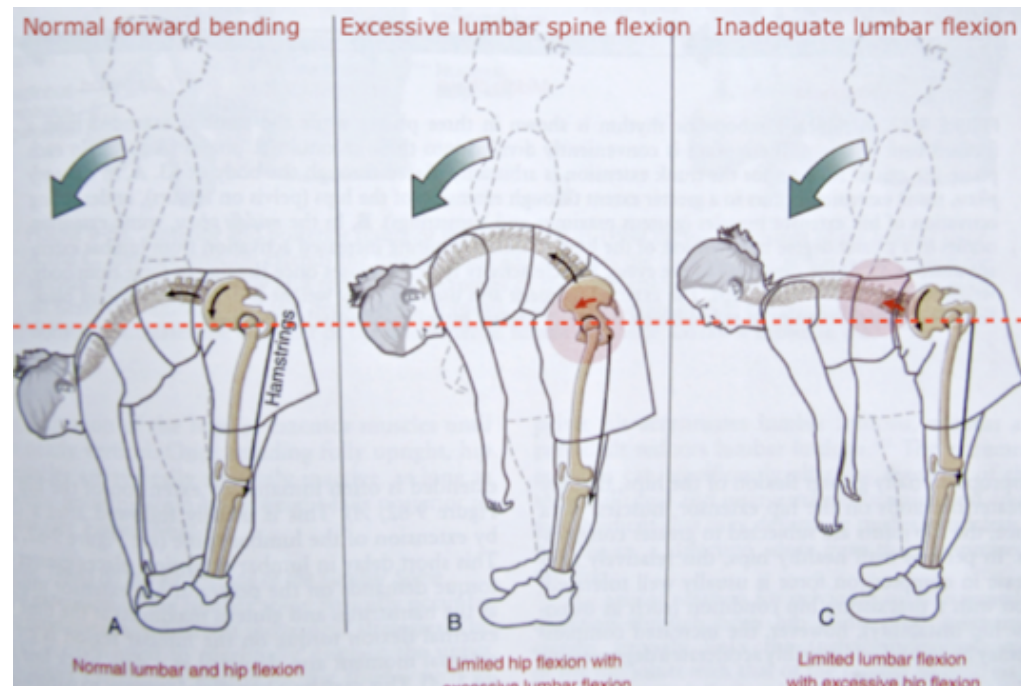
## Movement and Back Health

### Bend Movement Assessment

How we bend, lift, push, pull, and move can impact our back. Therefore having an assessment of back specific movement tests can be helpful.

**Bend Test:** Normal bending is a combination of lumbar flexion (20 degrees) and hip flexion (80 degrees - see figure A - shoulders below greater trochanter, see red dashed line). Subjects with low back pain often move more into lumbar flexion than hip flexion when bending over (see figure B). Excessive lumbar flexion may indicate tightness in the hip extensors (hamstrings and gluteals) and weakness in lumbar extensors (see B - where shoulders are above greater trochanter, see red dashed line). Inadequate lumbar flexion may indicate tightness in lumbar extensors. (see figure C - shoulder tip in line with the greater trochanter, see red dashed line).

<b>Test</b>	Test	ReTest
<b>Flexion</b>	Normal A.	-----



## 4) Core Ability and Back Health

The core of the body is broadly considered to be the torso and hips. Functional movements are highly dependent on this part of the body. Lack of core muscular development can result in a predisposition to injury and back pain. Core muscular endurance is more important than strength when it comes to back health. As important as strength and endurance is to back health a balanced amount from one side to the other and front and back is as important.

**Planks-** A very good score is a 90 second hold, while an acceptable hold is 45 seconds.

**Sidebridges-** A good score is a 120 second hold, while an acceptable hold is 90 seconds. Both sides should be the same (1:1 ratio). If not it could be a sign of a low back disorder. **A ratio of > 0.05 between sides may indicate a low back disorder.**







**Single Leg Bridge-**Balance should exist between sides; 1:1 ratio. A very good hold time is a 90 seconds.

**Leg Lift-**Lift both legs together 6 inches (15.24 cm) off surface and hold that position for 5 seconds. Both heels and calves should be cleared from the examining surface. If the patient cannot maintain this position for 5 seconds, the test is a failure. **A good score is a 30 second hold.**

**Flexion-**A very good hold time is a 90 seconds.

**Extension-**A very good hold time is a 120 seconds.

You can use many of these exercises as part of a well rounded core routine.

