

ENTITLEMENT ELIGIBILITY GUIDELINES SPONDYLOLISTHESIS AND SPONDYLOLYSIS

MPC 01414
ICD-9 756.12; 738.41; 756.11

DEFINITION

Spondylolisthesis is generally defined as an anterior or posterior slipping or displacement of one vertebra on another. A unilateral or bilateral defect (lesion or fracture) of the pars interarticularis without displacement of the vertebra is known as Spondylolysis. The pars interarticularis is the posterior plate of bone that connects the superior and inferior articular facets of a vertebral body.

If a non-pensioned Spondylolisthesis is responsible for a neurological syndrome or disease, such as cauda equina syndrome, entitlement should be sought for the neurological syndrome or disease of which Spondylolisthesis is a part.

DIAGNOSTIC STANDARD

A diagnosis from a qualified medical practitioner is required. Investigations must include x-rays and/or CT scan, and reports are to be provided on application.

The level of the Spondylolysis/Spondylolisthesis must be identified.

ANATOMY AND PHYSIOLOGY

Most spondylolytic defects and cases of Spondylolisthesis are congenital. The prevalence of Spondylolisthesis in the general population is about 5% and is about equal in men and women. Spondylolysis and Spondylolisthesis most frequently involve L5, although L4 can also be affected and, rarely, more proximal levels.

Normally the inferior articular facets of the fifth lumbar vertebra prevent the body of this vertebra from being displaced anteriorly on the sacrum. Bilateral defects in the pars interarticularis make the neural arch a loose fragment, causing a loss in osseous continuity between the inferior articular facets and the body of the fifth lumbar vertebra, and allowing the body of the vertebra to gradually become displaced anteriorly. In

addition, as the slip progresses, the foramen elongates and flattens, resulting in a foraminal stenosis. When the loose neural arch is removed, the reparative attempts by bone are evidenced in the hypertrophy of the cephalad pars stump. This overgrowth or elongation results in a "hook" that may rest directly on the nerve roots. This "hook" must be removed if the individual is to be relieved of radicular symptoms.

Spondylolisthesis by its nature causes instability of the spine. This instability has an adverse effect on the disc immediately below the displaced vertebra and can influence the development of degenerative changes to a moderate to severe degree.

Spondylolisthesis has been classified into grades I, II, III, IV and V depending on the severity of the displacement of the vertebra above on the vertebra below. In severe cases involving the lumbar spine, cauda equina syndrome can occur.

The following is a classification of Spondylolisthesis and Spondylolysis according to cause:

Type I. Dysplastic: This type results from congenital abnormalities of the upper sacral facets or inferior facets of the fifth lumbar vertebra that allow slipping of L5 on S1. There is no pars interarticularis defect in this type. The sacrum is not strong enough to withstand the weight and stress. Thus, the pars and inferior facets of L5 are deformed. If the pars elongates, it is impossible to differentiate it by x-ray from the isthmic (type II b) Spondylolisthesis. If the pars separates, it becomes impossible to differentiate it by x-ray from the isthmic lytic (type II a) Spondylolisthesis. This type is also associated with sacral and neural arch deficiencies. It has a familial tendency.

Type II. Isthmic: This type results from a defect in the pars interarticularis that allows forward slipping of L5 on S1. Three types of isthmic spondylolistheses are recognized:

- a. a stress (fatigue) fracture of the pars interarticularis - lytic
- b. an elongated but intact pars interarticularis
- c. an acute fracture of the pars interarticularis

The lytic subtype a results from the separation or dissolution of the pars. The incidence of this type of Spondylolisthesis increases from less than 1 percent in children 5 years of age to 4.5 percent in children 7 years of age. The remaining 0.8 to 1 percent increase occurs between the ages of 11 to 16 years, presumably because of stress fractures caused by athletic activity. Extension movements of the spine, with lateral flexion, can increase the shearing stress at the pars interarticularis and result in Spondylolysis.

Although this subtype has a strong hereditary tendency, it makes up only half of the

dysplastic group. The elongated pars (subtype b) is believed to result from micro fractures that heal with an elongated pars rather than from a lytic lesion. Acute pars fractures (subtype c) always result from significant trauma; these are rare and most frequently occur with Spondylolysis rather than with Spondylolisthesis.

