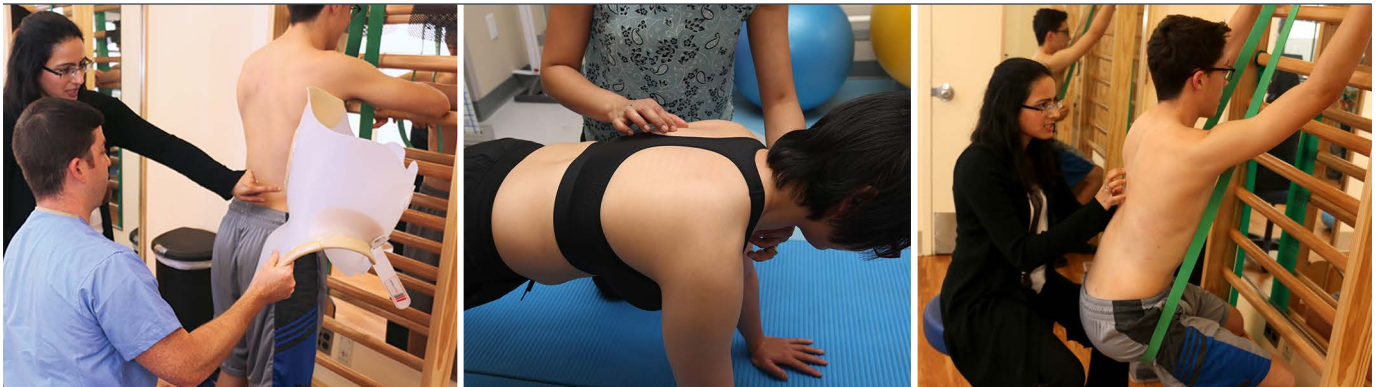


A guide for patients
and families

What to Expect: Non-Operative Care



AMAZING
THINGS
ARE
HAPPENING
HERE

for kids

Division of Pediatric Orthopedics

NewYork-Presbyterian/Morgan Stanley Children's Hospital
Columbia University Medical Center

Department of Orthopedic Surgery

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columbiaortho.org



COLUMBIA UNIVERSITY
DEPARTMENT OF ORTHOPEDIC SURGERY
College of Physicians and Surgeons



NewYork-Presbyterian
Morgan Stanley Children's Hospital

Welcome to Columbia Orthopedics

Dear Parents & Patients,

Welcome to the Non-operative Spine & Scoliosis Care at Columbia Orthopedics. We understand that scoliosis can be a frightening diagnosis and that you will have many questions. We have designed this book to provide you with general information about scoliosis and the non-operative treatment options available to you at Columbia.

Here at Columbia Orthopedics we have assembled a group of scoliosis experts who work together with families to create an individualized care plan for every patient. We do this by offering the most up-to-date, safest, and effective treatment options, as well as the support and guidance of our specialists.

Columbia Orthopedics is dedicated to providing sensitive, age-appropriate care to children and their families throughout their scoliosis journey. We understand that the emotional impact of scoliosis can be as intense as the physical demands and we are here to support you.

Sincerely,

The Non-operative Spine & Scoliosis Care at Columbia Orthopedics

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Your Non-operative Care Team



Michael G. Vitale, MD, MPH
Specializes in the non-operative and operative treatment of complex pediatric scoliosis and other spinal disorders. Has a special interest in quality and safety.

<https://pediatric scoliosissurgery.com/>

App: *Scoliosis Tracker* App for Iphone/Ipad

Book: *Scoliosis-A Guide for Children and Their Families*



Benjamin D. Roye, MD, MPH
Specializes in the non-operative and operative treatment of complex pediatric scoliosis and other spinal disorders.

<https://www.columbiaortho.org/>



Aameka George, CPNP
Pediatric Nurse Practitioner
Works with Drs. Roye and Vitale and sees patients independently.



Amber Sentell Mizerik, PA -C
Physician Assistant
Works with Dr. Vitale, helps run a clubfoot clinic, and sees patients independently.



Julie Morales, RN
Pediatric Nurse
Works with Dr Roye



Nikki Bainton, CPNP
Pediatric Nurse Practitioner
Works with Drs Hyman and Roye and sees patients independently.



Prachi Bakarania, DPT
Physical Therapist
Physiotherapeutic Scoliosis-Specific Exercise (PSSE) Focus



Abigail Smul, DPT, CSCS
Physical Therapist
Physiotherapeutic Scoliosis-Specific Exercise (PSSE) Focus



John Tunney, BOCPO
Orthotist and Prosthetist
Specialist in the NYRC brace



Walter A. Nance, BOCO, OTC
Orthotist and Scoliosis Casting Technician

Contact Information

Online Messaging – Patient Portal:

You can send messages to the clinical staff and office via the MyChart portal. Please make sure to sign up for an account either online or at your next visit. You can find information to sign up at columbiadoctors.org/connect.

Clinical Questions:

You may reach a member of our clinical team by calling (212) 305-5475. Please leave a detailed message with the team member who answers your call so that we might direct you to the most appropriate clinician. For school notes, PT prescriptions and x-ray requisition requests: please have a fax number or address available.

General Information

Medical Records

You may access health information we maintain about you or your child. You must complete a release form giving us permission to share protected health information with other providers. Please contact our medical records office so that they can help you with your requests. Their number is 212-305-8255. You can also visit our website at columbiaortho.org/patient-care/resources/medical-records to obtain the form online.

Insurance & Financial Information

Columbia Orthopedics has partnered with East Coast Orthotics to provide our patients with braces. If you have a question about insurance authorization or coverage of a brace, please contact Angela Berberich at (631) 392-2237.

