

Coping with the ageing spine

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The spine is like any other **joint** in the body. Its bony framework joins with other bones. These joints are smooth surfaced and they are lined with **cartilage** and supported by **ligaments** and muscles. In the spine each **vertebra** is joined to the next one by a **disc** at the front and two **facet joints** at the back, plus a series of ligaments and muscles. With time the joints wear and become less effective at allowing normal movement and keeping the spine in a normal position. This wear and tear can happen because of many reasons - for example, use over time, genetic factors, or trauma.

When discs degenerate (wear down) they reduce in height, causing the facet joints at that level in the spine to degenerate too. Joints may also degenerate without disc degeneration. If this process is symmetrical then the spine will be essentially the same shape, just shorter in height. However, unfortunately, in many patients this process is not symmetrical. Instead, vertebrae start to tilt or rotate on top of one other. When this happens there is a knock-on effect so that the levels of the spine above and/or below are affected too, which leads to a curvature in the spine.

There are lots of types of adult spinal disorders. The type of curvature in discussion here is called **de novo degenerative scoliosis** and consultants see it beginning to happen in people above the age of 50. Of course, children and younger adults with scoliosis develop degenerative changes in their spines with age. Such changes often cause the same challenges. However, this article looks specifically at the curvature acquired with age in a previously normal adult spine.

The term **scoliosis** can be too simple. Strictly speaking, scoliosis is when the spine curves to the side. However, de novo degenerative scoliosis

happens in three dimensions. Often the spine is more bent forward than normal (**kyphosis**), bent to the side, and twisted.

A knock on effect of the lower vertebrae deforming in a previously normal spine is that it can affect the overall position we hold ourselves in. This is a concept spinal surgeons refer to as being imbalanced. Being imbalanced is not the same as being unsteady or wobbly on your legs. It is a measure of how the shape of the spine determines your overall body position.

Usually a person's head is above their bottom in a normal standing position, but if the lower spine starts to bend forward then this puts the head in a position a long way forward. The rest of the body has to compensate for this by using other joints in the spine, **pelvis**, and legs. When a person can return their head to its normal position above the bottom using their other mobile joints this is known as compensated imbalance. However, sometimes this is not possible and the person is very bent forward. A forward bend can be compensated for, to a certain degree, but a sideways curve that does not come back on itself can be very difficult if not impossible to compensate for.

Many patients with a degenerative scoliosis do not know they have one. It may also not be spotted by a treating doctor or surgeon because of a lack of education or understanding of the condition. Plus, often it is not easy to see on most MRI scans. This is because **MRI scans** are taken lying down. The best way to assess a degenerative scoliosis is with good whole spine **X-rays**, taken when the person is standing. These X-rays need to show the full length of the spine as well as the head, pelvis, and thighs, so that the consultant can see how the curve affects the alignment of the body as a whole.

The big question among scoliosis specialists is when X-rays should be done. My golden rule is that in most cases tests such as X-rays should only be undertaken when a person has **symptoms**. If there are symptoms this might mean that treatment is an option. Considering symptoms, most patients will have back pain and/or leg pain. Plus, as the condition advances, they may notice a change in the shape of the back and find standing upright increasingly difficult. About 30% of people older than 70 have an abnormality in the shape of their spine. However, clearly, not all these patients have symptoms. As consultants, we have to be selective about who we investigate, and we have to investigate in order to answer a question and determine treatment. Usually our decisions about treatment are guided by symptoms. However, investigations such as X-rays help us to understand what we might want to do to treat a patient.

The symptoms of degenerative scoliosis can be divided into categories. First, localised pain happens at the site of the disorder, the place where there is wear and tear in the joints. This is **arthritic pain**. Often it is worse first thing in the morning. It is made worse when a person moves from A to B or rolls over in bed. Sometimes it is relieved when a person gets moving.

Second, **nerve** pain is caused by the compression (squashing) of nerves where the spine has degenerated and twisted. Nerve compression can also happen because of spurs of bone that come from arthritic joints, or because disc collapse has caused a narrowing of the holes that nerves pass out of. If this is central in the spinal canal it can cause heavy or tingling legs and is known as central spinal stenosis. Sometimes a nerve is squashed where it leaves the spine, which can cause a pain that can feel like **sciatica**. This pain can be either constant or made worse with **load** or changes in position, which will be discussed shortly.

Third, pain from the condition is harder to describe but is due to the fact that the muscles around the spine often have to work harder to hold the spine up. As a result, the muscles get tired with activity and then become painful. It is not uncommon for patients to say that by the mid-afternoon they need to lie down to ease this pain. Other sources of pain caused by the condition can be from ribs digging into the pelvis at the front or the side. There can also be pain from other joints that have

to be loaded differently to compensate for the spine (e.g. there might be pain in the hip, knee, or ankle).

