NHS
Lancashire Teaching Hospitals
NHS Foundation Trust

Information for patients and carers

Surgery for Scoliosis/Kyphosis

Introduction

Scoliosis and Kyphosis are spinal conditions. This booklet explains the spinal surgery you are going to have with the aim of improving or correcting that condition. It discusses the operation and the benefits and risks of the surgery. The booklet also tells you what to expect during your recovery. It covers what to do when you go home and returning to your everyday activities. There is also advice from your physiotherapist and occupational therapist.
You and your surgeon will have discussed this operation and decided that it is your best option. This is usually because treatment that does not involve surgery, has not helped.
The operation will be explained to you in detail by the clinician who listed you for surgery. The surgeon will make sure that you are fully informed before you sign the consent form agreeing to surgery.

Please let us know if you feel you do not fully understand the risks and benefits of surgery. You should also let us know if you are unsure whether to continue with surgery. Please contact the surgeon's secretary and ask for an appointment to discuss the surgery further.

You should also have been informed of alternative methods of treatment.

Why do I need surgery for scoliosis/kyphosis?

You may need spinal surgery for several reasons. The most common conditions that may result in you needing surgery are discussed below. Some patients may have a combination of causes. The specific cause in your case will have been discussed by the clinician you saw in clinic.

Adolescent idiopathic scoliosis

This occurs when a child's spine changes shape during growth. This results in the spine curving sideways and twisting (rotating) at the same

time. The ribs can change shape as a result of the twisting causing a prominence on one side of the back. It usually happens between the ages of 10 and 18. Idiopathic means that the cause for this type of scoliosis is usually not known, and it could not have been prevented. This type of scoliosis can run in families and is more common in girls than boys.

Neuromuscular scoliosis

This type of scoliosis occurs as a result of a condition which affects the nervous system (neurological) or the muscles (muscular). Some conditions which can cause this are cerebral palsy, Duchenne muscular dystrophy and spinal muscular atrophy. As patients with these conditions grow, or their conditions cause increased muscle weakness, the curve progresses (gets bigger). Large curves in the upper or middle parts of the spine may cause lung problems.

Syndromic scoliosis

This develops as part of a group of conditions which are linked. This is known as a syndrome where many signs and symptoms appear together.

Scheuermann's kyphosis

This occurs when the front sections of the spinal bones (vertebrae) grow more slowly than the back sections during adolescence, as a result the spine develops a forward bend of the spine called a kyphosis. The curve usually happens during times when the bones are growing quickly often between the ages of 10 and 15 but may become worse as an adult. It affects men and women equally.

Adult scoliosis

This can be divided into two subcategories:

Idiopathic scoliosis in adults is a continuation of progression of adolescent idiopathic scoliosis and can result in wear and tear (degeneration of the spine).

De Novo (new) where a scoliosis develops in an adult who has no previous history of scoliosis. This usually happens after the age of 50, the cause is not fully known and may be due to wear and tear of the spine.

Kyphosis

Is a forward bend of the upper / mid spine and can be the result of a number of conditions such as fracture, infection and tumour. It can also be related to poor posture, age, and occur after some spinal surgeries.

What are my surgical options?

Your spinal surgeon has recommended that you may benefit from surgical correction of your scoliosis or kyphosis. A clinician will have discussed the options with you – these include conservative measures such as pain management, observation/doing nothing, exercise and physiotherapy. You will then have been helped to decide regarding which option you prefer.

Surgery is performed under a general anaesthetic.

This is a major surgery and is not always the right option for everyone. If you are offered surgery, there usually is not any urgent need to decide and you and your family need to think carefully about the options. Do not be afraid to ask questions of your surgeon and their team and if you need another appointment to discuss matters further, please contact the surgeon's patient experience co-ordinator (PEA) on the number below.

There are several ways in which a scoliosis/kyphosis can be corrected depending on the shape of the curve. The surgeon needs to consider the shape of your spine in 3 dimensions and surgery will be tailored to your individual case.

Prior to surgery you may need investigations such as an MRI, CT, bone density Scans, traction x-rays or bending x-rays to allow the surgeons to decide how best to correct the deformity

Posterior Fusion or Stabilisation

The most common type of surgery is by posterior fusion (from the back) involving a combination of metal rods, cages, screws and hooks to correct the shape of the spine. Bone graft material which may come from the patient, from donors or synthetic bone substitute is used to help fuse the bones (make them grow together) forming a solid column of bone. It may be used in combination with some of the other methods detailed below.