Billing questions regarding an appointment with one of our providers should be directed to the Columbia Orthopedics Billing Department at (646) 317-7111.

Our Websites and Additional Resources

- Pediatric Orthopedics: columbiaortho.org/peds
- New York Presbyterian/Morgan Stanley Children’s Hospital: childrensnyp.org
- Dr. Vitale’s Website <https://pediatric scoliosissurgery.com/>
- **App:** *Scoliosis Tracker* App for Iphone/Ipad
- **Book:** *Scoliosis-A Guide for Children and Their Families* Paperback and Kindle by Dr. Vitale and Amber Mizerik, PA-C

Team Approach to Nonoperative Scoliosis Care

Non-operative care is an approach to the treatment of scoliosis focused on avoiding surgery. Currently, the non-operative methods that we use to treat scoliosis are bracing and physiotherapeutic scoliosis specific exercises (PSSE). Both of these options require an intense and prolonged commitment from the child and family, as well as a skilled team of orthopedic providers, orthotists, and physical therapists.

The study “Effects of Bracing in Adolescents with Idiopathic Scoliosis,” published by The New England Journal of Medicine in 2013, found that among patients with curves ranging from 20 to 40 degrees, bracing was more effective than observation at preventing progression to surgery. It also found that the number of hours that the child wears the brace matters – patients who wore the brace more had a greater likelihood of avoiding surgery. However, we know that handing a teenager a brace and telling them to wear it is not effective without the support of family and a team of trained professionals.

We understand that the diagnosis of scoliosis affects the entire family and we are committed to supporting and empowering you throughout this process. Our team includes doctors, nurse practitioners, physician assistants, orthotists, and physical therapists. Each team member brings a unique set of strengths and skills to the treatment process, and by working cooperatively we address all aspects of your care.

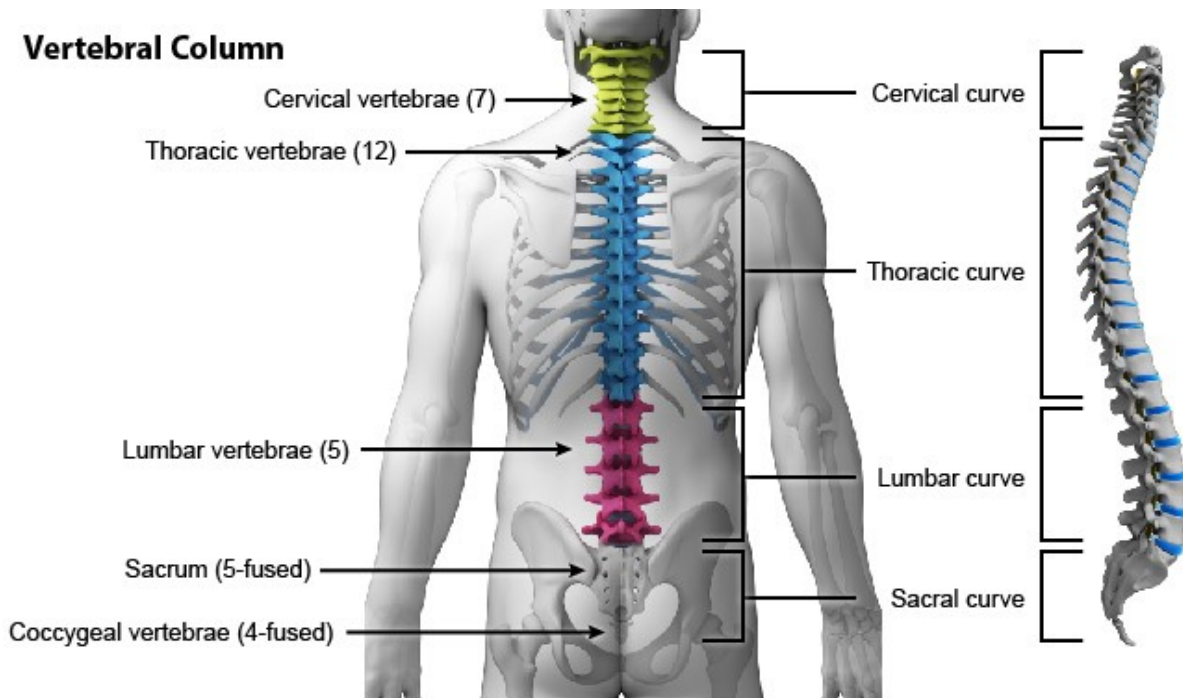
What is Scoliosis

Scoliosis is a 3-dimensional curvature of the spine. The most common form of Scoliosis is called Adolescent Idiopathic Scoliosis (AIS) – it is first diagnosed between ages 10 and 18. The term ‘Idiopathic’ means that the cause is unknown, and denotes that this type of scoliosis is not caused by any other medical problem. Scoliosis can also occur in children younger than age 10, and this is referred to as Early Onset Scoliosis (EOS).

AIS affects as many as 4 in 100 children and is more common in girls. There does appear to be a genetic link to AIS as the incidence is greater in children with a family history of scoliosis in a close relative. This book will be discussing AIS but many of the same principles and treatments apply to younger patients as well.

Anatomy of the spine

The spine is made up of 24 mobile vertebrae: 7 cervical, 12 thoracic, and 5 lumbar. The cervical vertebrae compose the neck, the thoracic vertebrae are attached to the ribs, and the lumbar vertebrae are in the lower back. The 5th lumbar vertebra connects to the sacrum, which is in turn attached to the pelvis. The spine houses and protects the spinal cord. When viewed from behind the spine should be straight and when viewed from the side it should have a normal thoracic *kyphosis*, or forward curvature, and a lumbar *lordosis*, or backwards curvature.

