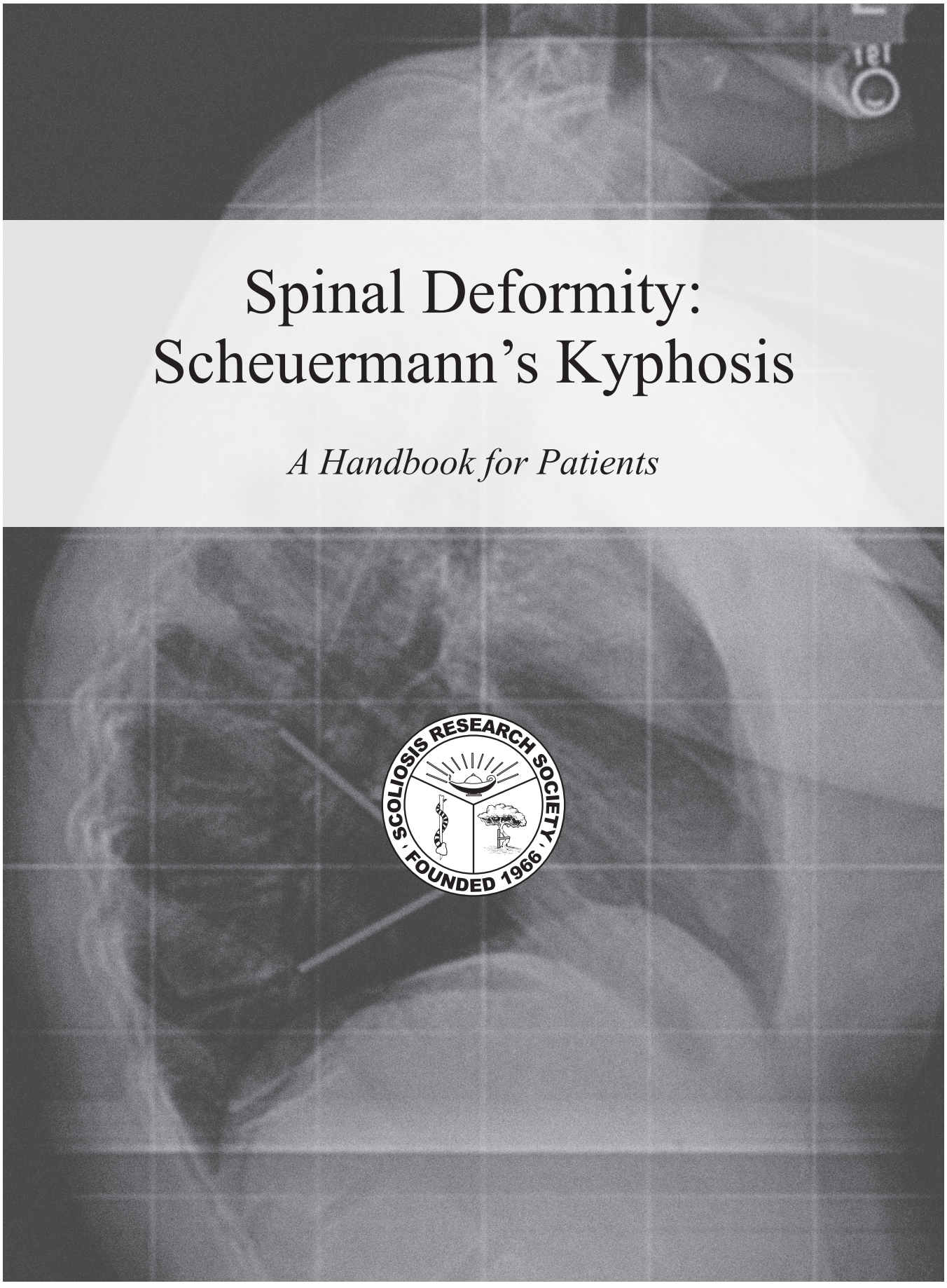

Spinal Deformity: Scheuermann's Kyphosis

A Handbook for Patients

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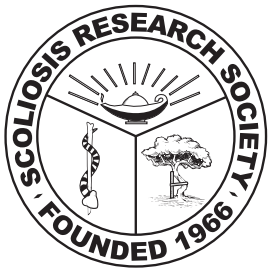

Scoliosis Research Society
Dedicated to Education, Research and Treatment of Spinal Deformity
555 East Wells Street, Suite 1100
Milwaukee, WI 53202
Phone: (414) 289-9107 | Fax: (414) 276-3349
Email: info@srs.org

To order additional brochures, please download an order form from this link:
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Preface

The Scoliosis Research Society's Patient Education Committee has prepared this booklet to provide patients and their families with a better understanding of Scheuermann's kyphosis, a particular type of spine deformity.

