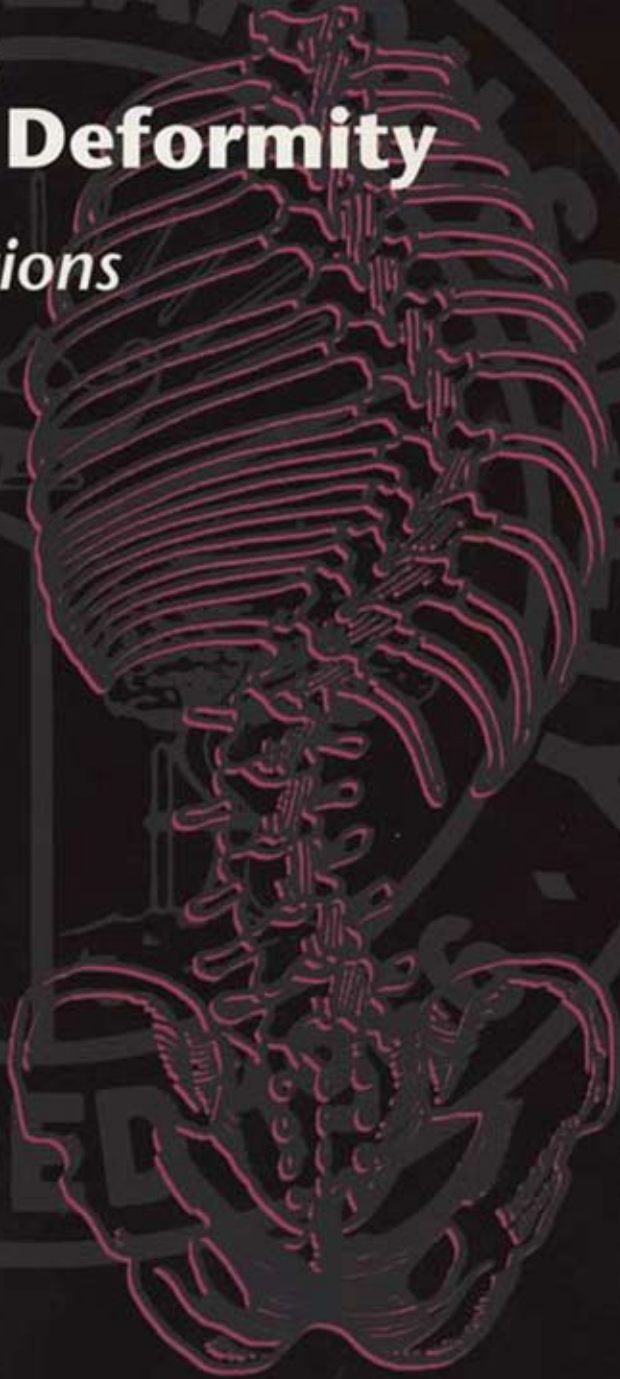


# Screening Procedure Guidelines for Spinal Deformity

*Recommendations  
for Examiners*



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## **School Screening for the Early Detection of Scoliosis**

The purpose of school screening is to detect scoliosis at an early stage when deformity is mild and likely to otherwise go unnoticed. It is at this early stage that bracing programs may be effective in halting progression of the deformity and thus prevent the need for surgical treatment. In addition, the children with more significant scoliosis, who often have no other symptoms may be detected at a time when surgical treatment is more effective.

*The American Academy of Orthopaedic Surgeons and the Scoliosis Research Society continue to support the principle of school screening for scoliosis.*

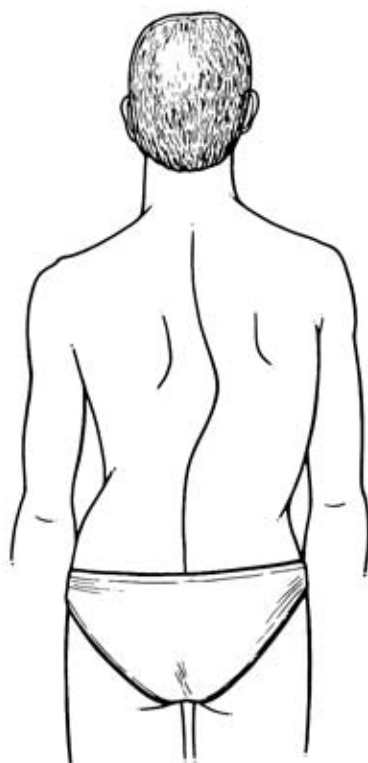
*– Position Statement, American Academy of Orthopaedic Surgeons  
and Scoliosis Research Society, Revised 1992*

