CONDITION

Scoliosis

Scoliosis is a sideways curve and rotation of the spine.

WHAT IT IS
Sideways spinal curvature with rotation

BODY SYSTEM
Bones, joints, and muscles

MAIN SYMPTOMS
Uneven shoulders, uneven hips, rib prominence, back pain

WHAT CAUSES IT
Usually unknown; sometimes congenital, neuromuscular, or age-related

HOW IT IS DIAGNOSED
Standing spine X-rays measuring the Cobb angle

MAIN TREATMENT
Monitoring, bracing, physical therapy, or surgery

CAN IT BE CURED?
Sometimes - mild childhood curves may resolve

IS IT AN EMERGENCY?
Sometimes - new weakness or loss of bladder or bowel control

LONG-TERM OUTLOOK
Most mild curves allow active, healthy lives

Overview

Scoliosis is a condition in which the spine curves sideways and usually twists or rotates. This can make the shoulders, ribs, waist, or hips look uneven. It is sometimes called curvature of the spine.

A small amount of natural front-to-back curvature is normal. In scoliosis, the abnormal curve is seen when looking at the spine from behind or in front. On an X-ray, scoliosis is generally defined as a curve measuring at least 10 degrees.

Scoliosis can begin in infancy, childhood, or adolescence. Adolescent idiopathic scoliosis is the most common type. "Idiopathic" means that there is no single known cause. Adults may have scoliosis left over from childhood or develop it as spinal joints and discs wear with age.

Many curves are mild and need only periodic monitoring. Larger curves may progress during

growth, affect appearance, or cause discomfort. Very severe curves can reduce the space available for the lungs, although this is uncommon and is mainly associated with severe curves that begin early in life.

Scoliosis is not caused by slouching, carrying a school bag, or sleeping in the wrong position. It is also not the same as poor posture, although posture can change how unevenness looks.

Symptoms

Mild scoliosis often causes no pain or other physical symptoms. It may first be noticed during a routine examination, sports physical, or clothing fitting.

Visible signs can include:

Teenagers with scoliosis may have back discomfort, but significant or persistent pain should not automatically be blamed on the curve. Another cause may need to be considered.

Adults are more likely to report back pain, stiffness, tired back muscles, or difficulty standing upright. Age-related scoliosis may also narrow the spaces around spinal nerves. This can cause leg pain, tingling, numbness, or weakness.

Breathing difficulty is not typical of mild or moderate scoliosis. It may occur with a very large curve, particularly one involving the chest that developed during early childhood.

- One shoulder sitting higher than the other
- One shoulder blade appearing more prominent
- One hip sitting higher or farther out
- An uneven waist or a leaning posture
- Ribs on one side becoming more prominent when bending forward
- Clothes hanging unevenly

Causes and risk factors

Most scoliosis in otherwise healthy children and teenagers is idiopathic, meaning its exact cause is unknown. It may run in families, but inheritance is complex. Having a relative with scoliosis does not mean that you or your child will necessarily develop it.

Other types have identifiable causes.

Congenital scoliosis begins before birth because some spinal bones do not form normally. The curve may not be noticed until later in childhood.

Neuromuscular scoliosis is associated with conditions affecting nerves or muscles, such as cerebral palsy, muscular dystrophy, or spinal cord disorders. Muscle imbalance and reduced trunk support can allow the curve to progress.

Syndromic scoliosis occurs as part of another condition affecting connective tissue, bones, or development.

Degenerative adult scoliosis develops as spinal discs and joints wear unevenly with age. Osteoporosis, which weakens bones, may contribute to collapse or worsening of an existing curve.

For adolescent idiopathic scoliosis, the main concern is whether a curve will progress. Progression is more likely when substantial growth remains, the curve is already larger, or measurements increase over time. Girls and boys can develop small curves, but girls are more likely to develop curves that require treatment.

Diagnosis

An examination usually begins with looking at the shoulders, ribs, waist, hips, balance, and walking pattern. You may be asked to bend forward with your arms hanging down. This can make rib or lower-back prominence easier to see.

A scoliometer is a small handheld tool that measures trunk rotation during the forward-bend test. It can help decide whether an X-ray is needed, but it does not confirm scoliosis.

The usual confirming test is a standing X-ray of the whole spine. A clinician measures the Cobb angle , which is the angle between selected vertebrae, or spinal bones. The curve's location, direction, and size are recorded.

If you are still growing, the X-ray may also provide clues about skeletal maturity. Growth stage is important because curves can change more quickly during growth spurts.

Repeat X-rays may be used to check whether a curve is progressing. Imaging is kept to what is clinically needed to limit radiation exposure.

MRI is not routinely required for typical adolescent idiopathic scoliosis. It may be considered when there are unusual curve features, rapid progression, significant pain, abnormal nerve findings, or concern about the spinal cord.

Treatment and management

Treatment is based on the type and size of the curve, whether it is progressing, symptoms,

age, and how much growth remains. A small curve in a growing child is managed differently from a painful age-related curve in an adult.

Observation is common for mild curves. This means scheduled examinations and, when needed, repeat standing X-rays. Observation is active monitoring rather than ignoring the condition.

Bracing may be offered to a child or teenager who is still growing and has a moderate curve at risk of progressing. A brace aims to reduce the chance that the curve becomes larger. It does not usually make an established curve permanently straight.

Braces are fitted to the individual. The type of brace and recommended wearing schedule are chosen by the treating team. How consistently it is worn can affect how well it works.

Physical therapy and exercise can improve strength, flexibility, posture, balance, and comfort. Scoliosis-specific exercises may help some people control posture or support treatment. Exercise alone should not be assumed to stop every growing curve, and it does not replace bracing when a brace is recommended.

