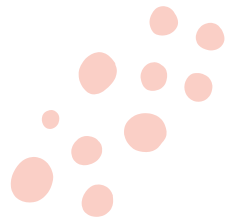


Scoliosis Passport For Children & Adolescents



Brought to you by KK Women's and Children's Hospital (KKH)

Contents



This Scoliosis Passport is developed for you by your healthcare team and patients and their families.

Patient Foreword

02

Part 1: Background Information on Scoliosis

03

Part 2: Treatment Options

06

Part 2a: Bracing

08

Part 2b: Physiotherapy

13

Part 2c: Surgery

19

Part 3: Discharge Information and Home Care

26

Patient Foreword

I first found out I had scoliosis when I was 7 years old. I had never heard about it before and didn't understand what it meant. I later found out that my curve was more severe than others, and that the treatment process was long. Hearing this made me shocked, sad, and especially worried about whether I could continue in my sports CCA which I liked.

I was later prescribed a brace, which was tight, painful, and uncomfortable especially on a long school day. It caused me to sweat a lot and my movements were limited, hence I didn't wear it at times. However, my family and friends were very supportive and they even thought it was cool! The clinical team was also nice to me and took good care of me. They constantly reassured me during each step of my treatment journey, and even taught me tips such as wearing a t-shirt underneath my brace to make it more comfortable.

Later on, I was offered surgery. I remember being scared of the risks and thought it wasn't going to go well, and that I may even lose the ability to move my legs. However, post-surgery, I can now bend lower than I used to and can compete for bowling! I also feel freer and better now that I don't have to wear a brace. Although I have a scar from surgery, I am not ashamed of it as it shows that I have overcome something in life.

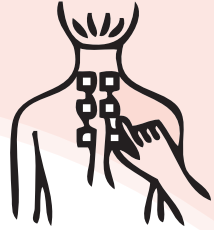
I hope that every one of you reading this would never give up during your scoliosis journey. It might be hard in the beginning but there is always light at the end of the tunnel!

Megan
14 years old, previous scoliosis patient



Part 1: Background Information on Scoliosis

Introduction



What Is Scoliosis?

Scoliosis is characterised by an 'S' or 'C'-shaped side-ways curvature of the spine. It can affect children of all ages, though it tends to affect children who are approaching or experiencing their pubertal growth spurt.

Idiopathic scoliosis is the most common form of scoliosis. "Idiopathic" means that the cause is unknown. Adolescent idiopathic scoliosis (AIS) occurs between 10 to 17 years of age. It is more common in girls than boys (8 to 10 times).

Symptoms of Scoliosis

- Uneven shoulders or waist
- One shoulder blade is more prominent than the other
- A tilt in the waistline where one hip is higher than the other
- One side of the back is significantly higher than the other when bending forward
- "S"-shaped curve in the back when standing up

Myth Buster - "Why me?"

Scoliosis is not caused by carrying heavy school bags on one shoulder, certain sports or physical activities, poor standing or sleeping posture, or a lack of calcium in your diet.



Diagnosis

From school screening to seeing a specialist now?

Scoliosis is usually detected in school children by nurses during health screening. Subsequently, they are referred to the hospital to see a spine specialist. With increased awareness of scoliosis, more cases are being diagnosed earlier. Although we cannot prevent scoliosis, we may be able to prevent it from worsening!

What can I expect at my visit to KKH?

- Your healthcare provider will ask you about your medical history and family history of scoliosis.
- Your height and weight will be measured.
- A physical examination will be conducted.
- X-rays of your spine will be taken.
- Your doctor will recommend a treatment plan based on the severity of your curve and the likelihood of this worsening.

How is my curve measured?

After you have your X-ray taken, your doctor will measure the 'Cobb angle', which is a measure of your scoliosis in degrees.

At KKH, a key facility housed in the Musculoskeletal Centre is the EOS Imaging System, which is a low-dose X-ray machine.

Will my curve get worse?

There are a variety of factors which may increase the risk of scoliosis progression. The greatest risk occurs during the adolescent growth spurt, which usually occurs between ages 11 – 14 in girls and 12 – 15 in boys.

