



# Spondylolisthesis

## DESCRIPTION

Spondylolisthesis is the slippage of one or more vertebrae, the bones of the spine. Many causes of slippage of the vertebra are possible; these include stress fracture (spondylolysis), which is often seen in athletes, and degenerative and congenital causes. Spondylolisthesis tends to occur in adolescent athletes. The stress fracture occurs because the mechanisms of repair fail to keep up with the damage caused by the repetitive force. Spondylolisthesis may or may not cause symptoms and may be found only on x-ray examination.

## COMMON SIGNS AND SYMPTOMS

- Chronic dull ache in the low back that is worse with hyperextension and occasionally with flexion, such as bending at the waist
- Tightness of the hamstring muscles
- Occasionally, stiffness of the lower back
- Spasms of the muscles in the back
- Pain, numbness, or weakness affecting one or both lower extremities
- If chronic, wasting of affected muscles
- Loss of bowel or bladder function

## CAUSES

Spondylolisthesis is most commonly caused by congenital or degenerative factors, but it may also be related to athletic activities that cause a stress fracture (spondylolysis) of the vertebrae. Rarely, it can occur because of an acute fracture from a sudden blow, severe trauma, or benign or malignant tumor.

## FACTORS THAT INCREASE RISK

- Any sport that causes hyperextension (arching) of the back, either excessively with rotation or repetitively, especially football, gymnastics, diving, weight lifting, dancing, rifle shooting, wrestling, tennis, swimming, running, volleyball, track and field, rugby, and contact sports
- Poor physical conditioning (strength, flexibility)
- Inadequate warm-up before practice or play
- Family history of spondylolysis or spondylolisthesis
- Poor technique

## PREVENTIVE MEASURES

- Use proper sports technique.
- Wear proper protective equipment, and ensure a correct fit.

- Appropriately warm up and stretch before practice and competition.
- Maintain appropriate conditioning that includes back and hamstring flexibility, back muscle strength and endurance, and cardiovascular fitness.

## EXPECTED OUTCOME

Spondylolisthesis is usually curable with appropriate treatment.

## POSSIBLE COMPLICATIONS

- Frequent recurrence of symptoms, resulting in a chronic problem; appropriately addressing the problem the first time decreases the frequency of recurrence.
- Chronic pain and nonhealing of the fracture
- Delayed healing or delayed resolution of symptoms, particularly if sports are resumed too soon
- Prolonged disability
- Progression to even greater slippage, depending on the cause of slippage and the age of the patient

## GENERAL TREATMENT CONSIDERATIONS

Initial treatment consists of rest from the activities that cause pain, such as hyperextension, and medications and ice to relieve pain. As pain subsides, exercises to improve strength and flexibility and to learn proper back mechanics are started. Referral to a physical therapist or athletic trainer may be recommended for evaluation and further treatment, including transcutaneous electronic nerve stimulation (TENS). A back brace may also be recommended. Surgery may be necessary based on the cause of the spondylolisthesis, the age of the patient, degree of slippage, neurologic symptoms, and persistent pain despite appropriate conservative treatment. Surgery is performed to help the fracture to heal or, more often, to fuse two or more vertebrae together.

## MEDICATION

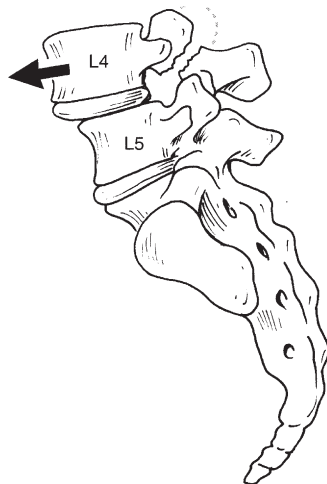
- Nonsteroidal antiinflammatory medications, such as aspirin and ibuprofen (do not take for 7 days before surgery), or other over-the-counter pain relievers, such as acetaminophen, are often recommended. Take these as directed by your physician, and contact your doctor immediately if any bleeding, stomach upset, or signs of an allergic reaction occur.
- Pain relievers may be prescribed as necessary. Use these only as directed. Do not use any heavy machinery or drive a car while taking these medications.

## HEAT AND COLD

- Cold is used to relieve pain and reduce inflammation for acute and chronic cases. It should be applied for 10 to 15 minutes every 2 to 3 hours as needed and immediately after any activity that aggravates your symptoms. Use ice packs or an ice massage.
- Heat may be used before performing stretching and strengthening activities prescribed by your physician, physical therapist, or athletic trainer. Use a heat pack or a warm soak.