*Prepared by the Education Committee of  
the Scoliosis Research Society  
with assistance from Spine Research Associates*

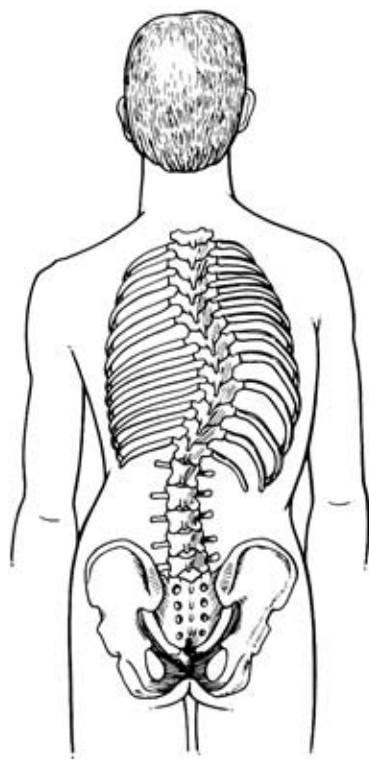
*Illustrations: Lauren Shavell, Medical Imagery*

## Introduction

Scoliosis is defined as abnormal lateral curvature of the spine. A curve may be functional or structural in nature. Functional scoliosis develops secondary to another abnormality, usually in the hip or lower extremity. A common cause of functional scoliosis is unequal leg length. The most common cause of structural scoliosis is "idiopathic scoliosis," which means there is no known cause. Idiopathic scoliosis occurs in two to three percent of the population. Sex prevalence is equal during early adolescence, but progression (increase in curve magnitude) is far more common in girls. When progression occurs, it is usually during the adolescent growth spurt. The risk of progression is related to the type of curve and the level of maturity of the child. The immature, premenstrual girl has a higher risk of progression than an adolescent female who has had the onset of menses, or an adolescent boy who has developed axillary hair.



*Fig. 1A: Clinical features of scoliosis, including elevated right shoulder, arm to flank inequality.*



*Fig. 1B: Anatomy of a right thoracic curve pattern which would be demonstrated by x-ray.*

Early detection is key to controlling scoliosis. It is extremely important that scoliosis be diagnosed during the growth years, usually between the ages of ten and fifteen. If progressive or potentially progressive curves can be identified early, appropriate treatment can be instituted, often allowing the patient to avoid surgical treatment. The principle of school screening for the early detection of scoliosis has been endorsed by the Scoliosis Research Society and the American Academy of Orthopaedic Surgeons. Currently, twenty-one states require school screening for spinal deformity and the following guidelines are provided to help the screener/examiner assess the child appropriately. The criteria for screening and referral are based on current knowledge of the natural history of scoliosis.

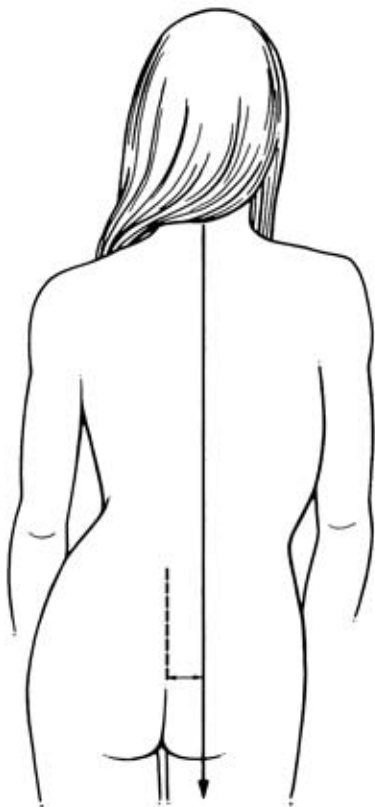
## Organization

1. Screening should be conducted in an area where students can change their clothes in private.
2. Boys and girls should be screened separately in an environment that offers some privacy.
3. Examiner will need a chair or stool to be seated in order to conduct an accurate screening examination. Good lighting is essential.
4. Have proper documentation forms to record clinical findings.
5. If possible, the back should be examined without clothing.
6. All positive findings should be recorded on appropriate documentation forms.

