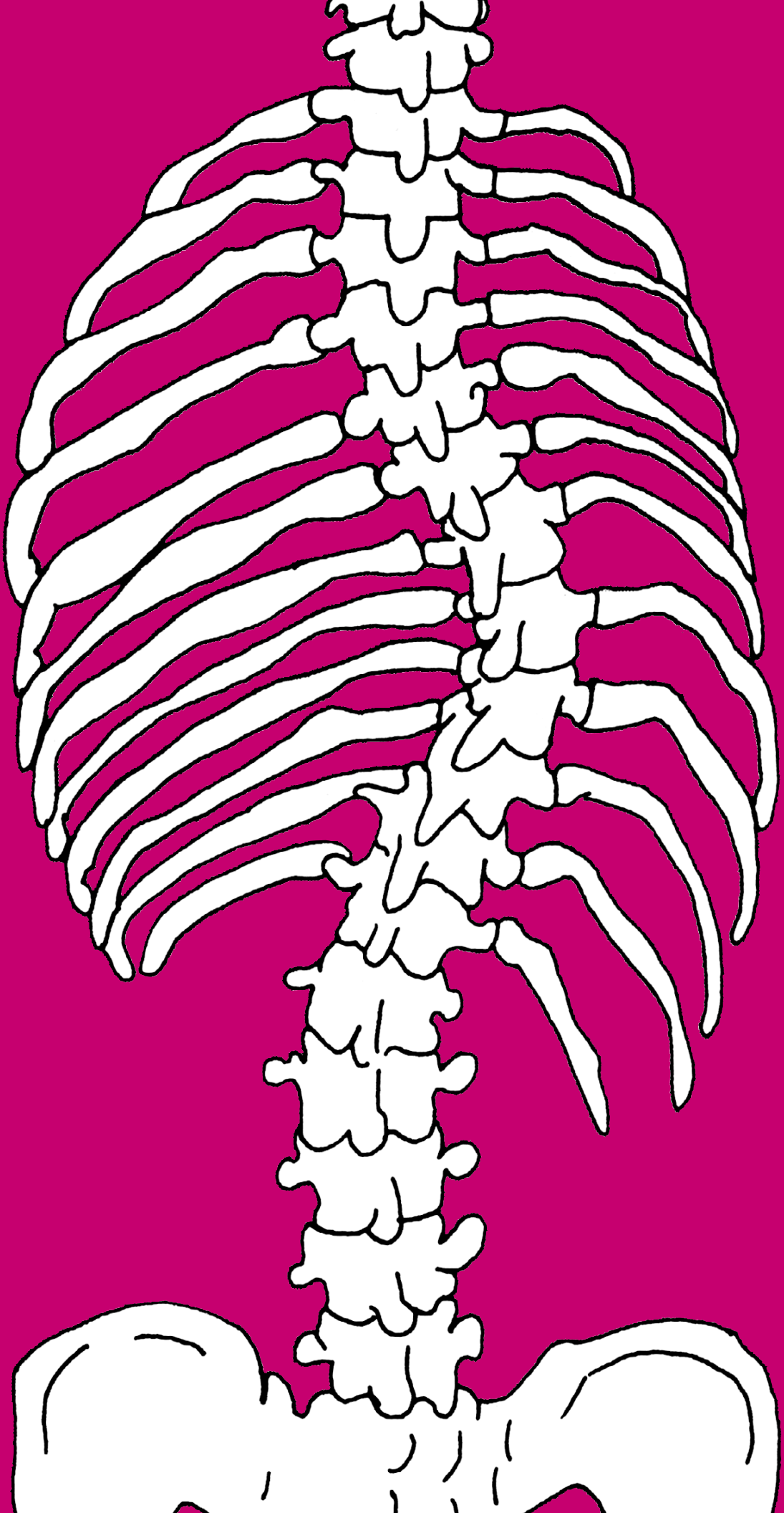


Scoliosis Screening

A Program Manual



Prepared by
Gillette Children's Specialty Healthcare and the
Minnesota Department of Health in conjunction
with the Twin Cities Spine Center and Shriners
Hospitals for Children – Twin Cities

A PDF of *Scoliosis Screening: A Program Manual* is available at www.gillettechildrens.org/Center for Pediatric Orthopaedics.