Anterior Fusion

Surgery from the front of the spine is performed to allow sections of bone or discs to be removed and allow cages (metal or plastic spacers) to be inserted to straighten the spine. For this to happen surgery is performed through the abdomen (belly) or chest.

Lateral Fusion

Lateral fusion (X-LIF or D-LIF) is performed through a small cut on the side and metal, or plastic cages are inserted between the bones. This can be used to correct some deformities without any further rods and screws and patients can recover more quickly but there are specific risks involved with this procedure which are detailed below.

Osteotomy

Wedge shaped sections of bone are cut from one or more bones (vertebrae) this allows the spine to be re-aligned (straightened).

Costoplasty

Small areas of rib are removed to improve the appearance of the rib prominence. A tube may need to be used to re-inflate the lung afterwards (chest drain).

Decompression

This involves removing bone and ligament from the back of your spine to make more room for your spinal nerves.

What are the risks of spinal surgery?

There are risks in having any type of surgery, especially procedures involving general anaesthetic.

General risks of surgery

Anaesthetic risks

Problems may include cardiac arrest, blindness, death, breathing difficulties, allergies to the drugs used, heart attack and stroke. Skin breakdown and nerve damage due to positioning in longer procedures. Swallowing difficulties and voice impairment associated with the use of anaesthetic breathing tube.

More information is available in the leaflet, **'You and Your Anaesthetic'** which may be given to you at your pre-operative assessment. The anaesthetist will also discuss any specific risks with you if you have an appointment with them or on the day of surgery.

Bleeding

Bleeding from the veins around your nerves is one of the more common risks. Blood loss is common and is managed using cell salvage. This means

that a machine is used to collect blood lost during the procedure, treat it and then return it to you. You may still need a blood transfusion. There is a rare risk (1 in 3000) of damage to the major blood vessels in front of the spine (vena cava, iliac veins / arteries and aorta) if this happens you could lose a lot of blood very quickly. This would need emergency surgery to correct and could lead to death.

Blood clot

Having surgery puts you at risk of having a Deep Vein Thrombosis (DVT) a blood clot in the leg veins. There is also a risk of Pulmonary Embolism (PE) a blood clot in the lungs. To prevent blood clots, you may be asked to wear elastic compression stockings. A mechanical pump may be used whilst you are in bed and you may need injections or medication to prevent blood clots after your operation. You may be given a leaflet about blood clots before your surgery.

It is recommended that everyone keeps moving after surgery to reduce the risk of blood clots. Make sure you drink (non-alcoholic) liquids regularly to keep hydrated.

Infection

At the time of surgery, you may be given antibiotics to help reduce the risk of infection. You may need more antibiotics afterwards; these are usually given by a drip.

There is a risk of infection with any surgery, but we take many precautions to keep that risk to a minimum. The infection rate is about 2 to 4 people in every 100 but this may be heightened by other conditions such as diabetes.
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If you develop infection post-operatively this may be dealt with by your GP with antibiotic tablets. In severe cases you may need to be admitted

to hospital for treatment with antibiotics through a drip or may even need further surgery to clean the wound.

Specific risks of surgery

Nerve damage

This occurs in approximately 1% of patients.

If a nerve is damaged you may have permanent pain, weakness and sensation changes such as numbness in the leg(s). These can be as bad, as or even worse than before the surgery.

Dural tear

This happens in approximately 5% of patients having surgery for the first time.

The layers around the spinal cord and nerves (Dura) can be damaged resulting in a leak of fluid (cerebrospinal fluid). This will be repaired at the time of surgery. If it happens it can cause severe headaches. You will need to stay in bed flat for 2-5 days and may need intravenous (through a drip) antibiotics. This is more common in patients who have had spinal surgery before (10% with second surgeries).

Bladder, bowel and problems with sexual function

Bowel and bladder problems are usually temporary but can, (rarely, about 1 in 350 cases), be permanent. These include incontinence or retention of urine (not being able to pass water).
Bowel problems may include constipation or incontinence.
Very rarely impotence can occur (problems getting or maintaining an erection in men).

Need for further surgery in the future

Approximately one in three (35%) of people develop problems at the level above or below where they have had surgery. This is known as Proximal or Distal Junctional Kyphosis (PJK) and causes further deformity and pain at that area. Surgery may be required to improve this.

For patients who had a type of osteotomy known as a pedicle subtraction osteotomy (PSO) there is a one in two (50%) chance of needing further surgery in the next 5 years.

Paralysis or death

Serious complications such as paralysis or death are uncommon, this may happen in less than 1 in 350 cases.