## Procedure

1. The examiner should be seated with a line or tape on the floor indicating the position in which the student should stand for the examination.
2. The student should stand erect, first facing the examiner, and then away from the examiner. Feet should be together, knees must be straight, and arms should hang loosely at the sides. With the student in these positions (from the front and back), check for:
  - a. high shoulder
  - b. curved spine
  - c. uneven shoulder blades
  - d. uneven hips or waist creases
  - e. unequal distance from arm to side of body (check both sides).

3. The examiner should then view each student from the side in the erect position to check for:
- a. accentuated roundback
  - b. accentuated swayback



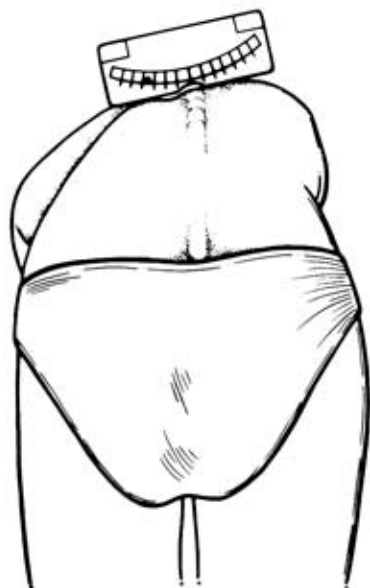
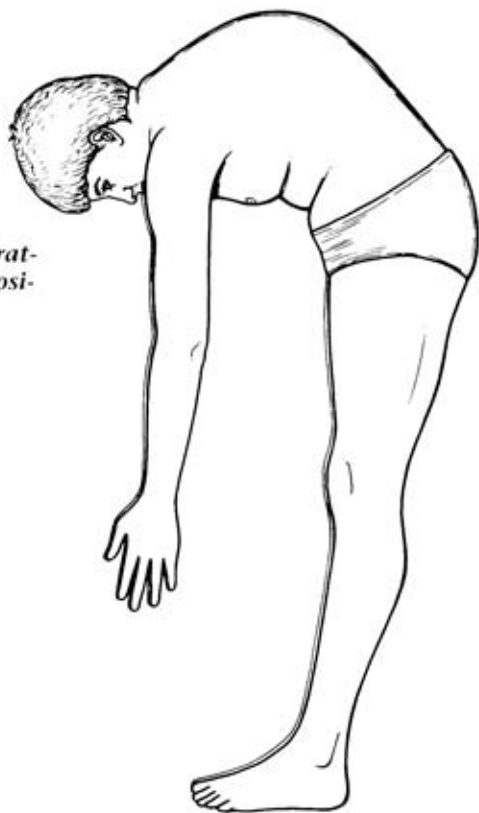
*Fig. 2: Rear view of adolescent girl demonstrating spinal decompensatin to the right, as indicated by a plumb line from the C-7 spinous process.*



*Fig. 3: Adolescent boy with thoracic kyphosis and exaggerated lumbar lordosis, i.e. "swayback".*

4. The last position is the bending position (Adam's test). Students should stand erect with feet together, knees fully extended, and the palms of both hands touching each other as the student then bends forward until the back is horizontal. Asymmetry of the thoracic or lumbar spine may be detected by using a scoliometer to measure the angle of trunk rotation (ATR) at the thoracic, thoracolumbar, and lumbar areas of the spine. Be aware of possible leg length differences by checking that the iliac crests are level and be certain the student always looks forward to avoid spurious rotational anomalies. Arms must remain loosely extended with palms touching and oriented vertical to the floor.