SCOLIOSIS SCREENING

A Program Manual

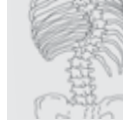
Prepared by:
Gillette Children's Specialty Healthcare
and Minnesota Department of Health
in conjunction with Twin Cities Spine Center
and Shriners Hospitals for Children – Twin Cities

Supported in part by:
John E. Lonstein Spine Care Fund at
Gillette Children's Foundation

Originally published in 1975
Minnesota Department of Health
Revised and updated in 2009 by
Minnesota Department of Health
Gillette Children's Specialty Healthcare and
Shriners Hospitals for Children – Twin Cities

Printed and distributed by:
Gillette Children's Specialty Healthcare
200 University Avenue East
St Paul, MN 55101

Copyright 2009



Scoliosis Screening

Scoliosis is a medical term that describes a lateral (sideways) curve of the spine. About 2 to 5 percent of children between the ages of 10 and 15 — the growth-spurt years — have such curves. Although the incidence of scoliosis is equal in boys and girls, it is more common for curves to progress in girls. Progressive scoliosis requires monitoring and possible treatment.

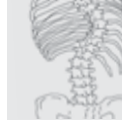
Although most curves are small, progressive scoliosis can lead to disabling spine deformities. To prevent such complications, scoliosis must be detected early. Treatment may include observation (for mild curves), bracing (for moderate curves), or surgery (for severe curves). Bracing can prevent curves from progressing and might eliminate the need for surgery.

Families are unlikely to detect curves at an early stage. In addition, many children ages 10 to 15 do not see a primary-care provider routinely.

For those reasons, Minnesota Department of Health (MDH) recommends that school districts — in collaboration with local primary-care providers — screen for scoliosis.

Gillette Children's Specialty Healthcare, MDH Division of Community and Family Health, Shriners Hospital for Children – Twin Cities and Twin Cities Spine Center provide ongoing guidance, as necessary, for the Minnesota scoliosis screening program in schools. MDH recommends screening girls in the fall of fifth grade and again in the spring of sixth grade. Scoliosis screening is not recommended for boys.

For more information and rationale regarding recommendation changes, see the MDH Web site:
<http://www.health.state.mn.us/divs/fh/mch/scoliosis/index.html>.



Setting Up a Screening Program

Step 1: Planning

The school nurse, health coordinator and screener(s) should familiarize themselves with this manual, *Scoliosis Screening: A Program Manual*.

Administration

Scoliosis screening should be integrated into the school's overall health program. The school nurse or health coordinator in charge of the scoliosis screening program should discuss its importance with the administrator and other appropriate personnel.

MDH encourages collaboration with local primary-care providers who might receive referrals from the screening program. Discuss screening procedures with them and encourage them to support the program.

Staff Orientation

All screeners — school nurses, physical-education and other teachers, volunteers, doctors, nurse practitioners and anyone else involved in the screening program — should consider attending the scoliosis screening seminar. It is held annually in the Twin Cities. Go to www.gillettechildrens.org for more information.

The half-day seminar generally includes:

- Presentations by specialists
- Demonstrations of the scoliometer (a device that measures spinal curves) and other techniques of the screening process
- Discussions of program planning and referral sources

In this manual are a letter to parents or guardians about screening and a referral letter for students who need an additional medical examination. (See appendices A and B.) Additional resources appear in Appendix C.

Scheduling

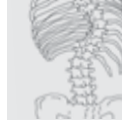
The school nurse or health coordinator should schedule screening times. Screening during physical-education classes often works well, because numerous students are available during a relatively short time. Consider test schedules, field trips and other school activities that could conflict with the screening. When dates are set, inform parents/guardians of the scheduled screening, using the sample letter found in Appendix A.

Parent and Student Orientation

Before the screening, consider teaching students about scoliosis and demonstrating the screening process. Such activities minimize apprehension of screening and increase students' knowledge of their health.