## WHEN TO CALL YOUR DOCTOR

- Symptoms get worse or do not improve in 2 to 4 weeks despite treatment.
- You develop numbness, weakness, or loss of bowel or bladder function.
- New, unexplained symptoms develop. Drugs used in treatment may produce side effects.



**FIGURE 1** From Shankman GA: *Fundamental orthopedic management for the physical therapy assistant*, St Louis, 1997, Mosby Year Book, p 228.

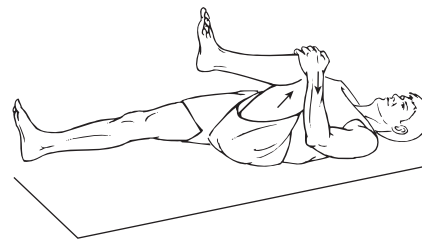
## RANGE OF MOTION AND STRETCHING EXERCISES

### Spondylolisthesis

The exact range of motion and stretching exercises *usually* need to be determined on an individual basis. Emphasis is placed on flexion exercises (rounding your back; pulling your knees to your chest) rather than extension exercises (arching your back), which increase the stresses on the spine that are related to this type of injury. The key point to remember is that if any exercise—range of motion, stretching, or strengthening—causes pain to radiate away from your back and toward your buttocks or legs, *stop the exercise immediately*. The purpose of these exercises is to begin to decrease the intensity and the size of the area of your pain.

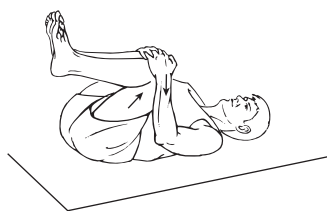
These are some of the *initial* exercises you may use to start your rehabilitation program, until you see your physician, physical therapist, or athletic trainer again, or until your symptoms resolve. Please remember:

- Flexible tissue is more tolerant of the stresses placed on it during activities.
- A *gentle* stretching sensation should be felt.
- If pain or other symptoms radiate away from your back toward your buttocks or legs, *stop the exercises immediately*.



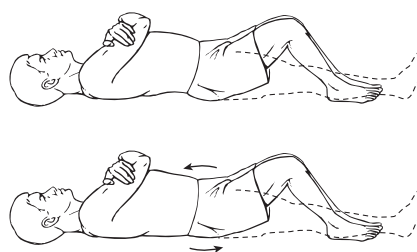
### RANGE OF MOTION • Lumbar Flexion

1. Lie on your back with both legs flat on the floor.
2. Bend one hip and knee up toward your chest.
3. Grasp your knee with your hands and pull it gently toward your chest. Keep the other leg flat on the floor.
4. Hold each repetition for \_\_\_\_ seconds, and return to the starting position. Repeat on the opposite side.
5. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



**RANGE OF MOTION • Lumbar Flexion**

1. Lie on your back with both legs flat on the floor.
2. Bend one hip and knee up toward your chest and then the other.
3. Grasp your knees with your hands and pull them gently toward your chest.
4. Hold this stretch position for \_\_\_\_ seconds.
5. Release one knee, allowing the leg to return to the floor, then release the other.
6. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



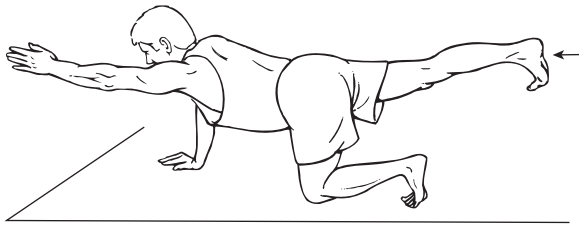
**STRENGTH • Pelvic Tilt**

1. Lie on the floor as shown. You may do this exercise with your knees bent or straight, but it is harder with the knees straight.
2. Tighten your stomach and buttock muscles and push back flat onto floor. If you do this properly, your pelvis will rotate in the direction shown in the diagram.
3. Hold each repetition for \_\_\_\_ seconds. Count out loud, and do not hold your breath.
4. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

**STRENGTHENING EXERCISES**  
Spondylolisthesis

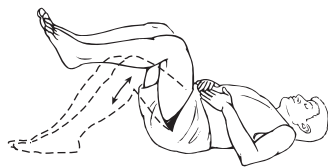
These are some of the *initial* exercises you may use to start your rehabilitation program, until you see your physician, physical therapist, or athletic trainer again, or until your symptoms resolve. Although emphasis is placed on strengthening your stomach muscles, other exercises are presented that promote maintaining proper posture and balance in all of the muscles that surround the spine. Please remember:

- Strong muscles with good endurance tolerate stress better.
- Do the exercises as *initially* prescribed by your physician, physical therapist, or athletic trainer. Progress slowly with each exercise under their guidance, gradually increasing the number of repetitions and weight used.