To recap, many patients will come to a spine clinic with back and/or leg pain and it is vital that a full assessment is made of the spine shape and whether or not a spinal condition is present. This investigation is important because it can change significantly the way a spine is treated, particularly for leg pain.

Unfortunately, in elderly patients too often an MRI scan taken lying down is all that is used for **diagnosis** before surgery is offered. If a consultant sees a spinal condition or if a patient has compensated or true imbalance then X-rays should be requested. I request X-rays for all those patients I am planning to operate on who have a visible abnormality or who are aged over 50 with leg pain. I do this to see if there is a subtle, less obvious, curvature. The reason for standing X rays is very clear and very important. The spine is mobile and very rarely completely stiff. In other words, it has a completely different position under load than it has when a person is lying down. Indeed, some curves go back to a normal position when a person is lying down. Surgery for nerve compression is the most common spinal procedure done in the over 70s in the UK. The people in this age group often have a spinal curvature. For some people, the spinal curvature may determine how the operation is done. For example, if the spine shifts when a person stands then it may need to be stabilised with implants or realigned. Plus, if the spine is stiff and twisted it may be possible to do a **microsurgery**.

What is clear is that one size does not fit all and this condition needs careful individual assessment. Awareness and recognition of the problem by both patients and clinicians is very important. Failure to recognise a spinal curvature may lead to inadequate or unsuccessful surgery, the need for further surgery, the worsening of the spinal curvature, and a very unhappy patient.

Non-surgical ways to manage the condition exist. Many patients with degenerative scoliosis do not need treatment because they have no symptoms. When they do have symptoms then non-surgical measures must be tried first. It is important for patients to adapt their lifestyles where possible, and to come to terms with the condition.



X-rays of pre-operative de novo degenerative scoliosis with permissions from Mr Harding.

Pain medications, such as simple analgesics, anti-inflammatories, or stronger pain medications (including those for pain caused by the nerves) may work well and be well tolerated. They should at least be tried. Walking aids, including sticks and rollator frames, can be very effective as a support. They can hold up the spine when the muscles are tired or when the nerves are compressed. Frail or elderly patients often prefer this option. Braces may help when tired muscles or arthritic pain cause problems. Braces should be used sparingly and, ideally, under the supervision of a therapist to make sure that the muscles still function. If a person wears a brace too much, the muscles can get weak. **Physiotherapy** comes in many forms. Different forms of physiotherapy, including aquatic physiotherapy, may help. They are worth trying and are certainly very unlikely to cause harm. **Chiropractic treatment**, with or without the chiropractor manipulating the spine with the hands, may relieve pain from misaligned joints. However, this relief is often only temporary and should be used together with a muscle strength building programme. Injections should be used sparingly with a clear explanation that they are not effective in the long-term. In people who are elderly or frail **nerve blocks** may give temporary relief from leg pain. Injections in the facet joints and **epidurals** should be discouraged outside the context of a formal pain management programme where **chronic pain** is the main problem. Having said this,

there is some weak evidence for **facet denervation** procedures giving some more longlasting pain relief. There are many **alternative therapies**. The people who offer them often promote them a lot. However, it is not clear how they work and true medical evidence for their effectiveness is unclear. When a patient has tried and failed with non-surgical measures then surgery can be considered. For nerve compression pain in particular, surgery has a proven track record in providing long-term relief. However, as with all surgery, there are risks and pain. Surgery comes in many forms. It depends on symptoms, imaging, a person's expectations and wishes, the surgeon's expertise, and many other factors, including the hospital.

There are lots of reasons for surgery alongside pain. It is not uncommon for people to dislike how a curvature makes them look. Although this is not the primary reason for surgery, it is an important consideration for some people. Normally a degenerative spinal scoliosis does not cause problems for the lungs, stomach, and heart. However, surgery can affect these organs. It is vital that patients make sure patients are in the best possible general health before having an operation.

Operations can vary a lot in size and scale, from small procedures that can take pressure off a nerve and deliberately 'ignore' the bigger curvature,

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to complete corrections that aim to bring back a normal shape to the spine and a normal balance. Small procedures may be an option for more elderly patients or, for example, for a person with a stiff spine and nerve compression in one particular area. A major correction might be an option for younger people who are otherwise well, not responding to non-surgical options, and who have larger curves, pain, and imbalance. Surgery can be done through the back, through the side, or sometimes a combination of the two. If the spine is stiff or **fused** in the wrong position then sometimes an **osteotomy** (where bone is cut away) needs to happen. An osteotomy increases the risk of injury to the **spinal cord** and nerves.

Essentially, many different treatments can be applied. The important questions are whether anything should be done and what is right for the individual patient. Before a decision can be made there needs to be: careful history taking with a full assessment of symptoms; a full examination; appropriate investigations (including standing imaging); and a medical risk assessment.