Set-Up

The screening area must be large enough for screeners, students being screened and students waiting to be screened. Make certain the area has adequate lighting. If walls in the screening rooms are white or yellow, set up a bright, solid-colored backdrop to make observation easier. Tagboard works well. Gymnasiums, locker rooms, large nurse's offices and empty classrooms are common sites. Using room dividers helps ensure maximum privacy.



Step 2: Performing the Screening Overview

The screening might have two parts:

- An optional subjective visual inspection as the child bends
- An objective measure of any asymmetry using a scoliometer

Identifying Students for Screening

Use class rosters to identify female students and record results. Students who have been treated with a brace or surgery for scoliosis do not need screening.

What Students Should Wear

Clothing can hide subtle signs of scoliosis. It is best to screen students when their backs are bare. Girls might be more comfortable wearing a sports bra, swimsuit, or camisole top. Instruct them in advance to bring such items.

Girls unwilling to be screened with a bare back may wear a plain colored T-shirt. For best results, however, minimal clothing is recommended.

Performing the Screening

Students stand erect, with their feet 2 to 3 inches apart and their backs toward the screener.

Students then bend forward 90 degrees at the waist, with their knees straight, arms hanging and palms slightly together. Their heads should be down.

Screeners should use a scoliometer to objectively measure spinal asymmetry. With the student in a forward-bending position, the screener moves the scoliometer along the vertebral column, starting at the cervical area and moving down the spine. Observe the scoliometer for changes in curve measurements, noting the highest degree of asymmetry.

Although subjective evaluation is no longer recommended in school screening, it can be a helpful component. If time allows, the

screener might observe each student's back, looking for abnormalities such as:

- An obvious curve
- Shoulders unequal in height
- One protruding shoulder blade
- An uneven waistline
- Uneven hips
- An unequal distance between the arms and body when the arms are hanging straight down at the sides

Although these are not diagnostic signs, they might indicate a problem.

Step 3: Referrals

A referral to a primary-care provider should occur if a student exhibits unequal lumbar or thoracic areas of 6 degrees or greater as measured by a scoliometer.

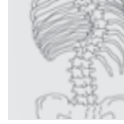
Notifying Parents/Guardians and Requesting Referrals

Communicate — by telephone, e-mail or letter — with parents/guardians of students who meet the criteria for referrals. When referring a student for further evaluation with a primary-care provider, the school nurse or screener should explain to parents/guardians why the referral is recommended. Appendix B provides a sample letter to use when notifying parents or guardians.

Discuss the screening results and emphasize the importance of further medical evaluation. It is essential for parents/guardians and students to understand that the student's condition might require treatment.

Emphasize that the screening identifies only a **possible** spinal problem; it is **not** a diagnostic service. Be prepared to discuss fears and answer student and family questions.

Primary-care providers or orthopaedic specialists provide follow-up treatment as needed, depending on the severity of the curve.



Monitoring Students and Documentation

Schools are encouraged to keep track of students who have a positive screening (see Appendix E). Such students might require classroom and scheduling adaptations to accommodate the prescribed scoliosis treatment (such as braces). Schools should also follow up with students who have scoliosis to make sure they are seeing a primary-care provider regularly.

Note all findings on the student's school health record, including the date of the screening and the name of the health-care provider to whom the referral was made. Record results of the subsequent medical evaluation.

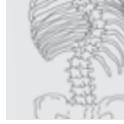
Data Collection and Program Evaluation

Keeping data on scoliosis school-screening programs demonstrates the outcomes of scoliosis screening and referrals in schools. It also demonstrates accountability for school nurses and enhances documentation of screening.

Schools are encouraged to record total number of students eligible for screening, total screened, number passed, number referred and information on resulting referrals, diagnoses and treatments. It is important to not only document referrals and outcomes, but also to record denominators including how many were eligible to be screened and how many were actually screened. Schools might want to use the School Scoliosis Screening Report (Appendix E) provided in this scoliosis screening manual to document this data.

Scoliosis school screening is voluntary.

The MDH does not collect or report this data. Instead it can be included in annual reports to school administrators about school health programs.



Appendix A: Letter to Parents/Guardians Regarding Screening

Dear Parents/Guardians:

In the next few weeks, we will conduct a screening program to identify female students who might have an abnormal curve of the spine (scoliosis). Studies estimate that two to five of every 100 children develop scoliosis, and some require treatment. Early detection and treatment helps prevent or minimize the development of severe spinal problems.