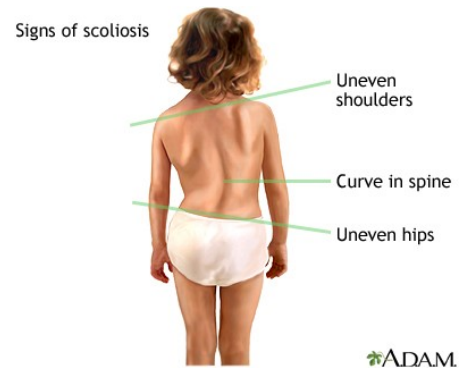


1

1 image: cybersurgeons.net

Connection to growth

Most children with scoliosis are not aware that they have it. Usually, a difference in the child's back is first noticed by parents or by a medical professional during a routine physical exam. The child may have passed routine scoliosis screenings in the past, but then an asymmetry appears in the child's shoulders, scapula, ribs or hips over a short period of time. This is because *scoliosis tends to progress as a child goes through a growth spurt*. Likewise, scoliosis tends to stabilize once a child is finished growing.



2

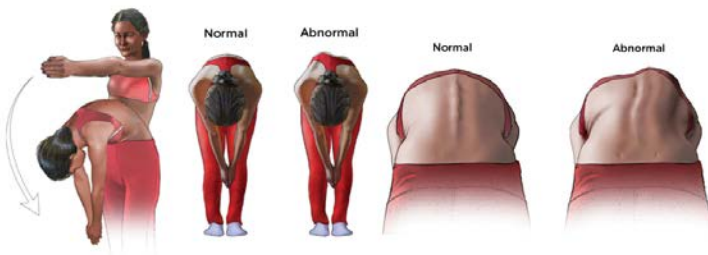
Risk of Progression Models with Risser Model and Sanders Model:

<https://pediatric scoliosis surgery.com/risk-severity-scores/>

How is scoliosis diagnosed?

The pediatrician uses the forward bend test to evaluate differences in the trunk. If there is a concern about scoliosis, your provider will send you to an Orthopedist for a spine x-ray and further clinical evaluation.

The forward bend test



3

The Orthopedist orders an x-ray of the spine and determines the degree of the scoliosis by measuring the curvature. This is referred to as the **Cobb angle**. Curves less than 10 degrees are considered within normal range, 10 to 25 degrees is a mild scoliosis, 25 to 45 degrees is a moderate curve size, and greater than 45 degrees is severe scoliosis.

Is that an 'S' or a 'C' curve?

There are a variety of curve patterns found among people with scoliosis. Some people have one curve; others may have two, three, or even four curves. Having more curves does not mean that your scoliosis is worse. The body wants to maintain balance by keeping your head centered over your pelvis. It does this by creating additional *compensatory curves*. These curves are a normal and expected finding.

2 Image: nlm.nih.gov

3 Image: choa.org

Why do we treat scoliosis?

In and of itself, a scoliosis measuring less than 45 degrees in a fully-grown person *does not have any impact on overall health or functional abilities*. The size of these curves tends to stay stable throughout life. However, once a curve is 45 degrees or larger it may continue to get bigger even after a person is completely grown. Very large curves can begin to impact internal organs such as the lungs, and they may cause back pain and functional difficulties.

The goal of treating adolescent idiopathic scoliosis is to prevent progression once treatment is initiated and help the child arrive at skeletal maturity with a curve less than 40 degrees.

When curves become greater than 50 degrees there is a very high likelihood that they will continue to get larger over time. At this point, spinal fusion surgery is recommended to correct the scoliosis and halt progression of the curve.

Calcium and Vitamin D Supplementation

Recent research suggests that Calcium and Vitamin D supplementation may further reduce the risk of progression of adolescent idiopathic scoliosis. We recommend that you take **600 mg of Calcium** and **800 IU of Vitamin D3 daily**. Many pharmacy chains carry this dose of calcium and vitamin D in one pill. This is a common over the counter supplement and does not require a prescription.

How will scoliosis affect my life?

Being told that you have scoliosis can be scary. In all of the most important ways scoliosis will not change who you are. Your personality will be the same, you will not feel sick or unhealthy, and you can still do all of the sports and activities that you enjoy.

However, while you are still growing your scoliosis needs to be checked by your Orthopedist several times per year. You will most likely need to get x-rays taken at your appointments to make sure that the curve hasn't progressed. Depending on the size of your curve, we may recommend a special type of physical therapy or you may be prescribed a back brace to wear. Living with a brace can be challenging, but this is temporary – *once you are finished growing you will be finished with the brace.*

As an adult, scoliosis will not stop you from doing any of the things you love. You will be able to have an active life, participate in sports without restriction, and have children.

Orthopedic Appointments and Imaging

Once you have been told you have scoliosis your Orthopedist will want to see you several times per year. The number of visits will vary based upon how quickly you are growing and the treatment regimen we have developed. In general, you can expect to see us 2 or 3 times per year. At those visits you will be asked to change into a gown so that we can perform a physical exam, which includes looking at your back during the forward bend test.

Spine X-rays

At most visits your Orthopedist will ask you to get a spine x-ray prior to your appointment. We do this in order to compare Cobb angle measurements and track your curve over time. X-rays may also be used to check the fit and effectiveness of a brace. Many children and parents have concerns about the repeated exposure to radiation at such a young age. We take this concern very seriously and do our best to limit the number of x-rays per year.

