

# Spinal Deformities

**Spinal Deformity** refers to a spectrum of medical conditions affecting the straight alignment of the normal human spine. These deformities can occur as a result of birth defect, a child's growth, aging, injury, or previous spine surgery.

## Types of Spinal Deformities



is a condition in which the spine curves laterally (side-to-side), forming an "S" or "C" shape when viewed from the back. This condition may cause the patient's upper body to shift to one side and is the most common form of spinal deformity.



**Kyphotic deformity** in which the spine forms an excessive outward curve (back-to-front), resulting in an abnormal rounding of the upper back. This condition may cause a person's upper body to stoop forward (a 'hunchback').

**Kypho-scoliosis** is a condition involving both kyphotic and scoliotic spinal deformities.

Spinal deformities can occur in any regions of the spine: neck (cervical spine), chest (thoracic spine) and abdomen regions (lumbar/sacral spine). The deformities can occur in both children and adult populations and have different clinical symptoms. The most common form of spinal deformity in children is **adolescent idiopathic scoliosis** which is usually presented after the age of 10 and usually does not have any clinical symptoms. The deformity is usually detected through the School Health Screening Services from the Health Promotion Board.

**Adult degenerative scoliosis** or **kypho-scoliosis** typically occurs after 40 years of age. In addition to the spinal deformity, the patient may complain of back pain due to the arthritic degeneration of the spine. The pain may radiate down from the spine to the legs, indicating spinal nerve compression.

## Location



## Contact Us

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# Spinal Deformities

## Common Causes of Scoliosis in Children

● **Idiopathic Scoliosis** does not have any known causes. Although many causes have been implicated (growth hormone, melatonin, heavy schoolbag, sports, physical activities, poor standing/sitting postures, none of these was conclusive. Recent research shows genetic factors may be the cause of scoliosis. There is no conclusive evidence to show chiropractic or traditional medicine halts the scoliosis progression. The prevalence of adolescent idiopathic scoliosis in Singaporean schoolgirls is 1.4% for 11-12 years of age and 2.2% for 13-14 years of age. Scoliosis is more common in girls than in boys (ratio of 7:1) and it affects all races.

● **Congenital Scoliosis** is a result of congenital birth defects in the spine and is often associated with other organ defects.

● **Neuromuscular Scoliosis** is a result of abnormal control of the nerves and muscles that support the spine. Common causes of this type of scoliosis are conditions such as cerebral palsy or muscular dystrophy.

## Common Causes of Adult Degenerative Scoliosis

● Degenerative progression of pre-existing, unrecognised idiopathic scoliosis.

● Scoliosis may also occur in patients with no pre-existing spinal deformity. This is due to an age-related, uneven degeneration of the intervertebral discs and facet joints, resulting in an asymmetric alignment of the spine.

● The deformity is often made worse with occurrence of osteoporotic spinal fracture.

## Physical Signs of Scoliosis

Patients who have scoliosis may exhibit some of the following signs:

- Uneven shoulder height
- Tilting of the body to one side when viewed from the patient's back
- "S" or "C" shaped curve in the back
- A tilt in the waistline
- Clothes do not fit properly
- Appearance of the rib hump when patient bends forward



Fig 1: A rib hump seen from the back

## Aims of Scoliosis Treatment

The primary aim for spinal deformity treatment is to arrest the progression of scoliosis and maintain a balanced spinal alignment. Uncontrolled scoliosis progression may result in severe deformity and restrictions of lungs and heart functions.

## Scoliosis Treatment Strategies

The general treatment principles are outlined in the following table:

Cobb angle (Magnitude of curve)	State of skeletal maturity	Recommended treatment
Less than 20°	Immature	Observation
Between 20° to 45°	Immature	Bracing
Greater than 45°	Immature	Surgery
Greater than 50°	Mature	Surgery

● **Observation** in which a regular X-ray examination every 6-12 months is required. Currently, there is no evidence to suggest that chiropractic treatment, swimming, physiotherapy or any dietary supplement can correct scoliotic deformity.

● **Bracing** is prescribed to stop the progression of mild scoliotic deformity in a skeletally immature spine. Bracing for more than 18 hours per day is recommended. The treatment is terminated when either the spine has reached full skeletal maturity e.g. >16 years of age for girls; >17 years of age for boys or the brace is unable to halt the progression of the curve.

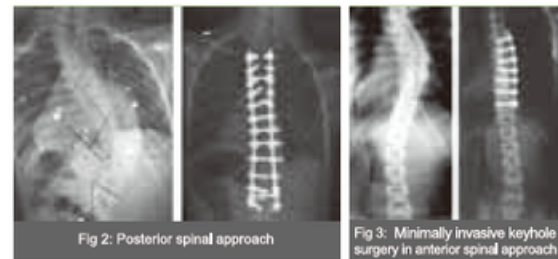


Fig 2: Posterior spinal approach

Fig 3: Minimally invasive keyhole surgery in anterior spinal approach

● **Surgery** aims to fuse (join together) the vertebrae in a balanced spinal alignment and arrest deformity progression. This is usually performed via a long skin incision along the back of the spine with the application of spinal implants to hold the spine in position (Fig 2). In suitable patients, the surgery can be performed through thoracoscopic or minimally-invasive keyhole surgery that requires only 4 to 5 small incisions through the side of the chest wall (Fig 3). For adult degenerative scoliosis, decompression of the compromised nerve will also be prescribed as part of the surgical treatment.

## Post-operative Care

Most patients can return to school or work 3 to 4 weeks after surgery. In the first 6 months after surgery, jumping, twisting, running and heavy lifting (more than 5kg) should be avoided. Patients may be exempted from Physical Education for up to a year. As each individual's recovery is different, a doctor's advice should be sought before any participation in physical activities and sports. If a brace is prescribed, it should be worn whenever one is in an upright position. Air travel is fine as the metallic spinal implants are located deep in the body and should not set off any metal detectors during international flight travel.

## Specialised Care

As the field of spinal deformity research is rapidly evolving and the complexity of the surgical treatment is often demanding, a highly specialised patient care is needed to ensure an optimal clinical outcome.

At the National University Hospital, we have a team of spine surgeons trained in spinal deformity treatment. Together with paediatricians, specialised nurse-clinicians and physiotherapists, as well as a well-equipped post-operative patient monitoring facility, we offer a plethora of specialised and comprehensive services for the treatment and management of spinal deformities and diseases.