The screening procedure is simple. It consists of a brief test in which the screener — usually a school nurse or physical-education teacher — looks at the girl’s bare back while she is standing and bending forward. A simple, painless device called a scoliometer is used to measure any spine unevenness. We will make every effort to ensure each girl’s privacy. Recommended clothing for this screening is a camisole, sports bra or swimsuit.

If your daughter appears to have an abnormal curve, we will notify you. Then you will be encouraged to make an appointment with your primary health-care provider for further evaluation of your daughter’s condition.

Please complete the form below if you **do not** wish to have your daughter participate in the screening program. Detach the form and return it to the school.

Sincerely,

School Nurse

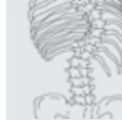
Phone Number

Detach here and return this form to your child’s school.

I do not wish to have my daughter, _____, screened for scoliosis. (Name)

Parent/Guardian Signature

This letter is available as a Word document on the Gillette Web site at www.gillettechildrens.org/Center for Pediatric Orthopaedics.



Appendix B: Referral Letter

Dear Parents/Guardians:

_____ recently participated in our school scoliosis-screening program.
(Student name)

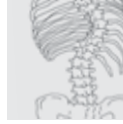
Although this screening program is not a diagnostic service, screening results indicate that your daughter needs further evaluation to determine whether she has a spinal abnormality and, if so, what treatment might be necessary. It is strongly recommended that you take your daughter to your primary health-care provider for further evaluation.

Scoliosis is a side-to-side curvature of the spine that can cause complications if left untreated. Although the cause is unknown, the condition becomes more apparent after the adolescent growth spurt. If detected early, scoliosis can be treated.

If you have additional questions, please do not hesitate to call me.

School Nurse

Phone Number



Appendix C: Suggested Professional References and Resources*

Books, Journal Articles and Educational Pamphlets

Postural Screening: Guidelines for School Nurses

National Association for School Nurses
163 U.S. Route 1
P.O. Box 1300
Scarborough, ME 04070-1300
Cost: No charge

McLain, R.F., Karol, L. (1994). *Conservative Treatment of the Scoliotic and Kyphotic Patient*. Archives of Pediatric Adolescent Medicine, 148, 646-651.

Lonstein, J.E. (1989). *Managing School Screening Referrals*. Journal of Musculoskeletal Medicine, July, 37-54.

Lonstein, J.E., Winter, R.B. (1994) *The Milwaukee Brace for the Treatment of Adolescent Idiopathic Scoliosis*. Journal of Bone and Joint Surgery, 76-A, 1207-1221.

Lonstein, J.E., Winter, R.B., Moe, J.H., Bianco, A.J., Campbell, R.G., Norval, M.A. (1998). *School Screening for the Early Detection of Spine Deformities: Progress and Pitfalls*. Minnesota Medicine, 59, 51-7.

Renshaw, T.S. (1988). *Screening School Children for Scoliosis*. Clinical Orthopaedics and Related Research, 229, 26-33.

Richards, B.S. & Vitale, M.G. (2008). *Screening for Idiopathic Scoliosis in Adolescents, An Information Statement*. The Journal of Bone and Joint Surgery, 90, 195-198.

Winter, R., and Lonstein, J. *The Spine: Juvenile and Adolescent Scoliosis* (third edition., volume 1), chapter 14, pp. 273-423. Check your local library for this publication.

Winter, R., Perra, J., and Lonstein, J. (2009). *Scoliosis: The Case for Screening and Referral*. Minnesota Physician, 12 (10), www.tcspine.com/sites/default/files/MPW_inter0109rev.pdf.