Children and teenagers who have moderate or severe scoliosis and have a significant amount of growth remaining are at high risk for progression (worsening) of scoliosis.

Our doctors will determine how much growth you have left until you complete puberty from your X-ray and other indicators. For girls, this includes menstrual history and breast development. For boys, this includes voice change and facial hair growth.

MY COBB ANGLES RECORD



Date of visit

Date of visit

Part 2: Treatment Options

Treatment Options

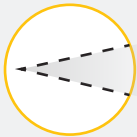
How can my scoliosis be treated?

Depending on the extent of your curve, scoliosis can be treated non-surgically or surgically. Your doctor will recommend the most appropriate treatment option (Figure 1).

SCOLIOSIS TREATMENT

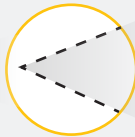
The severity and location of the curve determine treatment.

OBSERVATION



Less than 25°

BRACING



Between 25° & 45°

SURGERY



Greater than 45°

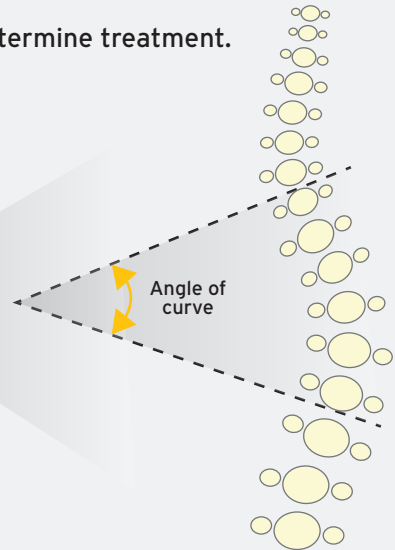


Figure 1: Treatment Options

Credit: Boston Children's Hospital

Non-surgical treatment in KKH:

- **Observation**

Observation is usually recommended if you are still growing and your scoliosis Cobb angle is less than 25°, or if you have finished growing and your Cobb angle is less than 40°.

Your doctor will conduct a physical examination and take X-rays regularly to check if your scoliosis has progressed. The frequency of visits is based on your growth rate and is expected every four to twelve months. Taking X-rays more often than every four months is generally not required or helpful.

- **Bracing**

Your doctor may recommend brace treatment to control your curve progression early on, especially if you are still growing.

There are different types of braces and regimens (hours per day). In KKH, we have Singapore's first one-stop paediatric orthotic centre providing a full range of orthotic services for children, including custom-made braces for scoliosis.

- **Physiotherapy**

Physiotherapy may be recommended together with brace treatment. While physiotherapy is usually prescribed after scoliosis surgery to allow you to adjust to daily movement, it is sometimes prescribed before surgery to improve your posture.

Surgical treatment in KKH:

Your doctor may recommend surgery if your curve is severe. Being told that spine surgery is part of your treatment plan may be daunting for you and your parents. However, surgical treatment is recommended for severe scoliosis to prevent worsening of the condition.



Part 2a: Bracing

Bracing

Why bracing?

A spinal brace is prescribed for those in the early stages of puberty and have moderate (25 - 45°) or progressive scoliosis. When worn for the recommended duration, a brace can slow down or even arrest progression of the scoliosis. It is generally worn until puberty is over.

We chose to proceed with bracing. What next?

First appointment: This is the appointment for the orthotist to assess you. If bracing is indicated, the orthotist will take your measurements and a 3D scan (if applicable) of your body to ensure your brace fits. An X-ray of your wrist may be taken to further assess your stage of skeletal maturity.

Second appointment: This is the appointment for fitting of the brace. An in-brace X-ray will also be taken immediately after brace fitting. This allows your orthotist to determine how much the brace reduces the curve and if it will be comfortable for your daily wear. You are advised to wear a well-fitting and thin-layered inner T-shirt for your fitting appointment. The fitting may take up to 2 hours.