This information is intended as a supplement to the information your physician will provide. Scheuermann's kyphosis deformities can be very different from one individual to another, although a number of general statements hold true for most patients. Your spinal deformity surgeon will be the most important source of information for you or your child's particular case.

It is beyond the scope of this booklet to discuss in detail the technical aspects of all the various surgical procedures that may be needed, but general concepts are discussed.

It is not intended that the contents of this manual be interpreted as standards or guidelines proposed by the Scoliosis Research Society.

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What is Kyphosis?

Kyphosis is a descriptive term that describes increased rounding of the spine when viewed from the side. When kyphosis is increased, some people refer to it as a "round back" or "hunchback".

The spine is normally straight when viewed from the front. However, when viewed from the side, it has three normal curvatures. There is a gentle rounding of the upper back from the shoulders to the bottom of the ribcage known as thoracic kyphosis, and an opposite curve in the lower back known as lumbar lordosis (sway back). *(Figure 1)* These two opposite curvatures of the spine work together to provide trunk balance and an upright posture.

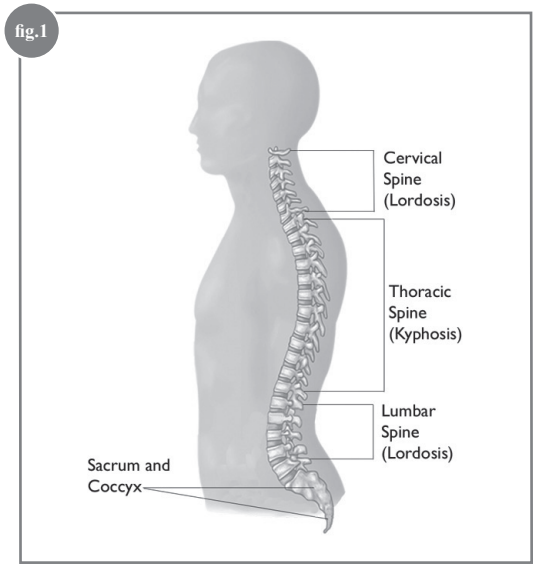

Figure 1

When viewed from the side, a normal spine has three normal curves.

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A normal thoracic spine consists of twelve vertebrae, each with two ribs, labeled T1-T12 (T for thoracic) from top to bottom. The natural, normal roundness of the thoracic kyphosis can be measured by your doctor on an X-ray, and typically ranges from 10° to 45°. When the kyphosis of the thoracic spine increases past 45° it is called "hyperkyphosis".

Increased Kyphosis Can Be Classified As Either Structural or Non-Structural.

Non-Structural Kyphosis

Non-structural kyphosis is flexible, can usually be corrected by standing upright, and does not change the shape of the bones of the spine. “Postural Kyphosis” is the most common form of non-structural increased kyphosis. As the name implies, the increased kyphosis is caused by slouched posture and can correct itself when the patient stands up straight. People commonly refer to postural kyphosis simply as “poor posture”. Typically, it is not painful and the bony structure of the vertebrae are normal when seen on x-rays or other scans.

Structural Kyphosis

Structural kyphosis means that the vertebrae have an abnormal shape. Structural kyphosis can occur with or without other deformities like scoliosis (a curvature seen from the front or back, rather than from the side). Structural kyphosis can result from deformed vertebrae that develop before birth known as congenital kyphosis, or can develop from abnormal growth of the spine, most commonly called Scheuermann’s kyphosis. Less common causes for structural kyphosis include infections such as tuberculosis, spine tumors, and fractures related to accidents or from bones weakened by osteoporosis.

Scheuermann’s Kyphosis

Scheuermann’s kyphosis is a type of kyphosis that occurs in teenage years (ages 12 to 15 in boys or 10 to 14 in girls) as a result of abnormal growth along the spine. The front sections of the vertebrae grow slower than the back sections, producing wedged-shaped vertebrae and a progressive increase in kyphosis. Instead of normal, rectangular vertebrae with a smooth kyphosis, wedge-shaped vertebrae exaggerate the forward bend of the spine and causes increased kyphosis. *(Figure 2)* This abnormal increased kyphosis is best viewed from the side with the patient bending forward attempting to touch the toes. A sharp, angular hump is clearly visible. Most Scheuermann’s kyphosis that develops with growth remains mild and requires only periodic examinations with X-rays to monitor the condition.

fig.2

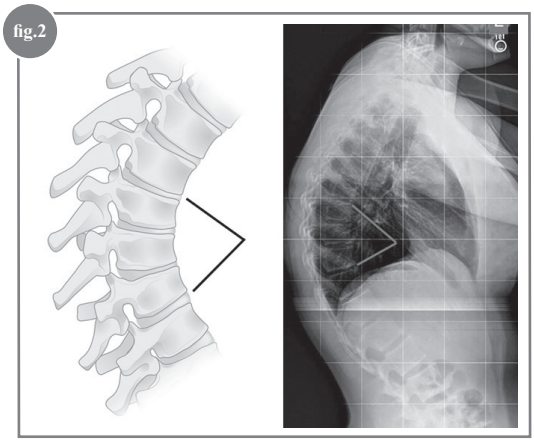

Figure 2:

Illustration and lateral X-ray of patient show the vertebral wedging that occurs in patients with Scheuermann’s kyphosis.