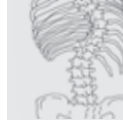
Audiovisual Materials/Tools

School Screening With Dr. Robert Keller
Length: 60 minutes

A training video that teaches proper technique for school spinal screening.
National Scoliosis Foundation
5 Cabot Place
Stoughton, MA 02072
Fax: 781-341-8333
800-NSF-MYBACK (800-673-6922)
Cost: \$19.95 plus shipping and handling

Scoliometer: A Tool for Measuring Spinal Curvature
National Scoliosis Foundation
5 Cabot Place
Stoughton, MA 02072
www.scoliosis.org
Cost: \$48.00

*Resources current as of 2009



Suggested Parent/Guardian References and Resources

Books and Educational Pamphlets

One in Every 10 Persons Has Scoliosis
A pamphlet illustrating what scoliosis is and how screenings work
National Scoliosis Foundation
5 Cabot Place
Stoughton, MA 02072
Fax: 781-341-8333
Cost: No charge

Stopping Scoliosis
A book on scoliosis and treatment
National Scoliosis Foundation
5 Cabot Place
Stoughton, MA 02072
Fax: 781-341-8333
Cost: \$19.95 plus shipping and handling

Audiovisual Materials

Scoliosis Screening for Early Detection
Length: 15 minutes
Describes the screening process for scoliosis and stresses the importance of early detection
Gillette Children's Specialty Healthcare
200 University Avenue East
St. Paul, MN 55101
Cost: \$19.95
For purchase questions, please 651-325-2320.

Internet/Web Sites

American Academy of Orthopaedic Surgeons
www.aaos.org

Gillette Children's Specialty Healthcare
[www.gillettechildrens.org/Center for Pediatric Orthopaedics](http://www.gillettechildrens.org/CenterforPediatricOrthopaedics)

Mayo Clinic
www.mayoclinic.com/health/scoliosis/DS00194

Medtronic
www.iscoliosis.com

Minnesota Department of Health
<http://www.health.state.mn.us/divs/fh/mch/scoliosis/index.html>

National Scoliosis Foundation
www.scoliosis.org

Pediatric Orthopaedic Society of North America
www.posna.org

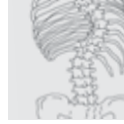
Scoliosis Association
www.scoliosis-assoc.org

Scoliosis Research Society
www.srs.org

Scoliosis World
www.scoliosis-world.com

Shriners Hospitals for Children – Twin Cities
www.shrinershospitals.org

Twin Cities Spine Center
www.tcspine.com



Appendix D: Frequently Asked Questions About Scoliosis

Q. *What is scoliosis?*

A. Scoliosis is a medical term describing a lateral curve of the spine. Although most curves are small, progressive scoliosis can lead to disabling spine deformities.

Prevalence

Q. *What percentage of people has scoliosis?*

A. Idiopathic scoliosis (scoliosis with an unknown etiology) prevalence varies by the severity of the curve:

- Curves of 10 degrees or greater are present in 2 to 3 percent of people
- Curves of 20 degrees or greater are present in 0.5 percent of people
- Curves of greater than 30 degrees are present in 0.2 percent of people

A health-care provider should evaluate children who have a scoliometer reading of 6 degrees or higher.

Cause

Q. *Can poor posture cause scoliosis?*

A. No. Poor posture does not cause scoliosis or have an effect on the way a curve progresses.

Q. *Can overuse of one side of the body cause scoliosis (e.g., carrying a backpack over one shoulder)?*

A. No. Overuse of one arm or leg will not cause scoliosis.

Q. *Do curves progress after the spine stops growing?*

A. After the spine stops growing, at approximately 14-16 years of age in girls, usually only severe curves progress. That is why it is important to detect the curves early and prevent them from increasing.

Screening

Q. *Why should schools screen for scoliosis?*

A. Scoliosis is most likely to be identified early when schools screen for it. Scoliosis may otherwise go undetected because:

- Students are unlikely to receive physical exams at this age unless they have health problems.
- Scoliosis is essentially painless, producing no symptoms other than an abnormal curve in the back
- Idiopathic scoliosis most often develops during preadolescence or early adolescence, when modesty may preclude parents/

guardians from seeing their children unclothed.

- Long hair and loose clothing styles can conceal significant deformities.