Your orthotist will teach you:



- 1** How to put on and remove the brace
- 2** Your wearing schedule, usually a minimum of 18 hours daily
- 3** How to maintain your brace
- 4** What to do when problems arise with your bracing treatment

Subsequent appointments involve a review of your brace, and its effectiveness in halting your curve progression. Changes to your brace may be made to ensure optimal comfort and function.

The brace treatment may depend on your age. Your orthotist will share about the types of brace available for idiopathic scoliosis treatment in KKH. Usually, our patients choose the white brace to match their school uniforms.

Bracing Regimen

How long does the brace need to be worn?

We recommend that you wear the brace for 20 – 22 hours a day, and no less than 18 hours a day. Compliance is important for the brace to be effective.

You will usually wear the brace until skeletal maturity and curve stabilisation, or when your curve reaches a high degree (high Cobb angle) and surgery is recommended.

Caring for my brace

- Do not place any part of your brace in water
- Use a washcloth or wet wipes and leave your brace to air dry
- Wipe as many times as you require each day

I'm scared to be seen in my brace ...

It is understandable that you may be sensitive to differences between yourself and your friends, including when wearing a brace.

Wearing a brace does not make you different from your peers! Speak to your family, friends, teachers or peer support groups if you feel that wearing a brace for a long period of time affects you.

These are some helpful tips from past patients and their parents:

From patients:

- Speak with fellow scoliosis warriors
- Keep active and engage in regular exercise (subject to your doctor's and orthotist's advice)

- Wear your brace more during the weekends and school holidays
- Don't be embarrassed by your brace, it is temporary!
- Wearing a brace does not make you different from your peers!

From parents:

- Encourage your child to lead an active lifestyle
- Speak to other parents with children on brace treatment
- Listen to your child's concerns
- Encourage your child in his/her efforts with brace wearing

FAQs

Will my brace treatment be effective?

While bracing is frequently effective, its success depends on a few factors, including the following:

- Your age
- Compliance to wearing time
- Correct brace wear
- Regular follow-up with your doctor and orthotist
- Curve type, flexibility and location

Studies have shown that one of the most important success factors of brace treatment is patient's compliance to the prescribed wearing time. Bracing will be more effective the longer you wear your brace.

Do try your best to wear your brace for the recommended hours daily. Discuss with your doctor and orthotist if you have difficulties following the treatment.

Will the brace straighten my spine?

While bracing cannot correct or reverse your scoliosis, we hope to achieve about a 50% reduction in your Cobb angle when you wear the brace (i.e. this means that it is helping the affected areas).

Can my curve still increase after using the brace?

While the curve may continue to progress if you are still growing, the brace can help to control the curve progression, reducing chances of the curve worsening to the point of requiring surgery. However, for those with rapidly progressive curves or have a high risk of curve progression, bracing may not be able to prevent surgery in the later stages.

Rashes at brace area, what does that mean?

To prevent sores or red skin, you should:

- Bathe daily
- Always wear a well-fitting and thin-layered inner T-shirt under your brace
- Apply topical antiseptic solution (hand rub) to area over hips
- Use moisturiser or powder to relieve symptoms

Observe for abrasions or excessive redness on your skin that does not disappear within 30 minutes of removing the brace. If they remain, adjustments to your brace may be needed, and you may have to call your orthotist to check that your brace fits.

Can I wear my brace for physical activities?

Although you are encouraged to remove your brace for all physical activities, you may wear it for non-contact sports, such as biking and walking. Kindly do not wear it for swimming!

How often do I have to change my brace?

Your orthotist will make adjustments to your brace during review appointments if it no longer fits as well. However, you may expect to go through more than one brace during puberty when your grow spurt occurs. Generally, most patients replace their brace at least once during their entire treatment duration.

Part 2b: Physiotherapy

Before Surgery/ Conservative

Why do physiotherapy?

Physiotherapy can improve postural balance, address any ongoing pain and educate you about your scoliosis. This will specifically increase your physical function and empower you to cope better with the condition.

Physiotherapy exercises will be tailored for you, which may include correcting your posture and strengthening your muscles. A good understanding of your condition has been shown to improve mental well-being and self-image, and reduce associated psychological stress.

What can I expect from physiotherapy?