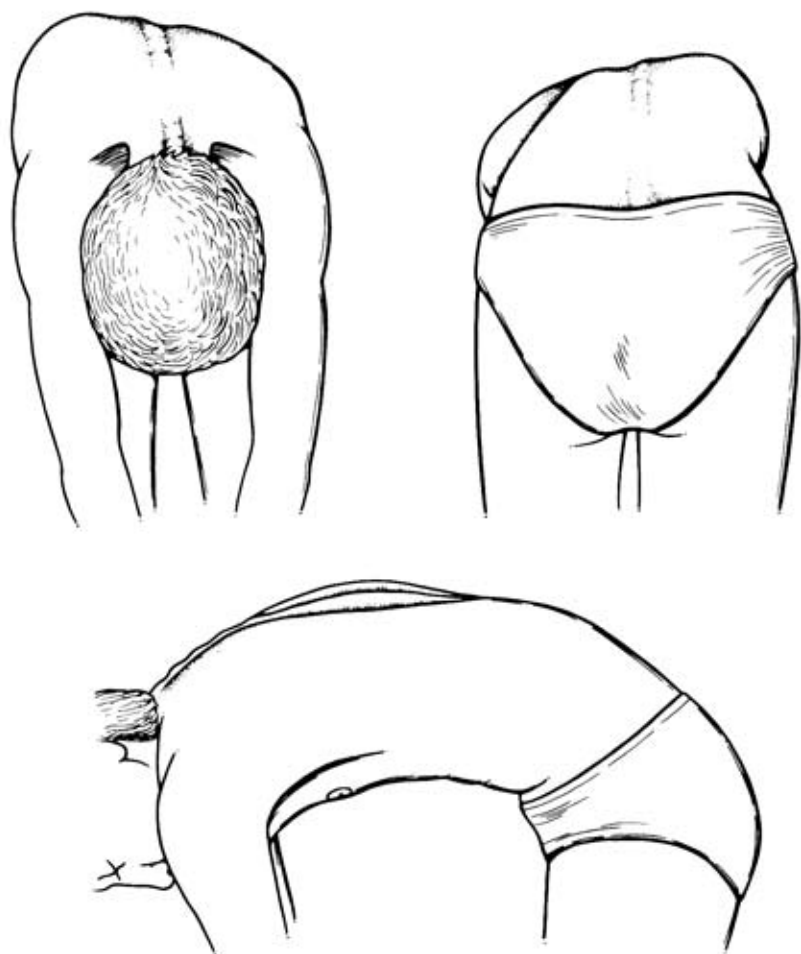
*Fig. 5: Adolescent boy with exaggerated kyphosis in the forward bend position, as viewed from the side.*



*Fig. 4: Forward bend position (Adams Test) viewed from behind. The scoliometer is positioned to record the angle of trunk rotation (ATR) of a right thoracic curve.*

Examine the student in this position from the front, back and side. With the student in each of these three positions, check for:

- a. paraspinous prominence
- b. uneven contours
- c. curve in the spine
- d. from the side view, note any accentuated roundback deformity
- e. flexibility (ability to bend forward and touch the upper shin or feet).



**Fig. 6: Adolescent boy in the forward bend position (Adams Test) with right thoracic curve, as seen from (A) front, (B) rear, (C) left side.**

5. Write down the name of any student with positive findings on your data sheet. Record the findings in as much detail as possible, for reference during the rescreening procedure. Be sure to include enough information (home-room number, gym class, etc.) so that you will be able to identify and locate the student for rescreening.

## Follow-Up

1. At a separate session, rescreen all students with positive findings to verify original findings. Use the original control form at the rescreening session. If an experienced screener is available, have him or her participate in this re-evaluation session.
2. Many screeners have found topographical measuring devices to be very useful in helping them determine whether a student should be referred for further examination. An example of one of these devices is the scoliometer. This is a simple device which measures the angle of trunk rotation in a reliable manner. Most examiners feel that an angle of trunk rotation of seven degrees or more is an indication for referral. Regardless of the type of topographical measuring device used, the examiner should be thoroughly familiar with its proper application.
3. If students question you about findings, tell them their parents will be notified if a problem is suspected.
4. Since scoliosis tends to run in families, screening the siblings of children with known scoliosis is a good idea, particularly if they are eight years of age or older.
5. Keep a list of students whose examinations have shown questionable findings. Arrange to screen them again in six months.



## Referral

1. Students who have shown positive findings at the rescreening session should be referred to a physician for follow-up.
2. Since curves can progress during adulthood, fully mature older students with positive findings should also be referred for competent follow-up.
3. Send a copy of your data form to the families of those students referred for physician evaluation. Request that they fill in the form and return it to you. A follow-up telephone call to the family is also suggested. This ensures accurate follow-through of suspected cases and is helpful in allaying fear and apprehension.
4. Enter the information from the control forms and from the follow-up form on the student's health record and file the control forms for future reference.
5. Try to follow up on all students with positive findings and get in touch with the parents again, if your first suggestion for physician referral has been ignored. It is sometimes necessary to telephone or visit the family to ensure proper compliance.
6. Repeat the entire process the next school year in the same grades.



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