EOS

We have installed an extremely low-dose x-ray machine, called **EOS**, at our Morgan Stanley Children's Hospital location. This machine simultaneously captures a full body image from the front and side and then uses a computer to combine the images. This unique process cuts the radiation exposure. As an added benefit, this type of x-ray is much faster; it takes less than a minute to complete. *In order to use EOS the patient must be able to follow directions and stand completely still for about 20 seconds.* ⁴



Why a hand x-ray?

A large part of treating scoliosis appropriately is determining the child's current rate of growth. To do this we consider several factors: any recent increase in height, pubertal development, and a special x-ray of your hand called a *bone age x-ray*. This x-ray helps us to determine where you are in your growth: whether you are growing steadily as a pre-adolescent, in the midst of your adolescent growth spurt, or in the slower final stages of growth. This information will help guide our treatment decisions. Unfortunately, it does not tell us how tall you will be! There are many bones in the hand and each one of these bones has a growth plate that we can see on x-ray. As a child matures, these growth plates begin to close in a sequential manner beginning at the tips of the fingers and proceeding down the hand until, finally, the growth plates of the wrist close. At that point the child is finished with growth. We use a grading system called the *Sanders scale* to classify the x-ray into one of 8 stages. *The adolescent rapid growth spurt occurs during stages 3 and 4*, followed by a period of slower growth. Understanding where you are in your growth tells us when to initiate and end treatment and helps guide us on how frequently you need to follow up.

⁴ Image: www.eos-imaging.com

MRI

Not all scoliosis is AIS; sometimes there are other reasons that scoliosis develops. If your Orthopedist notices that the curve has an atypical pattern, if the curve is progressing rapidly or if there are differences in your neurological exam we may ask you to get an MRI of the spine. This test allows us to look closely at the spinal cord to make sure that it is not being affected by the scoliosis and that there are no other causes of the scoliosis. This test is non-invasive and takes about one hour; it only requires that you lie still on a table inside the MRI machine.

We understand that lying still can sometimes be difficult for children, so at Morgan Stanley Children's Hospital we have Child Life Specialists on staff to explain the test in a developmentally appropriate way. There is a special "mock" MRI machine, which the Child Life Specialists may use to allow children to simulate the experience through play. This helps them to prepare for the test and understand what is going to happen. We also have special glasses and headphones that can be worn in the MRI machine to watch movies or listen to music. If you are interested in any of these options, please let your provider know and we will connect you with Child Life.

Research and technology

As a major academic institution, Columbia University is dedicated to enhancing the existing body of knowledge about scoliosis through research and the development of new technologies. At a visit with your Orthopedist you may be asked to participate in a research study. Your involvement may include filling out a questionnaire, allowing us to take your measurements, or trialing a new app or device. While the choice to participate is always optional, we hope that you will seriously consider any research request because the information we collect improves the care of all patients with scoliosis. All research at the University is under the strict oversight of the Institutional Review Board and whether or not you choose to participate in a study, your care will always adhere to standard practices.

Bracing

Bracing treatment is typically recommended after the curve has reached 25 degrees, but this may vary depending on the child's age, skeletal maturity, family history and additional factors. Several types of braces exist, such as the Boston style TLSO (thoracic-lumbar-sacral orthosis) brace, Charleston bending brace, Providence brace, and a Rigo-Chêneau brace.

All braces are designed to prevent progression of the spinal curve. However, it is expected that when you take off the brace your spine will return to its previous shape. Bracing does not cure or improve scoliosis.

It is important to remember that our goal is to keep your curve from changing, even though you are growing.

Advances in brace design have allowed for more comfortably fitting braces. If your brace is uncomfortable, it is important to speak with your Orthopedist as well as your orthotist. They may want to take updated x-rays to see if the curve has progressed; evaluate whether you have outgrown the brace; or make changes to the brace. If the brace is comfortable then you are more likely to wear it for the recommended number of hours.

Types of braces

In our practice, we typically use the **NYRC Brace with smart and brace technology and the TLSO brace.**



Boston TLSO (right)
Rigo-Chêneau Brace (left).

Essential differences in brace design give Rigo-Chêneau braces better derotational control over scoliosis curves.

The New York RC Brace (NYRC brace) is based on the tried and true principles of **Dr. Manuel Rigo** and **Dr. Jacques Cheneau**, while **maximizing in-brace frontal curve correction** (Cobb angle), derotation of the spine, and **sagittal balance**, specific to your patient's native pelvic incidence. The 3D biomechanical design of the NYRC brace complements the Schroth Physical Therapy Method. To slow the scoliosis curve progression Schroth therapists teach patients to improve their postural alignment with specific exercises and positions.

The **NYRC brace** helps to achieve the greatest 3D in-brace correction possible, contributing to the schroth treatment, exercises, and physical therapy. Sagittal balance has proved important in adult spinal deformity, maintenance of balance during scoliosis treatment has lasting effects. Both the therapists and the bracing system work to achieve this goal. There are cutouts in the brace that align with the concavities of your curves and allow for thoracic expansion and reshaping of the ribcage.



The NYRC Brace is a highly customized orthosis manufactured with the most advanced CAD/CAM technologies. The size and shape of a **NYRC brace** varies depending on your curve pattern because the brace is made specifically for you. Measurement for a **NYRC brace** involves photographs, measurements in static and dynamic postures, and a 3D scan of the patient's body. Your brace measurements are then uploaded into a state-of-the-art computer system. We select the appropriate brace mold and then your brace is manufactured by East Coast Orthotics according to these specifications. It has been developed to provide, for each case, the most reliable and effective results during the non-operative treatment of idiopathic scoliosis. Each **NYRC brace** is carefully designed and fabricated in New York (U.S.A.).