When surgery is done it should be undertaken by a surgeon with appropriate experience. Higher risk spinal procedures need large teams of people from a range of different medical disciplines. The members of the surgical team need to have the specialist skill and experience to treat complex spinal conditions, such as degenerative scoliosis. These kinds of procedure also need to take place in appropriate, designated hospitals. Large scoliosis correction surgery can be very rewarding. Between 80% and 90% of patients would have the same again and are happy with the outcome after a year, despite a risk of complications of over 30% and a 10% re-operation rate in even the most experienced centres. Risks are high. Costs are high, too, given an ever-increasing ageing population and ever-increasing demands and expectations. All these factors show how necessary it is to select patients for surgery carefully. They also show the need for good non-surgical treatment in the majority of patients.

Sources are available from SAUK on request.

Definitions

By Anna Glendenning and Stephanie Clark

Alternative therapy is used instead of standard treatment to cure or treat a health condition. There are companies and clinics in the UK that offer alternative therapy. Some claim that they can straighten curves or slow down their growth without bracing or surgery. Many of these practices are very expensive. We would advise you to be careful and ask for independent scientific evidence that the therapies work. Also please check with your doctor or specialist before undergoing alternative therapy to make sure it is safe for you and that the evidence does actually support it working.

Arthritis is a condition that causes painful swelling and/or stiffness in the joints. Arthritic pain is the pain this condition causes.

Aquatic physiotherapy is a form of treatment that uses gentle exercises in water. It should be undertaken by a physiotherapist who is qualified to recommend movements in the water and to make sure they are done properly. As with all forms of treatment, it is important that you seek medical advice before taking part.

Cartilage is a flexible type of tissue found in many parts of the body where bones are connected such as the joints of the elbows, knees, hips, and vertebrae.

Joints are the places in the body where two bones are connected.

Chiropractors use their hands to treat disorders of the bones, muscles and joints. Treatments that involve using the hands in this way are called manual therapies.

Chronic pain is continuous, long-term pain, which persists after the time that healing would have been thought to have occurred in pain after trauma or surgery.

De novo degenerative scoliosis is a curvature of the spine that develops in a previously straight spine because of ageing or premature ageing. It usually develops late in life.

Diagnosis is a judgement a clinician comes to about what a person's problem is, made after an examination.



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Discs are a part of the spine. The discs lie between vertebrae. They hold the vertebrae together but allow movement. The discs in your spine are made up of an outer ring of strong tissue and a gel-like middle. Discs can age and prolapse (a slipped disc) which is where a small amount of the jelly comes out. A slipped disc can lead to lower back pain and leg pain, and can also cause numbness and weakness.

An **epidural** is an injection of a substance into a person's spine to cause the lower part of the body to become unable to feel pain. Continued overleaf
Facet denervation is when a surgeon interrupts a nerve in a facet joint.

Facet joints connect each vertebra in your spine. They add stability and allow forward/backward, side bending, and some twisting of your spine. Fused bone is bone that has joined together into a particular position.

Genetic describes things that are passed down from one generation to the next.

Joints are the places in your body where two bones are connected.

Kyphosis is the term given to an outward curve of the upper part of the spine. This type of curve makes the back appear more rounded than usual. Ligaments are a type of connective tissue.

Loading is when a force presses on a part of the body, such as the spine, for example when a person stands up after being seated.

Magnetic resonance imaging (MRI) is a type of scan that uses strong magnetic fields and radio waves to produce detailed images of the inside of the body.

Microsurgery is a general term for surgery that happens under magnification with small, specialised instruments.

Nerves are fibres that send impulses between the brain and other parts of the body.

Nerve blocks are injections that act to block pain. An osteotomy is when a surgeon cuts bone, often to remove it.

The **pelvis** is the large bony frame at the bottom of the spine.

Physiotherapy is treatment using physical methods such as massage, heat treatment, and exercise rather than by drugs or surgery.

Sciatica is a type of pain affecting the back, hip, and outer side of the leg. Often it is caused by squashed nerves in the lower back.

Scoliosis is when the spine curves to the side. The spine can also twist at the same time.

The **spinal cord** is made of lots of strands of nerves, which run from the brain to the top of your lumbar (lower) spine. This set of nerves connects nearly all the parts of the body to the brain. It can be likened to the big electrical cable that connects the brain to the rest of the body.

The word **symptom** means sign.

In medicine, **trauma** is a word used to describe physical injury.

Vertebrae are the small individual bones that make up the spine. The word for a single bone is vertebra.

X-rays are images of the inside of the body, made by electromagnetic waves.

Additional support and advice

Contact the Helpline team

020 8964 1166 or info@sauk.org.uk

Go online

Check out the Information Standard accredited medical information and personal accounts on our website, at www.sauk.org.uk/scoliosis-information.

Connect with others

Contact the SAUK office for information about SAUK members, volunteers, and Regional Representatives who may have particular experience of this area.



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