A thorough clinical physiotherapy assessment will first be conducted. This includes history taking, assessing your body function and posture, and a clinical evaluation to determine what type of exercise treatment suits you best.

- **Physiotherapy General Exercises**

A mix of strengthening and mobility exercises will help to strengthen your core muscles and reduce associated stiffness. You will also gain a better understanding of your scoliosis curve type and learn how to manage your posture.

If any painful condition exists, for example lower back pain, it will be our priority to address and treat these symptoms.

Sessions usually last 30 – 45 minutes.

- **Physiotherapy Scoliosis Specific Exercises (PSSE) -**

- **The Schroth programme**

You may have read about the Schroth programme while researching about non-surgical management for idiopathic scoliosis. The Schroth programme is an intensive, evidence-based exercise method to address your scoliotic posture and stabilise the spine early. The goals of the Schroth programme are the same as physiotherapy rehabilitation.

Schroth exercises are an alternative, and not a superior clinical treatment option compared to general physiotherapy exercises. Based on current evidence, PSSE cannot always prevent the progression of scoliosis during the peak period of growth. When brace treatment is offered, we do not recommend PSSE as an alternative, but as supplementary to bracing.

You will be assessed by your physiotherapist for suitability.

Patients suitable for Schroth programme

- Adolescent Idiopathic Scoliosis patients only
- 10 years old and above
- Cobb angle between 15 to 30°
- Risser 0 – 2
- Able to follow instructions well
- Able to commit to doing the exercises daily, including the 6 consecutive weekly sessions with your physiotherapist

Patients not suitable for Schroth programme

- Have other types of scoliosis i.e. Congenital, Neuromuscular
- Post-spinal fusion surgery patients
- Unable to commit to doing daily exercises
- Unable to commit to the entire duration of the programme
- Have difficulties following instructions

What will the Schroth programme include?

- Comprehensive examination of your scoliosis
- Home exercise programme at the end of every session
- Each session includes 1 hour of contact time with your physiotherapist; sessions run weekly for 6 consecutive weeks
- Reassessment will be done at the end of 6 weeks, and subsequent follow-ups will be based on your physiotherapist's recommendation
- Exercises prescribed are based on the severity of your scoliosis, posture, daily function, mobility and strength
- Understanding your own curve pattern and increasing body awareness

What do I need to prepare for my Schroth programme?

- You are encouraged to wear exercise attire
- A sports bra is required for girls to have their backs assessed during the session
- Sessions will be conducted in a room to maintain your privacy



Post-surgery Management

Physiotherapy and post-surgical management in scoliosis

After your surgery, your physiotherapist will teach:

- Breathing exercises to reduce the risk of chest infection during your hospital stay
- Exercises to promote circulation and movement
- Techniques to reduce pain and discomfort while moving e.g. getting out of bed, walking, climbing stairs when you are ready
- Safe return to daily functional activities e.g. squatting and carrying objects

Upon discharge from the hospital, please attend your outpatient appointment for physiotherapy. Physiotherapy helps to address any pain with daily activities, balance concerns and provide guidance with appropriate exercises to do at each stage of recovery. The goal is to return you to a pain-free, pre-surgery level of activity.

Examples of simple exercises you may begin in the first month after operation



Daily walks at a comfortable pace, gradually increasing the duration by 5 minutes weekly, as tolerated

Simple household chores e.g. washing the dishes and folding the clothes to promote upper limb movements

Mini squats, holding onto support as required

Tandem walking or tandem heel raises to improve balance

Active neck and shoulder movements to reduce stiffness

Please ensure that the exercises are carried out in a safe environment where support is available when required. Do not perform these activities if you are feeling dizzy or unwell.

FAQs

Will my scoliosis improve with physiotherapy or other methods of conservative treatment?

Bracing, physiotherapy or other alternative treatment methods cannot always prevent worsening of scoliosis. With physiotherapy, many patients see improvements in their posture over time, which increases their self-image and confidence. Physiotherapy also helps to minimise the likelihood of developing lower back pain in the future through proper conditioning and muscle strengthening exercises.

What if I still want to join the Schroth programme even if I do not meet the criteria?