Our expert orthotist, John Tunney BOCPO, has years of experience with the **NYRC Brace** and is available in our office so that you are able to see him at the time of the visit with your Orthopedist.

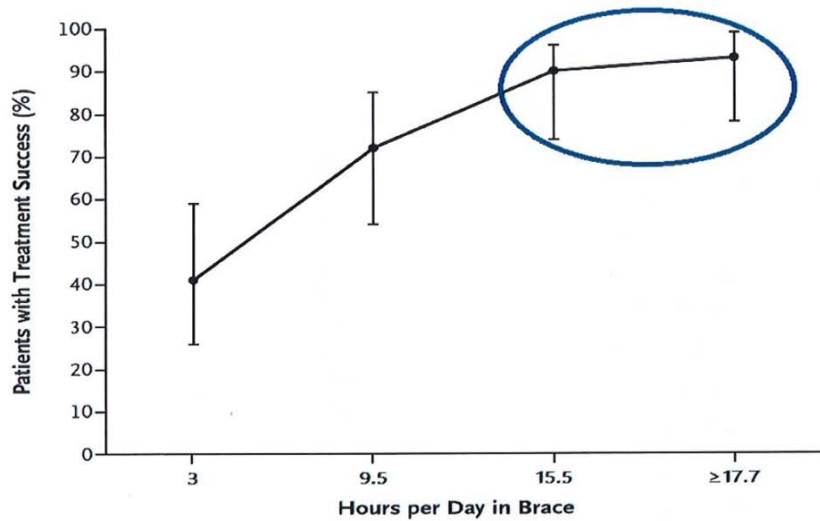
For more information on the **NYRC Brace**, please visit East Coast Orthotic & Prosthetic Corp. on the web at nycbrace.com. The Boston TLSO utilizes a custom, made-to-measure design. It works by applying three-point pressure to the curvature via foam pads placed within a molded plastic shell. The brace is constructed using a radiograph-based blueprint designed by the orthotist.

Time in the brace

For the **TLSO** and the **NYRC Brace**, it is recommended that you wear the brace 15-18 hours a day. A recent study published in the New England journal of Medicine and funded by the NIH, found that the effect of bracing is determined by the number of hours in the brace, as well as by the curve correction of the brace.

If you wear the brace less than the recommended 15-18 hours a day, it is more likely that your curve is going to progress and ultimately require surgical treatment. If there is no curve progression, the brace is usually worn until an adolescent reaches skeletal maturity, a point that varies among individuals. We use the bone age x-ray to help us determine the right time to halt bracing treatment.

While the standard brace prescription calls for full time bracing of 16-18 hours/ day, in some cases there is a role for part time or nighttime bracing as well. Patients with smaller curves (generally under 25 degrees) and not in their adolescent growth spurt may be candidates for this protocol.



The more you wear your brace, the better it works!

Adapted from: Weinstein SL, Dolan LA, Wright JG, Dobbs MB. "Effects of Bracing in Adolescents with Idiopathic Scoliosis." The New England Journal of Medicine. 2013 Oct 17;369(16):1512-21.

Brace follow up

Once you have been measured and fit for the brace, the orthotist will explain how to wean into the brace. The brace is like a new pair of shoes; it takes some time to get used to it and to be able to obtain the 15-18 hours a day at the desired tightness. It will take about 4 to 6 weeks to reach the 15-18 hours a day, and at that point we will have you follow up with our Nurse Practitioner to obtain an x-ray in the brace. We take this x-ray to make sure that the brace is correcting the curve. The orthotist will also be present at this appointment in case there are any changes that need to be made to the brace. For all of your other scoliosis follow up appointments, we will obtain x-rays **out** of the brace to see whether the curve has progressed. At those visits you must be out of the brace for 24 hours prior to the x-ray to eliminate any effect the brace might have on the curve.

*The series of appointments can get confusing, so we have created the guide on the **next page** to assist you.*

Brace Compliance Monitor

Tracking compliance with Bracing helps to get the best outcome. The Smart strap in the NYRC allows the patient and the provider to be able to look at compliance over a period of time. This helps to provide feedback during the visit and talk about ways to improve brace compliance.

Bracing Protocol

You will have 4 appointments with our team. The first 3 will occur at NYP/Morgan Stanley Children's Hospital or ColumbiaDoctors Tarrytown Office. Please refer to the guide on the next page to help you keep track of your appointments.

1. Brace Measurement Appointment

1 hour with our Orthotist John Tunney

Appointment Date _____

2. Brace Fitting Appointment

2 hours with our John Tunney

Appointment Date _____

Note: This is when you will receive your brace

3. Brace Check Appointment (and IN-BRACE x-ray)

With Ameeka George, CPNP, and John Tunney

Appointment Date _____

*Note: If you prefer this appointment to be **IN PERSON** with Ameeka **AND** John together please first call Columbia Orthopedics (212-305-4565) and make an appt with Ameeka. Then call Angela (631-392-2237) to make an appt with John for the same day/time. This appt should be scheduled 6 weeks after your brace fitting appt. If you are okay with a telehealth visit with Ameeka please first call Columbia Orthopedics (212-305-4565) and make a **telehealth** appt with Ameeka. Then call Angela (631-392-2237) to make an appt with John anytime up to 7 days prior to Ameeka's appt. Please make sure to let the appt scheduler and Angela know you are coming in for a brace check. When you see John you will need to arrive **1 hour** early to meet with John. He will help you tighten your brace before going for your in brace xray."*

4. Appointment with Your Doctor (and OUT OF BRACE x-ray)

Appointment Date _____

Note: this appointment will be scheduled for 6 months after the last out of brace x-ray

Do not wear your brace for 24 hours prior to this appointment

Questions? For all questions regarding insurance authorizations for your brace, or to schedule an appointment with John Tunney for a brace measurement or fitting appointment, please contact **Angela Berberich at East Coast Orthotics (631) 392-2237**

To schedule an appointment with a Columbia Orthopedics provider, please contact our appointment scheduling team at (212) 305-4565.