For adults, management often focuses on pain and function. It may include activity, physical therapy, general pain-relief approaches, and treatment of osteoporosis when present. Spinal injections are sometimes used for nerve-related pain, but they do not correct the curve.

Surgery may be considered for severe or clearly progressive curves, major imbalance, nerve problems, or symptoms that have not improved with non-surgical care. Spinal fusion is the most established operation. It joins selected vertebrae so they heal into one stable section, often using rods and screws to correct and hold the spine.

Very young children may need different procedures that allow continued growth. Surgery can substantially correct and stabilize a curve, but it does not always produce a perfectly straight spine or remove every symptom.

Complications

Most people with mild scoliosis do not develop serious complications.

Possible longer-term effects include persistent unevenness, back discomfort, reduced spinal flexibility, or gradual curve progression. Adults may develop arthritis in spinal joints or narrowing around nerves, leading to pain or neurological symptoms.

A large chest curve can limit lung development or breathing capacity, especially when it starts early in childhood. This is unusual in mild adolescent scoliosis.

Scoliosis can also affect confidence and body image. Brace wear may feel especially difficult

during school, sports, or social activities. Emotional support and practical planning can be valuable parts of care.

Surgical complications can include infection, bleeding, nerve injury, failure of bones to fuse fully, or the need for another operation. The surgical team discusses these risks in relation to the planned procedure.

Prevention

Most childhood scoliosis cannot be prevented. Idiopathic scoliosis has no known single cause, and congenital scoliosis begins while the spine is developing before birth.

Good posture, exercise, and carrying a backpack correctly are helpful for general comfort and fitness, but they do not prevent structural scoliosis. Screening may identify a curve earlier, but it does not stop the condition from developing.

Age-related spinal changes cannot always be prevented. Regular activity, avoiding smoking, and supporting bone health may reduce some wider spine and fracture risks, but they do not guarantee that adult scoliosis will not occur.

Living with it and what to expect

Over months and years, the main question is whether the curve stays stable or becomes larger. During rapid growth, appointments may be closer together. Once growth is complete, many mild adolescent curves remain fairly stable.

Larger curves are more likely to progress in adulthood, although the rate is not the same for everyone. Age-related scoliosis may change as discs, joints, muscles, and bone strength change.

Most people with mild scoliosis can take part in school, work, exercise, and sports without special restrictions. Staying active can support strength, mobility, sleep, and confidence. A specific activity may need adjustment if it causes persistent pain or after surgery.

If you wear a brace, the first weeks can involve pressure, warmth, skin irritation, and changes to clothing. Fit can be adjusted as you grow. Skin that remains red, sore, blistered, or broken should be reviewed.

Follow-up may eventually become less frequent when a curve is stable and growth is complete. Adults may return for assessment if pain, posture, walking tolerance, or nerve symptoms change.

When to get medical help

Arrange a routine appointment if you notice persistent uneven shoulders or hips, a rib prominence, leaning to one side, or clothes repeatedly hanging unevenly. Children and teenagers should also be assessed if a known curve appears to change during a growth spurt.

Make a prompt appointment for persistent or worsening back pain, pain that regularly wakes you, a rapidly changing posture, new leg tingling, or reduced walking tolerance. Fever, unexplained weight loss, or feeling generally unwell alongside back pain also needs timely assessment.

Seek urgent or emergency care for:

These symptoms are not typical of uncomplicated scoliosis and may indicate pressure on nerves, spinal injury, or another condition requiring urgent assessment.

- New or rapidly worsening leg weakness
- Loss of bladder or bowel control
- Numbness around the groin or buttocks
- Severe breathing difficulty
- Major back injury with weakness, numbness, or severe pain

Common questions

Can scoliosis be corrected without surgery?

Mild curves often need monitoring rather than correction. Bracing can reduce progression in some growing children, while physical therapy can improve posture, strength, and comfort. Exercises and braces do not usually erase an established structural curve.

Does scoliosis always get worse?

No. Many mild curves remain stable, especially after growth is complete. Progression is more likely during rapid growth, with larger curves, or with some congenital, neuromuscular, and degenerative forms. Follow-up measurements show what is happening in an individual case.

Is scoliosis painful?

It can be, but many children and teenagers have little or no pain. Back pain is more common in adults. Severe, persistent, or unusual pain should be assessed rather than assumed to come from scoliosis.

Can I exercise or play sports with scoliosis?

Most people can remain active and participate in sports. Exercise does not generally make scoliosis worse. Restrictions may apply after surgery or when another medical condition affects the spine, nerves, muscles, heart, or lungs.

Will scoliosis affect pregnancy?

Most people with scoliosis can have a healthy pregnancy. Pregnancy does not usually cause a major permanent increase in an adolescent idiopathic curve. Severe curves, previous spinal surgery, or heart and lung effects may require additional planning, including discussion of anaesthesia options.

Is scoliosis inherited?

There can be a family tendency, especially with adolescent idiopathic scoliosis, but inheritance is not straightforward. A parent with scoliosis may have a child who never develops it, and many people diagnosed with scoliosis have no known family history.

Sources

- National Institute of Arthritis and Musculoskeletal and Skin Diseases: Scoliosis in Children and Teens
- American Academy of Orthopaedic Surgeons, OrthoInfo: Introduction to Scoliosis
- Scoliosis Research Society: Adolescent Idiopathic Scoliosis
- NHS: Scoliosis
- Weinstein SL, Dolan LA, Wright JG, Dobbs MB. Effects of Bracing in Adolescents with Idiopathic Scoliosis. New England Journal of Medicine. 2013;369:1512-1521
- Negrini S, Donzelli S, Aulisa AG, et al. 2016 SOSORT Guidelines: Orthopaedic and Rehabilitation Treatment of Idiopathic Scoliosis During Growth. Scoliosis and Spinal Disorders. 2018;13:3