Type III. Degenerative: This lesion results from intersegmental instability of long duration with subsequent remodeling of the articular processes at the level of involvement. Multiple small compression fractures of the inferior articular process of the vertebra that slips forward also have been postulated as a cause. The articular processes change direction to a more horizontal position as the slip progresses. This lesion is 4 times more frequent in females than in males and is 6 times more likely to occur at L4-5 than at the adjacent levels. This lesion is generally not seen in individuals younger than 40 years of age.

Type IV. Traumatic: This type results from fractures in the area of the bony hook other than the pars interarticularis, such as the pedicle, lamina, or facet, that allow a slip to occur.

Type V. Pathological: This type results from generalized or localized bone disease and structural weakness of the bone such as *osteogenesis imperfecta*.

CLINICAL FEATURES

A. Symptoms

1. Children/adolescents

Spondylolysis and Spondylolisthesis usually cause no symptoms in children; however, many seek medical evaluation because of a postural deformity or gait abnormality. Pain most often occurs during the adolescent growth spurt and is predominantly backache, with only occasional leg pain. Symptoms are exacerbated by high activity levels or competitive sports and are diminished by activity restriction and rest. The back pain probably results from instability of the affected segment, and the leg pain is usually related to irritation of the L5 nerve root.

2. Adults

In Spondylolysis, symptoms are often absent. Defects are then discovered only incidentally on x-ray made for other purposes. In Spondylolisthesis, injury may aggravate (permanently worsen) any symptoms, but rarely does a single injury

cause symptoms in a person who previously had none. Symptoms generally begin insidiously during the second or third decade as an intermittent dull ache in

the lower back, present with increasing frequency during walking and standing. Later, pain may develop in the buttocks and thighs, and still later unilateral sciatica may develop.

B. Signs

There may be no objective signs in Spondylolysis, or in first or second degree Spondylolisthesis. The finding of Spondylolysis on x-ray in an adult is likely to be incidental, and not the cause of back pain if that pain did not commence in childhood or adolescence. Tightened hamstrings are present in the majority of those who are symptomatic. Tenderness and spasms of the paravertebral muscles may be present at the level of the vertebral defect and surrounding segments. Pain may be induced and increased by certain movements.

In Spondylolisthesis with a significant slip, a step-off at the lumbosacral junction is palpable, motion of the lumbar spine is restricted, and hamstring tightness is evident on straight leg raising. As the vertebral body displaces anteriorly, the individual assumes a lordotic posture above the level of the slip to compensate for the displacement. Adults may have objective signs of nerve root compression, such as motor weakness, reflex change, or sensory deficit. These signs are seldom seen in children.

PENSION CONSIDERATIONS

A. CAUSES AND/OR AGGRAVATION

To apply these pension considerations it is necessary to know the vertebral level involved.

THE TIMELINES CITED BELOW ARE NOT BINDING. EACH CASE SHOULD BE ADJUDICATED ON THE EVIDENCE PROVIDED AND ITS OWN MERITS.

1. Congenital for Spondylolysis or Spondylolisthesis

Spondylolysis, in most cases, is congenital.

Dysplastic Spondylolisthesis results from congenital abnormalities of the upper

sacral facets or inferior facets of the fifth lumbar vertebra that allow slipping of L5 on S1.

2. Repetitive trauma in clinical onset or aggravation of Spondylolisthesis and/or Spondylolysis

For repetitive trauma to cause or aggravate Spondylolisthesis and/or

Spondylolysis, the following should be evident:

Signs/symptoms of Spondylolisthesis and/or Spondylolysis at the time of the repetitive trauma, or within 2 to 3 days of cessation of the trauma; and Medical attention sought for the signs/symptoms, and x-rays conducted which demonstrate Spondylolisthesis and/or Spondylolysis .

Repetitive trauma means extension movements of the spine, with lateral flexion, which increase the shearing stress at the pars interarticularis and result in a stress fracture.

Repetitive trauma may be associated with, but not limited to, soldiers carrying heavy backpacks for prolonged periods and North American football players.