Bracing Tips and Tricks

1. The undershirt you wear underneath the brace is very important. Something relatively tight fitting, seamless, and sweat wicking are all qualities to look for. This can greatly increase your comfort.

Websites that sell comfortable tank tops for underneath the brace:

- www.hopescloset.com
- www.embracedincomfort.com
- www.bracebuddies.co

2. You can find some clothing recommendations in the book *“Straight Talk with The Curvy Girls”*. There is a whole section of the book devoted to how to make it easier to dress with a brace on.
www.straighttalkscoliosis.com/index.html
3. Always bring your brace, x-rays, and appropriate clothing with you to your visits with the Orthopedist and the Orthotist. An example of clothing would be a snug fitting t-shirt and leggings.
4. Call your Orthotist immediately if you are having brace fit issues. You do not need to wait to see the doctor for these issues to be resolved.
5. Always make sure that your brace is on correctly. In most bracing systems the waist is well defined and should be the landmark for correct brace wear. If the waist is positioned properly the rest of the brace should fit as designed. Putting on the Rigo-Chêneau brace while lying down can make a big difference.
6. If you are having a hard time connect with a brace mentor through Scolios-us Mentor Program:
<https://www.bracingforscoliosus.org/bracing-mentor-program/>

When do I stop wearing the brace?

When your growth has slowed and your Orthopedist determines that you are ready to stop wearing the brace, we will recommend a period of weaning out of the brace. Typically, we will first wean the brace to nighttime only and then at the next visit if there is no further progression, discontinue the brace all together.

During the weaning period and after the brace has been discontinued, some patients experience some back pain. This is because your core and back muscles can become weak from immobilization while in the brace. It is important that you continue with scoliosis specific exercises to maintain your core while you are wearing the brace. If you do experience back pain after you discontinue the brace, please speak with your Orthopedist. We may prescribe some physical therapy to work on your core muscles and decrease the pain.

Physiotherapeutic Scoliosis-Specific Exercise (PSSE)

Our medical center is proud to offer a specialized form of physical therapy called Physiotherapeutic Scoliosis-Specific Exercise (PSSE), for the management of scoliosis, kyphosis, and other spinal conditions. Our physical therapists are trained in a variety of different PSSE approaches, to include

- the Schroth Method from the Barcelona Scoliosis Physical Therapy School (BSPTS) Concept by Rigo
- the Scientific Exercise Approach to Scoliosis (SEAS) from the ISICO group out of Milan Italy
- the Lyon Method based out of Lyon, France (*certification is in process*)

Our therapists each have close to a decade of experience working with individuals with scoliosis, kyphosis and other spinal conditions and have been therapists for over 15 years.

Background:

BSPTS Concept by Rigo - Barcelona, Spain

BSPTS Concept by Rigo is a PSSE approach and one of several branches that have emerged from the Schroth method. The Schroth method was originated by Katharina Schroth and her daughter, Christa Lehnert-Schroth, in the early to mid 1900s. BSPTS- Concepts by Rigo is a rigorous certification pathway rooted in a solid understanding of the biomechanics of the spine in order to best optimize the health of each patient's spine and movement system throughout the lifespan. The approach utilizes exercises that are based in training the individual to find the best three-dimensional alignment that is most stable, centered, and balanced for that individual's unique trunk shape.

Supporting References

Kwan KYH, Cheng ACS, Koh HY, Chiu AYY, Cheung KMC. Effectiveness of Schroth exercises during bracing in adolescent idiopathic scoliosis: results from a preliminary study-SOSORT Award 2017 Winner. Scoliosis Spinal Disord. 2017;12:32.

Schreiber S, Parent EC, Khodayari moez E, et al. Schroth Physiotherapeutic Scoliosis-Specific Exercises Added to the Standard of Care Lead to Better Cobb Angle Outcomes in Adolescents with Idiopathic Scoliosis - an Assessor and Statistician Blinded Randomized Controlled Trial. PLoS ONE. 2016;11(12):e0168746.

SEAS method - ISICO, Milan Italy

This method begins with the patient's understanding and perception of their own posture. Once awareness is in place, the patient learns an "active self-correction", where they are trained to find the best possible alignment of the spine and trunk in all three-dimensions. The SEAS method then focuses on achieving trunk and spine stabilization through individualized exercises and incorporation of the active self-correction into daily activities. The SEAS method is unique in that it uses less props and is easier to implement in day-to-day life.

Supporting Reference

Monticone M, Ambrosini E, Cazzaniga D, Rocca B, Ferrante S. Active self-correction and task-oriented exercises reduce spinal deformity and improve quality of life in subjects with mild adolescent idiopathic scoliosis. Results of a randomised controlled trial. Eur Spine J. 2014;23(6):1204-1214.

Lyon Method - Lyon, France

The Lyon Method is the oldest PSSE method in existence and combines scoliosis-specific exercise with bracing. The Lyon school of physiotherapy is directed by Dr. Jean Claude de Mauroy. It is the first method to focus on the importance of the sagittal plane (side view) alignment and its role in affecting scoliosis progression.

Supporting Reference

De Mauroy JC, Fort D. Prospective study of 393 adolescent thoracic hyperkyphosis patients treated by the Lyon method. Scoliosis. 2013;8(S2):050.