No improvement or a worsening of current symptoms

You may have little or no improvement in the amount of leg or back pain you experience. A small number of patients find that their symptoms are worse following surgery.

Incomplete correction of the scoliosis or kyphosis

You may have little or no improvement in the shape of the spine after surgery. A small number of patients find that their symptoms are worse following surgery. Pedicle Subtraction Osteotomy at the L3 level carries a risk of abnormal shape of the abdomen.

For procedures using cement augmentation

Your surgeon will discuss with you if they think you need to have bone cement used to support the screws. This usually happens if there is a

risk that they may become loose due to conditions such as osteoporosis.

Leakage of cement; may require surgery to remove the cement from the spinal canal and could cause paralysis.

Pulmonary embolisation of cement, (cement leakage into the blood vessels of the lungs) causing chest pain, breathing difficulties and possibly death. Cement leakage into the blood vessels may require surgery to correct.

Additional risks for thoracic spine

Damage to the diaphragm with a risk of partial paralysis and subsequent difficulty with deep breathing, or failure to heal resulting in a diaphragmatic hernia.

Infection within the chest cavity; this may require antibiotics and / or further surgery.

A chest drain may be required to prevent the entry of air and / or blood into the chest cavity. This may need to be reinserted in the post-operative period, or in rare cases, at a later date. Any injuries to the lung lining or lymphatic system may require long term use of a chest drain.

Fusion complications

There is a small risk that metalwork and implants can fail or break. If this happens you may need further surgery to repair this.
Bone may not graft fully which may weaken the fusion and cause breakage of the metalwork. You may also need surgery to correct this.

Lateral fusion - additional risks

For those patients having lateral fusion procedures (X-LIF or D-LIF) there are additional risks due to the surgical approach the way the surgeon enters the spine).

The nerve that controls the thigh muscle can be damaged during surgery. The risk of this is reduced by nerve monitoring during the procedure but can still happen. If it occurs it can cause numbness over the front of the thigh, weakness and stiffness in the hip, giving way of the knee and pain. This settles for most people but can last over a year and sometimes may be permanent.

There is a risk of fracture of the vertebrae (bones) when the implant is being inserted.

Factors which may affect spinal fusion and your recovery

There are a number of factors that can negatively impact on a solid fusion following surgery, including:

- Smoking
- Diabetes or chronic illnesses
- Obesity
- Malnutrition
- Osteoporosis
- Post-surgery activities
- Long-term (chronic) steroid use

Of all these factors, the one that can affect fusion rate the most is smoking. Nicotine has been shown to inhibit the ability of the bone-growing cells in the body to grow bone.

Smokers should stop smoking to improve their chances of a good recovery. If you need help to stop smoking, we can refer you to the smoking cessation service. Ideally you should stop smoking or using

nicotine containing products 6 weeks before your surgery and also for at least 3 months after your surgery.

It is common to be referred for physiotherapy before your operation. This is to optimise the flexibility, alignment and strength of your spine and surrounding joints. The treatment will also focus on improving your posture and general condition. Pre-operative physiotherapy may aid your recovery following your operation. These are some gentle exercises that can help before and after your surgery

https://www.lancsteachinghospitals.nhs.uk/therapy-outpatients-services
.
Please take a look at the exercises in the 'spinal physiotherapy service' section.

It is important to remember

Most of our patients benefit from having surgery. In some cases, the risks and benefits are different. If this is the case your consultant will discuss this with you.

So please remember that although the risks of spinal surgery can be very serious, for the vast majority of our patients the risks are very low.

You will be given the opportunity to discuss this as part of the consenting process. Once you are satisfied, you will be asked to sign the consent form and agree to go ahead with surgery.

What are the benefits?

The benefits of deformity correction surgery depend on the type of the deformity and the symptoms you are experiencing. These will be discussed with you individually by your surgeon and you may also be seen by more than one surgeon before a decision is made. The aims of surgery are usually

to partially correct/correct the curve as far as possible or prevent progression of the deformity (stop it getting worse).
Surgery is not the right option for everyone and you should think carefully about your options before making your decision.

What happens before the operation?

Consent

We must by law, obtain your consent to carry out any operation and some other procedures beforehand.

Clinicians will explain all the risks, benefits and alternatives before they ask you to sign a consent form.

If you are unsure or unhappy about any aspect of the treatment proposed, please ask to speak with a senior clinician again.

Pre-operative assessment

When you have agreed that you wish to go ahead with an operation, you will be contacted to attend a pre-operative assessment. This assessment makes sure that you have had all the investigations you need and that you are fit for surgery. This may include, blood tests, x-rays and ECG (heart reading), to check that you are fit. You may also need some more complex breathing (spirometry) and heart tests (echocardiogram) if you are having thoracic surgery.