3. A severe trauma to the vertebral spine in the clinical onset or aggravation of Spondylolysis or Spondylolisthesis

For severe trauma to the vertebral spine to cause or aggravate Spondylolysis or Spondylolisthesis, the following criteria should be met:

- (1) The trauma, when in the form of an acute fracture of the vertebral arch or a vertebral dislocation at the level affected by the trauma, occurs at the time of clinical onset or aggravation of Spondylolysis; or*
- (2) The trauma, when in the form of a vertebral facet joint dislocation, occurs at the time of clinical onset or aggravation of Spondylolisthesis; or*
- (3) The trauma, when in the form of a fracture of the pedicle, pars interarticularis, or facet joints of the vertebral arch occurs within 6 weeks prior to clinical onset of spondylolisthesis. Please note: In the case of cervical spondylolisthesis, the fracture may also occur in the posterior cortex of the axis vertebra, i.e. at the C1-C2 levels.*

Severe trauma to the lumbar spine means a major, high impact, direct injury to the lumbar spine which produces immediate lumbar pain and precludes unaided ambulation for a period of at least 2 weeks, and is associated with other fractures and/or significant soft tissue injuries. Examples are as follows:

- a fall from a significant height directly onto the back;
- a major motor vehicle accident;
- a blow across the back by a heavy, high momentum object, e.g. a falling tree.

Severe trauma to the thoracic spine means a major, high impact, direct injury to the thoracic spine which produces immediate thoracic spine pain and precludes unaided ambulation for a period of at least 2 weeks, and is associated with other fractures and/or significant soft tissue injuries. Examples are as follows:
a fall from a significant height directly onto the back;
a major motor vehicle accident;
a blow across the thoracic spine by a heavy, high momentum object, e.g. a falling tree

Severe trauma to the cervical spine means a major injury to the cervical spine which produces immediate cervical spine pain which persists for at least 2 weeks, and is usually associated with other fracture or significant soft tissue injuries to the head and/or neck. Examples are as follows:
a motor vehicle accident;
a diving accident;
a fall from a significant height.

4. A posterior spinal fusion of a segment of adjoining vertebra, prior to clinical onset only of Spondylolysis or Spondylolisthesis

Posterior spinal fusion means a surgical procedure involving immobilization of the posterior elements of two or more vertebrae by the use of bone grafting, in the absence of immobilization of the lateral elements, of the same vertebrae. This type of surgery produces an abnormality in the functional loading of the adjacent vertebrae, and can result in either Spondylolysis or Spondylolisthesis.

5. Posterior spinal decompression surgery, at the level of the involved vertebra, prior to clinical onset or aggravation of Spondylolysis or Spondylolisthesis

For posterior spinal decompression surgery to cause Spondylolysis or Spondylolisthesis, the surgery may occur any time before clinical onset of either condition.

For posterior spinal decompression surgery to aggravate Spondylolysis or Spondylolisthesis, signs/symptoms of Spondylolysis or Spondylolisthesis should occur within 10 years of the surgery.

6. Spondylosis affecting the facet joints at the involved intervertebral level prior to clinical onset only of Degenerative Spondylolysis or Degenerative Spondylolisthesis

7. A destructive bone lesion involving the affected vertebral arch and/or vertebral body prior to clinical onset or aggravation of Spondylolysis or Spondylolisthesis

A destructive bone lesion means lytic or erosive lesions of the bone resulting from pathology such as Paget's disease, Rheumatoid Arthritis, benign and malignant tumours, tuberculosis, and osteomyelitis.

8. Inability to obtain appropriate clinical management

B. MEDICAL CONDITIONS WHICH ARE TO BE INCLUDED ENTITLEMENT/ASSESSMENT

Spondylolysis, in the absence of spondylolisthesis, does not cause pathological changes in the disc, or neurological deficits.

Spondylolisthesis includes:

- osteoarthritis in the affected area of the spine
- degenerative disc disease in the affected area of the spine
- cauda equina syndrome in the affected area of the spine

C. COMMON MEDICAL CONDITIONS WHICH MAY RESULT IN WHOLE OR IN PART FROM SPONDYLOLYSIS AND SPONDYLOLISTHESIS AND/OR THEIR TREATMENT

REFERENCES FOR SPONDYLOLYSIS AND SPONDYLOLISTHESIS

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