Do not worry if you were not recommended Schroth therapy. The same physiotherapy and exercise principles will be applied and tailored for you. By consistently incorporating physiotherapy exercises, most patients obtain better posture over time.

What else can I do to help my condition?

Participating in regular physical exercise of your choice is highly encouraged as it helps increase your overall body strength and muscle endurance. This will provide good support to your spine and joints, and reduce postural changes due to scoliosis.

Part 2c: Surgery

Surgery

When is surgery recommended?

- Cobb angle is greater than or equal to 45° in the skeletally immature
- Cobb angle is greater than or equal to 50° in the skeletally mature

What is the purpose of surgery?

The aim is to correct spinal deformity by straightening the spine and achieve bony fusion of spine to prevent further worsening of scoliosis in future. The majority of children or teenagers require this form of spinal fusion surgery. However, there are other surgical options for younger patients, or those with less severe but progressive scoliosis.

Your doctor will be happy to discuss these other options in detail with you.

Your Decision

Why now?

It is not causing me any problems yet, should I wait until I finish growing?

Individuals who meet the criteria for scoliosis surgery should consider having the operation soon. Postponing surgery may result in the scoliosis worsening significantly and may make the operation longer and riskier.

What are the risks of surgery?

Scoliosis surgery is a major surgical operation and is associated with many potential risks and complications. However, with advances in surgical navigation and instrumentation systems, the risks are kept to a minimum.

Take your time to ask your doctor about the surgery. Our nurse clinicians may also be able to connect you with other patients and their parents who are willing to share their experience with you.

What are some of my fears?



Surgery Details

What will my surgery experience be like? (Posterior spinal instrumentation and fusion)

- Metallic implants will be used to make your spine straighter
- The surgery usually takes about 4 – 6 hours but may last longer if the scoliosis is more severe
- You will usually need to stay in hospital for about 5 – 7 days

What will my surgery experience be like? (Non-fusion surgery)

For patients in early stages of puberty with less severe curves, 'fusionless' surgical options may be recommended instead to gain control of the spinal curvature. These operations generally take 2 – 3 hours and the inpatient stay is also slightly shorter, typically 2 – 4 days.

For all scoliosis operations,

- The surgery will be done under general anaesthesia (i.e. you will be asleep the whole time)
- Your anaesthetist will see you the day before surgery and answer any questions you might have regarding anaesthesia and pain control
- In some cases, patients may be able to donate their own blood 2 – 3 weeks before surgery so that they can receive their own blood for transfusion during their surgery

What about my spinal implants?

Spinal implants are safe for the long-term and generally do not need to be removed. The implants help your spinal bones fuse together permanently.

Before Surgery

How can I prepare for my surgery?

It is natural to feel afraid and anxious when you find out that you require surgery. If you have questions or concerns, share and discuss them with your doctor and family. You will also receive a call from our nurses 2 – 3 months before your surgery to confirm the operation date.

We have prepared some helpful tips to help you and your parents prepare for your surgery:

- Attend the pre-surgery meeting
- Talk to your doctor about your worries. Your doctor can explain about what to expect before, during and after your surgery
- Attend your pre-surgery physiotherapy appointment
- For Adolescent Idiopathic Scoliosis patients, watch the “Accelerated Recovery Programme Educational Video” (scan the QR code on the right with your phone)
- Bring your favourite books, toys and electronics to help you during recovery
- Bring lip balm and skin moisturiser as lips and skin often become dry after surgery
- Make a list of things to look forward to after your surgery! This can be a list of food you want to eat or activities you want to join once you recover. This can keep you motivated
- Think positive, you are here to get better!
- If you are unwell 1 – 2 weeks before your surgery date, please call the clinic to inform our nurses



What to expect the day before surgery:

- Please arrive at the hospital around 12.30 pm and report to the Admissions department
- Your doctor and anaesthetist will see you to ensure you are well
- Consent for the operation and anaesthesia will be taken from your parents
- Your anaesthetist will teach you how to use a hand-controlled button for pain relief to help control pain
- Your physiotherapist will teach you deep breathing and mobility exercises that will be helpful during recovery
- Blood samples will be taken
- Shower the evening and morning before surgery with antiseptic wash
- Your nurses will conduct routine checks
- Adhere to fasting instructions given to you
- Have a good night's sleep so that you are refreshed and well-rested for your big day!