What to Expect

Our therapists practice with a philosophy that considers the whole person, and not simply a painful body part. Your experience with us will begin with a thorough and comprehensive assessment. We will take a history, and perform an exam that investigates your posture, function, movement patterns, breathing patterns, and muscle performance, as well as tissue tone. A plan of care will be developed based on goals set by you and your therapist together and individualized to your needs.

What to bring to your first appointment

Please bring a prescription from your referring provider if you have one, insurance information, as well as any diagnostic tests such as x rays for your therapist to review. Note: if you are a patient who was seen or referred by a Columbia provider, your MD notes, PT script, and imaging will be in our system, so no need to bring them to your appointment.

What to wear to your first appointment

Bring or wear comfortable clothes that enable you and your therapist to observe your trunk as you perform various postures and movements. For females, this includes a sports bra or bathing suit top and shorts. For males, this includes a T-shirt and shorts. You can expect to be with us up to 45 minutes for your initial appointment.

What are the Exercises Like?

You may find the experience of scoliosis-specific exercises to be different than conventional exercises. The exercises have an emphasis on body awareness and discovering the most centered and sturdy alignment for your unique spine and trunk shape in all three dimensions (front view, side view, and rotation). You and your therapist will work to create stronger postural muscles and you will learn to utilize your new alignment knowledge in activities of daily life, school, sports, and work. If appropriate, your therapist will review modifications to conventional exercises you are doing to ensure you are able to maintain your best alignment. Mirrors, hands-on guidance, as well as external props might be used to facilitate your most optimal posture. The total duration of your program will vary based on your individual needs, but usually averages 10-15 total sessions.

Non-operative Care for Spine & Scoliosis

ColumbiaDoctors and New York Presbyterian Hospital have several certified Schroth therapists in different areas of New York.

ColumbiaDoctors Midtown – 590 5th Avenue (In person and virtual visits available if patients reside in NY or NJ)

Prachi Bakarania, DPT - Appointments: 212-305-4878

Abigail Smul, DPT - Appointments: 212-305-4878

Columbia Tarrytown Practice – 155 White Plains Road, STE 102 (In person and virtual visits available if patients reside in NY or NJ)

Rebekah Wallach, DPT – Appointments: 914-333-2403

Trella Allen, DPT - Appointments: 914-333-2403

NewYork-Presbyterian Westchester (formerly Lawrence Hospital) – 329 White Plains Road, Eastchester

Meghan Fontaine, DPT – Appointments: 914-787-3370

Mary Miceli, DPT – Appointments: 914-787-3370

NewYork Presbyterian Morgan Stanley Children’s Hospital – 3959 Broadway, New York, NY

Appointments: 646-697-8479

NewYork-Presbyterian Brooklyn Methodist Hospital - 263 7th ave Suite 2A, Brooklyn

Kevin Migliore, DPT - Appointments: 718-369-8000

NewYork-Presbyterian Hudson Valley Hospital – 1980 Crompond Road

Renee Lemieux, PT, DPT - Appointments: 914-0734-3251

To find a PSSE therapist in your area, please contact us for recommendations of therapists that we often work with. You can also view a more expansive list on the websites below:

- Schrothptsintheus.com
- Schroth-barcelonainstitute.com/physical-therapists-directory

Research Articles to Support Scoliosis-Specific Exercise

Randomized Controlled Trials/ Cohort Controlled Trials

- *Exercises Added to the Standard of Care Lead to Better Cobb Angle Outcomes in Adolescents with Idiopathic Scoliosis - an Assessor and Statistician Blinded Randomized Controlled Trial. PLoS ONE. 2016;11(12):e0168746.*
- *Kuru T, Yeldan İ, Dereli EE, Özdiñçler AR, Dikici F, Çolak İ. The efficacy of three-dimensional Schroth exercises in adolescent idiopathic scoliosis: A randomised controlled clinical trial. Clin Rehabil. 2015*
- *Kwan KYH, Cheng ACS, Koh HY, Chiu AYY, Cheung KMC. Effectiveness of Schroth exercises during bracing in adolescent idiopathic scoliosis: results from a preliminary study-SOSORT Award 2017 Winner. Scoliosis Spinal Disord. 2017;12:32.*
- *Liu D, Yang Y, Yu X, et al. Effects of Specific Exercise Therapy on Adolescent Patients With Idiopathic Scoliosis: A Prospective Controlled Cohort Study. Spine (Phila Pa 1976). 2020;45(15):1039-1046. doi:10.1097/BRS.0000000000003451*
- *Monticone, M, Ambrosini, E, Cazzaniga, D, Rocca, B, Ferrante, S. Active self-correction and task-oriented exercises reduce spinal deformity and improve quality of life in subjects with mild adolescent idiopathic scoliosis. Results of a randomised controlled trial. European Spine Journal Eur Spine J. 2014:1204–1214.*
- *Schreiber S, Parent EC, Khodayari moez E, et al. Schroth Physiotherapeutic Scoliosis-Specific Exercises Added to the Standard of Care Lead to Better Cobb Angle Outcomes in Adolescents with Idiopathic Scoliosis - an Assessor and Statistician Blinded Randomized Controlled Trial. PLoS ONE. 2016;11(12):e0168746.*
- *Schreiber S, Parent EC, Moez EK, et al. The effect of Schroth exercises added to the standard of care on the quality of life and muscle endurance in adolescents with idiopathic scoliosis-an assessor and statistician blinded randomized controlled trial: "SOSORT 2015 Award Winner". Scoliosis. 2015;10:24.*