Q. *How can we make our screenings more accurate and prevent over-referring for questionable spinal deformities?*

A. For new programs, the most efficient way to obtain screenings that correlate with clinical results is to have help.

Invite someone who has helped with other screenings, who is experienced in visual screenings and who has used a scoliometer to be present. An experienced person can help establish criteria for normal and abnormal curves. Experienced screeners, such as nurses who attend the scoliosis screening seminar, are excellent resources. The use of a scoliometer promotes more accurate assessments and referrals.

Q. *Do I need to attend training to conduct screening for scoliosis?*

A. While training is not required, it is available through Gillette Children's Specialty Healthcare in conjunction with Shriners Hospitals for Children – Twin Cities, the Twin Cities Spine Center and the Minnesota Department of Health.

Q. *Why is screening boys for scoliosis not recommended?*

A. In the past, screening boys in eighth or ninth grade for scoliosis at school was recommended. However, it is much less common for boys to have curves that require treatment. Because the curves do not require treatment very often, screening for boys for scoliosis in schools is no longer recommended.

Q. *If someone has scoliosis, is it important to evaluate family members?*

A. Yes. Heredity may be a factor in the most common type of scoliosis (idiopathic). Therefore, all siblings of a child diagnosed with scoliosis should also be evaluated.

Q. *Can a difference in leg lengths mimic scoliosis?*

A. Differences in leg lengths may cause a variance in the sides of the back when a student bends forward. A primary-care provider can diagnose scoliosis. Schools should screen the student using a scoliometer regardless of leg length differences and refer students with a

scoliometer reading of 6 degrees angle of trunk rotation (ATR) or greater for further evaluation.

- Q. Should a screener use blocks of wood for students with leg length discrepancy to prevent an unnecessary referral?**
- A. No. Using blocks of wood is no longer recommended during the screening process. Perform the standard screening with a scoliometer. Refer students whose asymmetry measures 6 degrees or greater even if there is a leg length discrepancy.
- Q. Some children with disabilities cannot bend forward. How do we screen those children for scoliosis?**
- A. Such children may need help undressing or bending forward. They might need to sit on a tabletop, with their legs swinging free and apart. Although screening children who have disabilities requires patience and additional time, it is critical to perform such screenings. The incidence of scoliosis requiring treatment is higher among children who have disabilities than it is in others.
- Q. Is it necessary to keep a watch list or to rescreen students?**
- A. No. Students with an ATR of 6 degrees or greater should be referred to a primary-care provider. No further action is needed for students with an ATR of fewer than 6 degrees.

Signs of Scoliosis

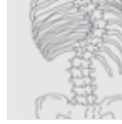
- Q. I am a parent, and suspect my child has scoliosis. What should I do?**
- A. If you suspect a child may have scoliosis, the best thing is to contact the child's primary-care provider. If that is not possible, contact the school nurse or your local public health agency.
- Q. What is the major sign of scoliosis?**
- A. A scoliometer result of 6 degrees ATR or greater is a sign of possible scoliosis. Students who have such results should be referred to a primary-care provider.
- Q. What signs indicate that a curve is progressing?**
- A. The most accurate sign is that, when standing X-rays are taken three to six months apart, they show an increasing curve. It is almost impossible to note such a progression just by examining the back.

Prevention and Treatment

- Q. Is there any way to prevent scoliosis?**
- A. There is no known way to prevent scoliosis from developing. The best ways to prevent scoliosis from becoming a severe problem are by early detection and prompt treatment. Treatment may include observation for mild curves, bracing for moderate curves, and surgery for severe curves.
- Q. Can chiropractors help treat scoliosis?**
- A. There is no long-term study showing that chiropractic treatments and adjustments can stop scoliosis or prevent it from progressing.
- Q. Does exercise prevent mild scoliosis from getting worse?**
- A. No. There is no evidence that physical exercise affects curves or prevents curves from progressing.
- Q. Does scoliosis treatment prevent women from becoming pregnant or having children?**
- A. No, treatment for scoliosis will not prevent women from becoming pregnant or having children.

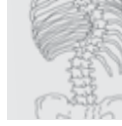
Other Spinal Deformities

- Q. What is kyphosis?**
- A. Kyphosis ("roundback" or "hunchback") is an abnormally convex curve in the thoracic area of the spine. In most instances, it is caused by poor posture. It also can be caused by Scheuermann's disease. Children with excessive kyphosis should see a primary-care provider for further evaluation.
- Q. What is lordosis?**
- A. Lordosis ("swayback") is an increased concave curve in the lumbar and cervical areas of the spine of 6 degrees or greater as measured by a scoliometer. In adolescence, it is usually caused by poor posture.