Surgery

On the day of surgery, you can expect:

- Meetings with your surgeon, anaesthetists and nurses
- During your journey from the ward to the operating theatre, you may be asked the same set of questions by different people, such as nurses and doctors
- Your nurse will apply an antiseptic lotion to your nostrils to prevent infection
- A chance to ask questions before surgery

Surgery is done. What's next?

For **pain control**, you will be:

- Able to press a hand-controlled button for pain relief before sitting, standing or walking
- Reviewed regularly in the first few days after surgery by the pain specialist doctors. Let them know how your pain levels are so they can adjust your medications accordingly

When can I eat?

- You will be given fluids through your drip immediately after surgery
- Sometimes, you may be able to drink fluids 1 – 2 days after surgery
- You will gradually be allowed to eat a normal meal sometime later
- You are advised to drink high-fibre fruit shakes such as papaya to prevent constipation

What else can I expect?

- Constipation is not uncommon after general anaesthesia and decreased activity levels
- Being turned every few hours by ward nurses
- Oral pain medications will be prescribed to manage your pain
- You will be encouraged to sit and stand on the first day after surgery
- Early physiotherapy to focus on recovery through sitting, standing and walking
- Wound inspection and dressing change will be done on the ward before going home
- Wound care advice will be given
- You may experience dizziness, nausea and vomiting or itching. These may be side effects of your pain medication. Inform your doctor if you have any of these symptoms
- X-rays will be taken before going home

FAQs

Can scoliosis reoccur sometime later even after surgery?

Correction by surgery is permanent and scoliosis will not reoccur. After your surgery, you can look forward to many years of good health and an improved quality of life!

Part 3: Discharge Information and Home Care

Discharge Information

When can I be discharged?

Throughout your stay here, expect to see yourself continually improving day by day. Many of our patients who have undergone scoliosis surgery are able to stand and even walk the day after surgery. Once you are able to walk comfortably, we will perform X-rays to check the position of your implants and check your wound. You will then be ready to go home!

Care at Home

First six weeks at home after surgery:

Return to the hospital immediately if there is:

- Excessive staining of your back dressing from wound discharge
- Persistent fever of 38.5 °C or more
- Significant weakness or numbness in your legs

Wound care

- Keep your wound clean and dry. A waterproof dressing will be applied before you go home; shower as usual without directing the shower jet on your wound
- Our nurses will give you an appointment upon discharge to return to the clinic so that your wound can be reviewed

Daily activities

- Resume activities as tolerated and advised by your doctor
- Avoid carrying or lifting heavy objects
- Keep your back straight when picking up objects by bending your knees
- Resume the exercise regime taught by your physiotherapist
- Take pain medications if your pain is significant
- Drink more water and eat high-fibre fruits and vegetables
- Use chairs and beds with a firm base; try not to sit and stand for more than 1 hour each time
- Have enough rest between activities

Pain control

- Oral pain medications will be prescribed for use when you are discharged

After six weeks at home:

- Attend follow-up consultations and X-rays with your doctor
- Attend follow-up appointments with your physiotherapist
- Avoid contact and high-impact sports, physical education lessons or heavy lifting until cleared by your doctor
- After 3 months, start short periods of distance walking and low-impact sports

Now that I am 'discharged' from KKH for scoliosis, what now?

- Be confident, surgery has little physical effect on your ability to do things
- Continue a back-friendly lifestyle by keeping active and maintaining your weight
- If you are referred to an adult hospital, attend regular follow-up sessions

MEDICAL DISCLAIMER:

The information provided, and other materials contained within this handbook are for informational purposes only. No material is intended to be a substitute for professional medical advice, diagnosis or treatment. Always seek the advice of your doctor with any questions you may have regarding scoliosis or its treatment.

Information in this booklet is accurate as of November 2021.

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