

## Tethered Cord Syndrome

Tethered cord syndrome is a neurological disorder in which the spinal cord is attached or tethered to a structure within the spine. This condition may be caused by a thickened filum terminale, meningeal adhesions, or spinal canal obstructions (e.g. masses). Patients with this condition may present with back pain, urinary/fecal incontinence, or ataxia. Diagnosis is typically achieved by MRI, which shows an abnormally low position of the conus medullaris. Treatment involves surgery to release or untether the spinal cord.



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### Pathophysiology

#### Thickened Filum Terminale

##### Thickened Film and Terminator

A tethered cord can be caused by a thickened or fatty filum terminale. Normally, the filum terminale is made of fibrous tissue that helps to anchor the spinal cord in its proper place. It is highly elastic and connects the end of the spinal cord to the tailbone (sacrum) in order to allow movement of the spinal cord. If abnormal fibrous tissue grows, the filum terminale loses its elasticity and becomes a mechanical cause of tethered cord syndrome.

#### Meningeal Adhesions

##### Men-in-tights Stuck to Spinal-cord

Adhesion of the meninges to the spinal cord or surrounding tissue is a possible cause of tethered cord syndrome.

#### Spinal Canal Obstruction

##### Spine Canal Obstructed

Congenital causes such as spina bifida can cause tethered cord syndrome. Masses that could tether the spinal cord can also be caused by secondary obstructions such as lipomas, malignant tumors, or dermoid cysts.

### Clinical Features

#### Back Pain

##### Back Pain-bolt

The back pain seen in tethered cord syndrome is motion-dependent pain that is worsened by activity and relieved with rest.

#### Urinary and Fecal Incontinence

##### Urine and Feces In-continents

Children may experience bladder and bowel dysfunction. Typically this involves loss of bladder and bowel control because of injury to parasympathetic structures in the lower spinal cord.

#### Ataxia

##### A-taxi

Symptoms of this disease include sensory and motor defects such as ataxia, leg pain, numbness, and tingling. Children may have delayed motor milestones, such as late walking. Toddlers may stumble after learning to walk.

### Diagnosis

#### MRI

##### M-R-eyes Machine

A spinal MRI will show an abnormally low position of the conus medullaris below the L2-3 region. Imaging can also show a thickened filum terminale.

## Treatment

### Surgery

#### Surgeon

Surgery involves removing structures, such as adhesions or lipomas to free the spinal cord. If left untreated, the patient's motor and sensory symptoms may worsen. Children may become paraplegic as the tethered spinal cord lengthens.<br>