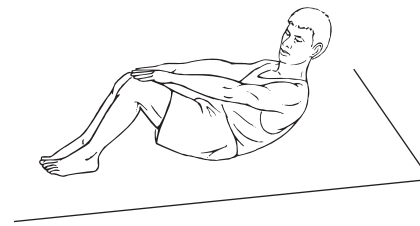
### STRENGTH • Quadruped Lift

1. Position yourself on your hands and knees.
2. Keep your back flat and parallel to the floor. *Do not allow it to arch or move during this exercise.*
3. Lift your *left* arm up to shoulder height. Hold this position and lift your *right* leg to the same height.
4. Balance and hold this position for \_\_\_\_ seconds. Count out loud, and do not hold your breath.
5. Return to starting position, and repeat with the opposite arm and leg.
6. Repeat this sequence \_\_\_\_ times, \_\_\_\_ times per day.



### STRENGTH • Double-Leg Hold

1. Lie on your back with your hips and knees bent.
2. Bend your legs toward you as shown.
3. Tighten your stomach muscles, and press your back into the floor.
4. Keeping your back flat on the floor, *slowly* lower your legs to the floor. When you feel your back start to arch, stop and hold that position. *Count out loud to \_\_\_\_, and do not hold your breath.*
5. Return to the starting position.
6. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.



### STRENGTH • Partial Sit-ups

1. Lie flat on your back with your hands resting on your thighs.
2. Tuck your chin to your chest, and *slowly* sit up, until you touch the top of your knees.
3. Hold this position for a count of \_\_\_\_\_. *Count out loud, and do not hold your breath.*
4. Return to the starting position.
5. Repeat this exercise \_\_\_\_ times, \_\_\_\_ times per day.

### POSTURE AND BODY MECHANICS Spondylolisthesis

Maintaining the most appropriate posture and using correct body mechanics can have a significant effect on back pain. The following are basic suggestions regarding proper posture and body mechanics. These should be specifically discussed with your physician, physical therapist, or athletic trainer. Please remember:

- Good posture minimizes the stress and strain on any portion of your spine.
- Incorporate these posture principles into all of your daily and recreational activities.

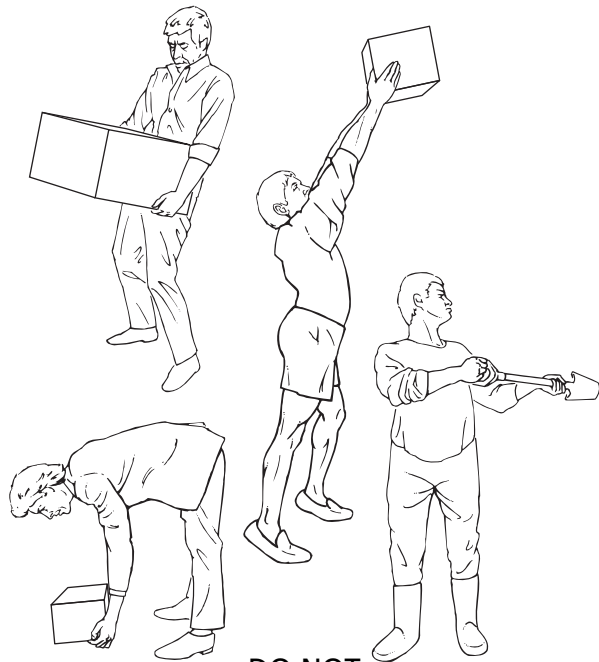
**CORRECT LIFTING TECHNIQUES**



**DO**

- Lift with your legs, keeping your back straight.
- Use a footstool for objects that need to be placed or retrieved from high locations.
- Use two people to lift heavy or awkward objects.

**INCORRECT LIFTING TECHNIQUES**



**DO NOT**

- *Do not* lift with your legs straight and your back bent.
- *Do not* lift objects that are too heavy over your head.
- *Never* lift and twist at the same time.
- *Do not* lift an object that is too heavy or awkwardly shaped without help.

**CORRECT SITTING POSTURES**



**DO**

Sit erect. Use a lumbar roll, cushion, or pillow. Use a chair that has a high enough back to support your back up to your shoulder blades.

**INCORRECT SITTING POSTURES**



**DO NOT**

Do not slouch or slump. Maintain a proper position in the chair.