Appendix E: Scoliosis-Screening Recommendations

	2003 Recommendations	2008 Recommendations
Periodicity	Girls in fifth and eighth grades Boys in eighth or ninth grade	Girls in fall of fifth grade and spring of sixth grade Not recommended for boys
Instrument	Adam's Forward Bending Test with scoliometer	Scoliometer, used according to instructions
Referral	At 7 degrees ATR* or greater, lordosis or kyphosis To primary-care provider Watch list for 5-6 degrees ATR*: rescreened within three months	At 6 degrees ATR* or greater To primary-care provider No watch list
<p><i>*ATR is the angle of trunk rotation as measured by the scoliometer.</i></p>		



Appendix E: School Scoliosis-Screening Report

SCHOOL SCOLIOSIS-SCREENING REPORT

For internal use only. Do NOT submit to Minnesota Department of Health.

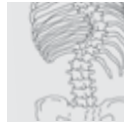
Screening and Referral		Results of Referral to Primary-Care Providers											
		Numbers			Provider		Diagnosis			Recommended Scoliosis Treatment			
Grade	Total Enrolled	Screened	Referred	M.D.	Other	Scoliosis	Normal	Other	Incomplete Follow-up	Observation	Bracing/Other	Surgery	None/Unknown
5													
6													
Other:													
Other:													
Other:													
Total													

Minnesota Department of Health 2008 Scoliosis School-Screening Recommendations

- Girls are to be screened in the fall of fifth grade AND spring of sixth grade.
- Screening is no longer recommended for boys.
- The preferred screening method is the scoliometer, used according to instructions.
- Those screened who show an angle of trunk rotation (ATR) greater than or equal to 6 degrees are to be referred to their primary-care provider. No watch list is recommended for children with an ATR of fewer than 6 degrees.

School Name	
School District Name	District Number
County	City
Name and Title of Person Completing This Report	
School Year of This Report	

Form released by Minnesota Department of Health, March 2009.
Available online at www.health.state.mn.us/divs/fh/mch/scoliosis/index.html.



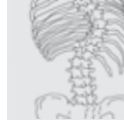
Appendix F: Photos

This photo demonstrates the positioning of the scoliometer.



This photo demonstrates a positive screening of an 8-degree thoracic spine asymmetry using the scoliometer. This student should be referred to her primary-care provider.



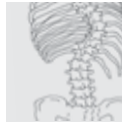


This photo shows thoracic asymmetry. Note the uneven shoulders and the difference in width between the arms and waistline.



The standing posterior spine examination demonstrates left thoracolumbar scoliosis and mild decompensation to the left. Note the shoulder asymmetry, left shoulder lower than right, prominence of the left scapula, and wider space between left arm and side as compared to the right.



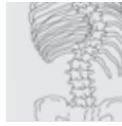


These photos show the Adam's Forward Bending test, side view.



This photo shows the Adam's Forward Bending test, back view. Note the thoracic asymmetry.



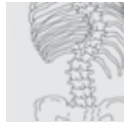


This is the front view of the high profile thoracolumbosacral orthosis (TLSO).