Reproduced from JF Sarwark, ed: Essentials of Musculoskeletal Care, ed 4. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2010

Patients with kyphosis often have poor posture and complain of back pain that can interfere with daily activities. Kyphosis is more likely to be painful when the apex (most angular section) is in the mid-to-low back instead of the upper back. In severe cases, children may not be able to lie on their back without several pillows under their head.

Treatment Options: Non-Operative Management

Observation

Observation is typically recommended for postural kyphosis (rounded back which straightens with proper posture), small size kyphosis in patients that are still growing and large size kyphosis in patients who have completed growth and who also are without pain or cosmetic concerns.

X-rays and Exercise

Standing, long-cassette x-rays are typically taken every 6-12 months as children grow to monitor kyphosis. If the child experiences pain or increasing kyphosis, an exercise program can be recommended. Exercise programs for kyphosis focus on strengthening the muscles that attach to the spine (core muscles). Exercise programs can improve pain in both structural and non-structural types of kyphosis, but there is no evidence that exercise or therapies can improve the kyphosis itself.

Bracing

When Scheuermann's kyphosis is progressing and the patient is still growing, brace treatment in conjunction with an exercise program may be recommended. Protocols for brace wear, including what type of brace to use, how many hours per day of wear and total length of brace treatment, are variable and should be determined by your physician. Braces must be regularly be evaluated and adjusted to ensure proper fit. Permanent correction of kyphosis from brace use is unusual, but the goal of bracing is to slow progression, improve pain and help avoid surgery in some cases. *(Figure 3)* Using braces can be challenging for many patients and a thorough discussion with your doctor is needed prior to starting brace treatment to determine if it is a good choice for you.

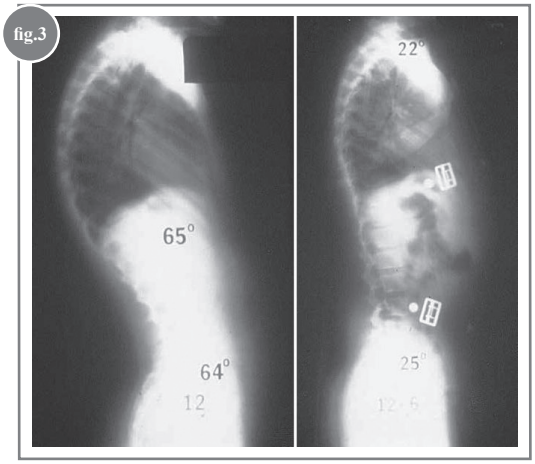

Figure 3:

On the left is a side-view of a patient with Scheuermann's kyphosis. On the right is the same x-ray after he was placed in a hyperextension brace.

Reproduced from Pizzutillo PD: Nonsurgical treatment of kyphosis. Instructional Course Lectures, Pediatrics. Rosemont IL, American Academy of Orthopaedic Surgeons, 2006, pp. 181-187.

Bracing may be beneficial in other types of structural kyphosis, especially kyphosis from fractures or osteoporosis. However, there is little role for bracing in congenital kyphosis, where abnormal vertebrae exist from birth, or in postural kyphosis.

Treatment Options: Surgical Treatment

Spinal Fusion

If kyphosis becomes very large, surgical treatment may be recommended. Surgery can provide significant correction without the need for postoperative bracing. Pain relief following surgery is not 100%, but many patients experience less pain following their recovery from surgery. The vertebrae that cause the deformity are fused together in a corrected position. Metal implants such as screws, hooks, or cables are placed, and connected with two strong rods. These metal implants provide stability for the vertebrae as they fuse together in the months following surgery.

Most surgeries are performed through a back incision. However, in severe cases, some physicians may recommend additional surgery on the front of the spine. Patients are usually able to return to normal daily activities quickly, and eventually to all activities. Your surgeon can give you an idea of how long your activities might be restricted after surgery. *(Figure 4)*

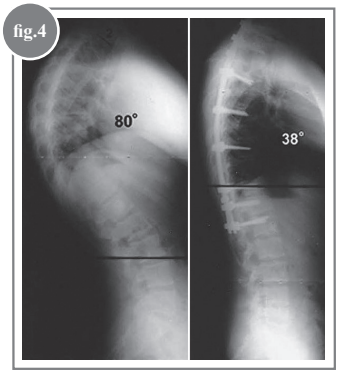

Figure 4:

(Left) Preoperative x-ray of a patient with severe kyphosis secondary to Scheuermann's disease.