Systematic Reviews

- *Burger M, Coetzee W, du Plessis LZ, et al. The effectiveness of Schroth exercises in adolescents with idiopathic scoliosis: A systematic review and meta-analysis. S Afr J Physiother. 2019;75(1):904. Published 2019 Jun 3. doi:10.4102/sajp.v75i1.904*
- *Day JM, Fletcher J, Coghlan M, Ravine T. Review of scoliosis-specific exercise methods used to correct adolescent idiopathic scoliosis. Arch Physiother. 2019;9:8. Published 2019 Aug 23. doi:10.1186/s40945-019-0060-9*
- *Fan Y, Ren Q, To MKT, Cheung JPY. Effectiveness of scoliosis-specific exercises for alleviating adolescent idiopathic scoliosis: a systematic review. BMC Musculoskelet Disord. 2020;21(1):495. Published 2020 Jul 27. doi:10.1186/s12891-020-03517-6*
- *Park JH, Jeon HS, Park HW. Effects of the Schroth exercise on idiopathic scoliosis: a meta-analysis. Eur J Phys Rehabil Med. 2018;54(3):440-449. doi:10.23736/S1973-9087.17.04461-6*
- *Romano M, Minozzi S, Zaina F, et al. Exercises for adolescent idiopathic scoliosis: a Cochrane systematic review. Spine. 2013;38(14):E883-93.*

Clinical Guidelines and Clinical Commentary

- *Negrini S, Donzelli S, Aulisa AG, et al. 2016 SOSORT guidelines: orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. Scoliosis Spinal Disord. 2018;13:3. Published 2018 Jan 10. doi:10.1186/s13013-017-0145-8*
- *Roye BD, Simhon ME, Matsumoto H, et al. Establishing consensus on the best practice guidelines for the use of bracing in adolescent idiopathic scoliosis. Spine Deform. 2020;8(4):597-604.*

Continued Research

If you wish to do further reading about this non-operative approach to the treatment of scoliosis, we recommend the following articles:

Weinstein SL, Dolan LA, Wright JG, Dobbs MB. "Effects of Bracing in Adolescents with Idiopathic Scoliosis." *The New England Journal of Medicine*. 2013 Oct 17;369(16):1512-21.

Sanders JO, Khoury JG, Kishan S, Browne RH, Mooney JF, Arnold KD, et al. "Predicting scoliosis progression from skeletal maturity: a simplified classification during adolescence." *The Journal of Bone and Joint Surgery*. 2008 Mar;90(3):540–53.

Kuru T, Yeldan I, Dereli EE, O Zdincler AR, Dikici F, Colak I. "The efficacy of three-dimensional Schroth exercises in adolescent idiopathic scoliosis: a randomised controlled clinical trial." *Clinical Rehabilitation*. 2015;30(2):181–190.

Monticone M, Ambrosini E, Cazzaniga D, Rocca B, Ferrante S. "Active self-correction and task-oriented exercises reduce spinal deformity and improve quality of life in subjects with mild adolescent idiopathic scoliosis. Results of a randomised controlled trial." *European Spine Journal*. 2014;23(6):1204–1214.

Schreiber S, Parent EC, Moez EK, et al. "The effect of Schroth exercises added to the standard of care on the quality of life and muscle endurance in adolescents with idiopathic scoliosis—an assessor and statistician blinded randomized controlled trial: " SOSORT 2015 Award Winner." *Scoliosis Journal* 2015;10(24).

Scoliosis Resources:

View all at - <https://www.columbiaortho.org/patient-care/specialties/pediatric-orthopedics/conditions-treatments/spine-disorders-scoliosis>

Books

Non Fiction

- Scoliosis A Guide for Children and Their Families by Michael G. Vitale and Amber Sentell, Mizerik, PA-C
- Staying Out of Trouble in Pediatric Orthopedics
- Patient Guide What to Expect: Non-operative Scoliosis Care
- Patient Guide What to Expect: Your Child's Spine Surgery
- Straight Talk with the Curvy Girls by Theresa Mulvaney and Robin Stoltz
- Straight Talk Scoliosis The Journey Continues by Theresa Mulvaney and Robin Stoltz
- Finding Curvy Girls Activity Book

Fiction

- Braced by Alyson Gerber
- Dear Isaac Newton You're Ruining My Life by Rachel Hruza
- When Life Throws You a Curve by Elizabeth Golden
- I'm Bent Not Broken by Caroline Bielen
- Deenie by Judy Blume
- Cole and the Crooked Flower
- Being Grace by June Hyjek
- Beautiful Crooked Letter I by Shae Smith
- The Back Brace Bully by Joe Capi

Organizations

- Curvy Girls – Support Group
- Growing Spine Foundation
- Setting Scoliosis Straight
- SOSORT
- POSNA
- HARMS Study Group
- Safety in Spine Surgery

Other

- Higgy Bears
- Hope's closet
- Embraced in Comfort
- Brace Buddies
- Straight Talk Scoliosis
- Scoliosis Tracker App for Iphone and Ipad
- Brace Mentoring Program: <https://www.bracingforscoliosis.org/bracing-mentor-program/>
- Columbia's Patient to Patient Program
- Facebook Support Groups
- SHIFT scoliosis
- Patient Education
- AAOS Ortho
- POSNA OrthoKids
- NY times Article: <https://bit.ly/s-shape>
- Rigo-Chêneau brace
- Schroth Wall Bars

Websites

- National Scoliosis Foundation
- Pediatric Orthopaedic Society of North America (POSNA) Patient Education Site <https://orthokids.org/>
- Scoliosis Research Society
- Dr. Vitale's Website <https://pediatric scoliosissurgery.com/>

What to Expect: Non-Operative Care



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