The results from some of these tests only last for 3 months and may need to be repeated nearer to the time of the operation, if appropriate.

It is important that you inform us of any changes to your health between your pre-operative assessment and surgery.

Please bring to your pre-operative assessment a current list of any medication you are taking. This includes any supplements, vitamins or inhalers.

If necessary, you may be referred to an anaesthetist for further assessment of your fitness for surgery.
You will not be entered onto the waiting list until you are fit for surgery.

Specialist education clinic

You may be asked to the 'Specialist education clinic' 1-8 weeks before your surgery.
A nurse and occupational therapist will assess you and explain what happens during your operation and hospital stay. They will also explain what to expect and give you advice regarding what you can and cannot do after the surgery.

If further investigations are needed at this time they will be arranged.

The nurse will also talk to you about going home after your surgery. We will help you decide whether you need more help in your home after the surgery.

What happens when you are in hospital?

Day of admission

Your admission letter will explain what time to come into hospital and to which ward to go to.

You must not eat or drink anything before your surgery, and we will tell you when to stop eating and drinking at home. The waiting list department will tell you what time to stop eating and drinking depending on when your operation is planned for.

You usually meet your surgeon and anaesthetist and are given the opportunity to ask questions before going into surgery.

Medications

Please bring with you a supply of any regular medications you take. These will be locked in a locker by the side of your bed and given to you at the right times.

A pharmacist visits each of our wards every day. They will go through your medications with you and answer any questions you have about them.

Valuables

Please do not bring valuables, jewellery or large sums of money into hospital. The hospital cannot accept responsibility for lost items.

Getting ready for surgery

Before you go to the operating theatre, we will ask you to change into a hospital gown. You will be asked to remove all jewellery (except wedding rings which can be taped over) and make-up. Your nurse will accompany you to the theatre reception. You will then be taken into the anaesthetic room where you will be given an anaesthetic. This is usually a general anaesthetic, but some patients may have a spinal anaesthetic. This will have been discussed with you by the anaesthetist.

What happens after the operation?

When you wake up you will be in the theatre recovery area or Surgical Enhanced Care Unit (SECU) or High Dependency Unit (HDU). You may be wearing an oxygen mask. We will take this off once you are fully awake. You may also have an intravenous line (IV or drip) in your arm. This gives you fluid as you will not have drunk anything for several hours. We will take this out once you are drinking well.

If you have had a larger surgery, you will be cared for in the Surgical Enhanced Care Unit (SECU) or High Dependency Unit for at least 24-48 hours after your surgery. This will allow us to observe you more closely. You will be told if you are going to the SECU after your operation, so you know what to expect. You will have a number of wires and tubes to help monitor your condition. Once you are feeling better you will be taken to the main ward to continue your recovery.

Most patients will need a catheter (tube to drain urine) inserted in theatre.

Usually, you can eat and drink when you are fully awake. We advise you to start with a light meal.

The nurses will observe you closely when you return to the ward. They will make sure that any pain you have is well controlled. If you have any other symptoms such as nausea (feeling sick) your nurse will help you with this.

Getting moving

We aim to get you moving around on your own as soon as possible. The physiotherapist or nurse will come to see you and help you to get out of bed and start walking. They may go through some simple exercises with you and practise using the stairs if this is needed.
All of this will improve your confidence to get up and about again once you get home.

How long will I have to stay in hospital?

This depends on the type of surgery you have and how you feel afterwards. You will not be discharged until all members of the team who treated you are sure you are well enough.

What's the best way to look after myself at home?

You will probably feel a little anxious about managing at home after your operation. The advice we give here should help you. If there is anything we have not covered in this booklet, please ask before you go home.

It is normal to feel very tired in the first few weeks. Try to keep moving but also take time to rest and recover at your own pace.

You will need to take things easy for several weeks after the operation. You will be advised to take time off work. It can take at least twelve weeks (and for some patients even longer) to heal properly. Full recovery can take up to a year. We recommend that you follow the advice we give you carefully.

How do I care for my wound?

When will I have my stitches taken out?

If you have stitches or clips, these will be taken out ten to fourteen days after your operation. The practice nurse at your GP surgery will do this for you. Please make an appointment for this once you are at home. Please inform the ward staff if you feel you are unable to attend the GP surgery. They may be able to arrange for the district nurse to visit you.

How soon can I shower?

Keep your wound clean and dry. You can shower as normal, but you may need to change your dressing after each shower for the first week. We will give you a supply of dressings before you go home.