Age			
<b>Plank</b>			
<b>Plank Time (Secs)</b>			
<b>Plank Time Score</b>	0.0	0.0	
<b>Right Sidebridge</b>			
<b>RT Sidebridge Time (Secs)</b>	0.0	0.0	
<b>SidebridgeTime Score</b>	0.0	0.0	
<b>Left Sidebridge</b>			
<b>LT Sidebridge Time (Secs)</b>	0.0	0.0	
<b>SidebridgeTime Score</b>	0.0	0.0	
<b>Right Single Leg Bridge</b>			
<b>Single Bridge Time (Secs)</b>	0.0	0.0	
<b>Single Bridge Score</b>	0.0	0.0	
<b>Left Single Leg Bridge</b>			
<b>Single Bridge Time (Secs)</b>	0.0	0.0	
<b>Single Bridge Score</b>	0.0	0.0	
<b>Leg Lift</b>			
<b>Leg Lift (secs)</b>	0.0	0.0	
<b>Leg Lift Score</b>	0.0	0.0	
<b>Static Flexion</b>			
<b>Flexion (secs)</b>	0.0	0.0	
<b>Flexion Score</b>	0.0	0.0	
<b>Static Extension</b>			
<b>Extension (secs)</b>	0.0	0.0	
<b>Extension Score</b>	0.0	0.0	

**Interpreting Endurance Scores from Four Back Tests (Extension, Flexion, RSB and LSB)**

McGill suggests the following limits on discrepancies between the endurance scores. Scores outside these limits suggest unbalanced endurance-which may predict future lower back disorders. .

**Right-Side Bridge / Left Side Bridge Endurance Ratio  $\leq 0.05$**

McGill suggests the RSB/LSB ratio should not differ from unity (1) by more than 0.05 (i.e. the ratio should be between 0.95 and 1.05). **Mathematically this is written:  $0.95 \leq \text{RSB}/\text{LSB Ratio} \leq 1.05$ .** Outside of these values muscle balance is UNACCEPTABLE (within values ACCEPTABLE).

**Flexion / Extension Endurance Ratio  $\leq 1.0$**

A ratio less than or equal to 1.0 it is ACCEPTABLE; a ratio greater than 1.0 is UNACCEPTABLE.

**Side Bridge (either side) / Extension Endurance Ratio  $\leq 0.75$**

A result less than or equal to 0.75 it is ACCEPTABLE; a ratio greater than 0.75 is UNACCEPTABLE.

Age			
<b>RT/LT Sidebridge</b>			
<b>RT/LT Sidebridge Ratio</b>			
<b>RT/LT Sidebridge Score</b>			
<b>Flexion/Extension Ratio</b>			
<b>Flexion/Extension Ratio</b>			
<b>Flexion/Ext. Ratio Score</b>			
<b>Sidebridge/Extension Ratio</b>			
<b>Extension (secs)</b>			
<b>Extension Score</b>			
<b>Overall Core</b>			
<b>Overall Core Average</b>			
<b># Tests Performed</b>	8	8	
<b>Crunch Test</b>			
	0.0	0.0	
	0.0	0.0	



## Training the Core for Back Health

A solid core program should include some of the standard core exercises that you were tested on.

Perform 2-3 times a week.

1) Planks or Modified Planks (on knees for those who can not do a plank)

Hold for > 30 seconds for 1-3 sets or 10 seconds for 10 reps

2) Sidebridge or Modified Sidebridge (on knees for those who can not do a full sidebridge)

Hold for > 30 seconds for 1-3 sets or 5-10 seconds for 10 reps

3) Single leg bridge or Double bridge (use both legs to bridge-for those who can not do a single leg bridge)

Hold for > 30 seconds for 1-3 sets or 10-30 seconds for 5 reps

4) Bird-dog

Hold for > 30 seconds for 1-3 sets or 5-10 seconds for 10 reps

5) Modified Crunch

1-3 sets for 15 to 30 reps is a good goal



The **Bird Dog exercise** is a classic core exercise that emphasizes lower back strength and balance

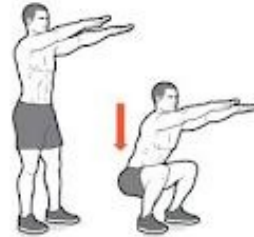


## Training for Back Health

### Additional Exercises

Perform Squats and Lunges for 1-3 sets at 10 to 15 reps 2-3 x a week. If you can not do a full squat or Lunge do a half motion and work up to full motion.

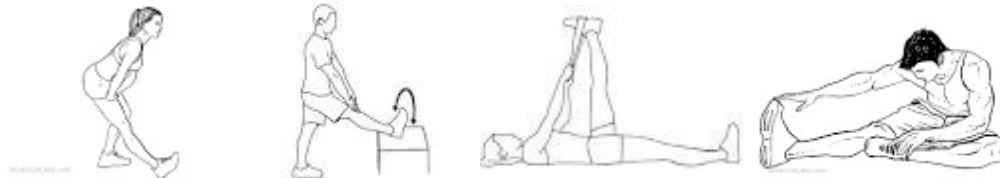
Bodyweight Squats



Bodyweight Lunges



Hamstring Stretches



Hip Flexor Stretches



Perform 3-7 x a week. Do each stretch for 1-3 sets and hold for 30-45 seconds. If your gluteals are tight ask for additional stretches.