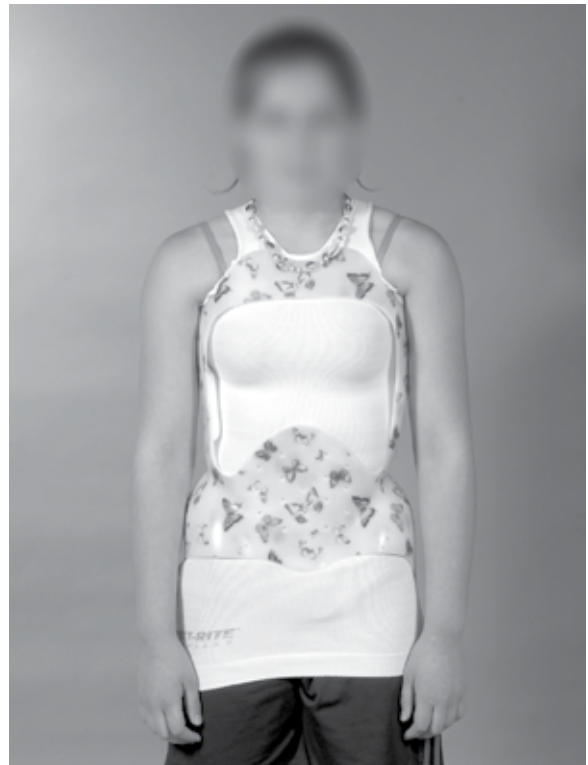


This is the back view of the high profile TLSO.





This patient is wearing the high profile
TLSO.

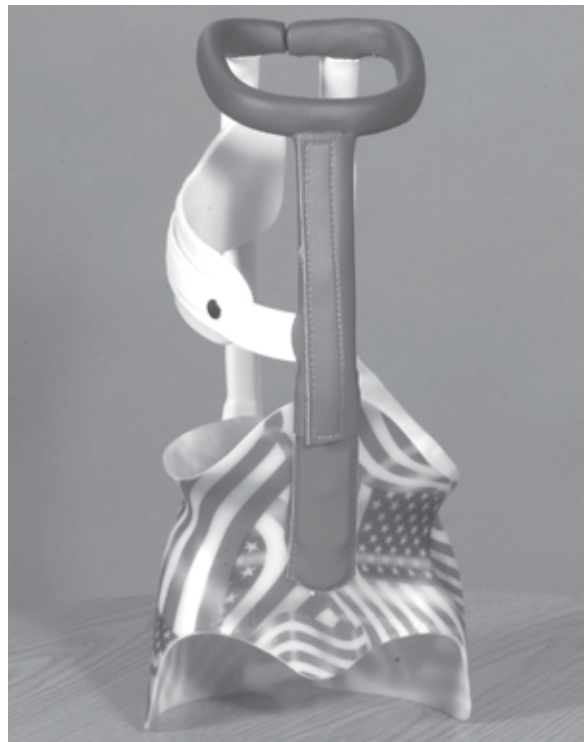




This is a side view of a high profile TLSO.



This photo shows a Cervicothoracolumbosacral orthosis (CTLSO) with neck ring.

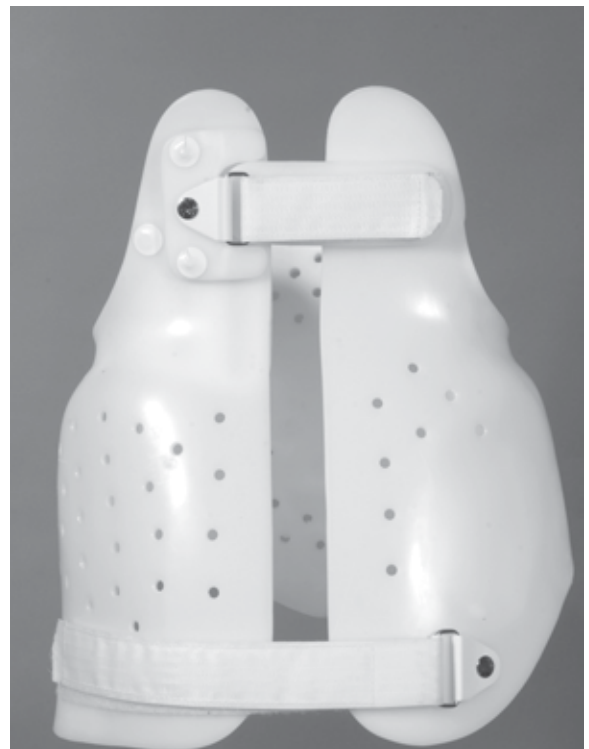


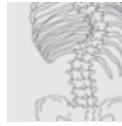


This is a front view of the low-profile thoracolumbosacral orthosis (TLSO).



This is a back view of the low-profile TLSO.





This photo shows a patient without a brace.



This is a back view in a low-profile TLSO.