How long will my wound take to heal?

Wound healing goes through several stages. You might feel tingling, numbness or some itching around the wound. The scar might feel a little

lumpy as the new tissue forms and it might also feel tight. These are all normal. Do not be tempted to pull off any scabs as this is a protective layer and removing it will delay healing.

These are some of the signs of infection. Contact your GP, the ward or the emergency department if you develop any of these symptoms:

- **The wound becomes more painful, swollen or hot**
- **You have expanding redness around the wound**
- **You notice any yellow or green discharge from the wound or the wound becomes cloudy**
- **You feel unwell, have a raised temperature (fever/shivering)**

These are the warning signs for Cauda Equina Syndrome, which is a condition where there is pressure on the bundle of nerves at the base of your spine that affects your legs, bowel and bladder. It can be caused by infection or a blood clot after surgery and is considered an emergency.
Contact your GP, the ward or the emergency department if you develop any new combination of these symptoms:

- **Severe pain radiating down both legs**
- **Loss of feeling/pins and needles between the inner thighs or genitals**
- **Numbness in or around your back passage or buttocks**
- **Altered feeling when using toilet paper to wipe yourself**
- **Increasing difficulty when you try to urinate (pass water)**
- **Increasing difficulty when you try to stop or control the flow of urine**
- **Loss of sensation when you pass urine**
- **Leaking urine or recent need to use pads**

Will I see my surgeon again after I am discharged home?

An appointment will be sent to you after discharge. Your follow-up appointment will be with the surgeon or a member of their team. Your appointment will depend upon your surgeon's instructions. This follow up appointment may be a telephone appointment.

Your consultant will send a summary of your care to your GP after your operation.

What medication will I be given to take home?

We usually give you a supply of your regular medications, unless you already have enough at home. If needed, we will also give you some painkillers to take home, depending on the type of operation you have had.
Take regular pain relief initially to allow you to be as active as possible. Reduce these as your pain levels begin to improve.

Where can I get a fitness for work certificate?

The hospital can provide you with a certificate for your hospital stay. Please ask the nursing staff or ward clerk. You will have to ask your GP for any further certificates.

Who can I contact with queries or concerns?

If you have any medical problems, contact your GP first. They will contact the medical team at Preston or Chorley if necessary.

Contact details

Should you require further advice or information please contact:

The Orthopaedic spinal team on telephone:
01772 522307
01772 522943
01772 521391
01772 522310

Royal Preston Hospital
Ward 14 **01772 522474**
Ward 16 **01772 522990**

Chorley Hospital
Leyland Ward **01257 245742**
Rawcliffe Ward **01257 245748**

Support groups and organisations

EuroSpine
European Spinal Surgeons website, information on spinal conditions and surgery.
www.eurospine.org

British Association of Spinal Surgeons
Advice and information on spinal conditions and surgery.
www.spinesurgeons.ac.uk

Scoliosis Association (SAUK) Advice, support and information about scoliosis and other spinal conditions.
Helpline: 020 8964 1166
www.sauk.org.uk

Backcare
Information about back pain and how to manage it.

Helpline: 0845 130 2704 www.backcare.org.uk

Outsider's Sex and disability advice.
Helpline: **0333 335 6215**
www.outsiders.org.uk

More information and advice

Drivers Medical Enquiries - DVLA
Drivers Medical Group
Swansea
SA99 1TU
Tel: **0300 790 6806** (car drivers and motorcyclists)
Tel: **0300 790 6807** (bus, coach and lorry drivers)
www.gov.uk/dvla-medical-enquiries

Benefit Enquiry Line
Freephone: **0800 882 200**
Textphone: **0800 243 355**

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www.lancsteachinghospitals.nhs.uk/patient-information-leaflets

Lancashire Teaching Hospitals is a smoke-free site. Smoking is not permitted anywhere on any of our premises, either inside or outside the buildings. Our staff will ask you about your smoking status when you come to hospital and will offer you support and advice about stopping smoking this will include Nicotine Replacement Therapy to help manage your symptoms of withdrawal and the opportunity to speak to a nurse or advisor from the specialist Tobacco and Alcohol Care Team.

If you want to stop smoking, you can also contact Smokefree Lancashire on Freephone **08081962638**

Please ask a member of staff if you would like help in understanding this information.
This information can be made available in large print, audio, Braille and in other languages.

Our patient information group review all leaflets regularly, if you feel you would like to feedback on this information or join our reading group please contact on email address:
patientexperienceandinvolvem@LTHTR.nhs.uk

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