(Right) Postoperative x-ray of the same patient. Moderately flexible curves often straighten simply from lying face down during surgery; however, rigid curves may require additional surgical intervention, such as spine osteotomies.

Reproduced from Wood KB, Melikian R, Villamil F: Adult Scheuermann kyphosis: valuation, management, and new developments. J Am Acad Orthop Surg 2012; 20:113-121

Spine Osteotomies

Spine osteotomies are a surgical technique used during some fusion surgeries for structural kyphosis. "Osteotomy" means to create a cut in a bone. Spine osteotomies are typically used when deformities are severe and adequate correction cannot be achieved with the rods and simpler methods to loosen the spine.

In these operations, parts of the vertebrae are removed. This creates more flexibility in the spine that is then controlled by the inserted rods and anchors. In some cases, osteotomies may include removal of parts of ribs. Osteotomies often involve greater risks of injury to the spinal cord, blood vessels and nerves, and so are typically done only when needed to achieve correction that cannot be accomplished by other methods. *(Figure 5)*

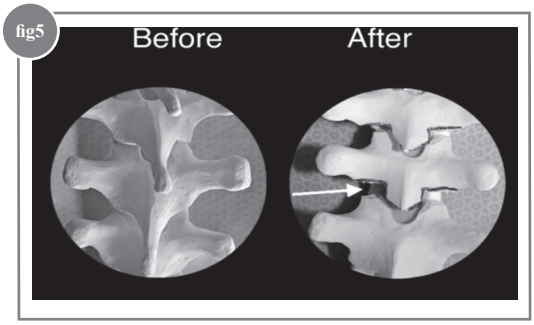

Figure 5:

(Left) Sawbones model of a section of a normal thoracic spine.

(Right) Sawbones model of a section of thoracic spine with select portions of bone and facet joints removed (arrow) demonstrating a posterior column osteotomy.

Summary

Scheuermann's kyphosis is an abnormal rounding of the back caused by wedge-shaped vertebrae. Treatment for Scheuermann's kyphosis must take into account how large the curves are, whether they are getting worse, in which part of the spine they are located, and whether the patient is still growing. There are several treatment options for Scheuermann's Kyphosis, which include observation, physical exercises, bracing, or spinal fusion surgery. Your surgeon can work with you to identify which treatment is the most appropriate.

Where Can I Get More Information?

The best information about your specific condition typically comes directly from your surgeon. You can check to see if your surgeon is a member of the Scoliosis Research Society by going to http://www.srs.org/find/. Membership in SRS indicates that at least 20% of the doctor's practice is in spinal deformity, that they attend annual meetings, and stay abreast of new information and new research.

In addition to the Scoliosis Research Society website (www.srs.org), there are other reputable organizations that may offer information about Scheuermann's Kyphosis.

Here is a list of some patient resource websites that may be of assistance:

- www.srs.org – Scoliosis Research Society
- www.posna.org - Pediatric Orthopaedic Society of North America
- www.aaos.org – American Academy of Orthopaedic Surgeons
- www.nih.gov/niams/healthinfo - National Institute of Arthritis and Musculoskeletal and Skin Diseases
- http://etext.srs.org/ - SRS provides information through the E-Text as an educational service. E-Text material is not intended to represent the only, nor necessarily best, methods or procedures appropriate for the medical situations discussed, but rather is intended to present an approach, view, statement or opinion of the chapter author(s) that may be helpful to others who face similar situations. SRS disclaims liability for all claims that may arise out of the use of techniques demonstrated therein by such individuals.

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Please consider a donation to SRS.

100 percent of all contributions and donations to the Scoliosis Research Society's (SRS) Research, Education Outreach (REO) Fund are used entirely for research, outreach programs, and educational scholarships and fellowships seeking improved treatments, the causes and possible prevention of spinal deformities. Operating funds for SRS come from membership dues, educational meetings and courses, publication sales and other sources.

With your support, SRS can continue to support and offer necessary educational opportunities, beneficial research grants and maintain effective advocacy efforts that will change the lives of those living with spinal deformities.

If you would like to make a donation to the Scoliosis Research Society, please fill out the form below and mail it to:

Scoliosis Research Society
555 East Wells Street, Suite 1100
Milwaukee, WI 53202-3823 USA

Please make checks payable to Scoliosis Research Society.

If you would like to make your donation online, please go to www.srs.org/support/donate_now.htm

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YES! I would like to donate to the Scoliosis Research Society (SRS) to help continue in fulfilling its mission to improve the lives of patients with spinal deformities!

Enclosed is my gift of: ☐ $10, ☐ $20, ☐ $35, ☐ $50, ☐ $100, ☐ $150, ☐ Other _____

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Notes

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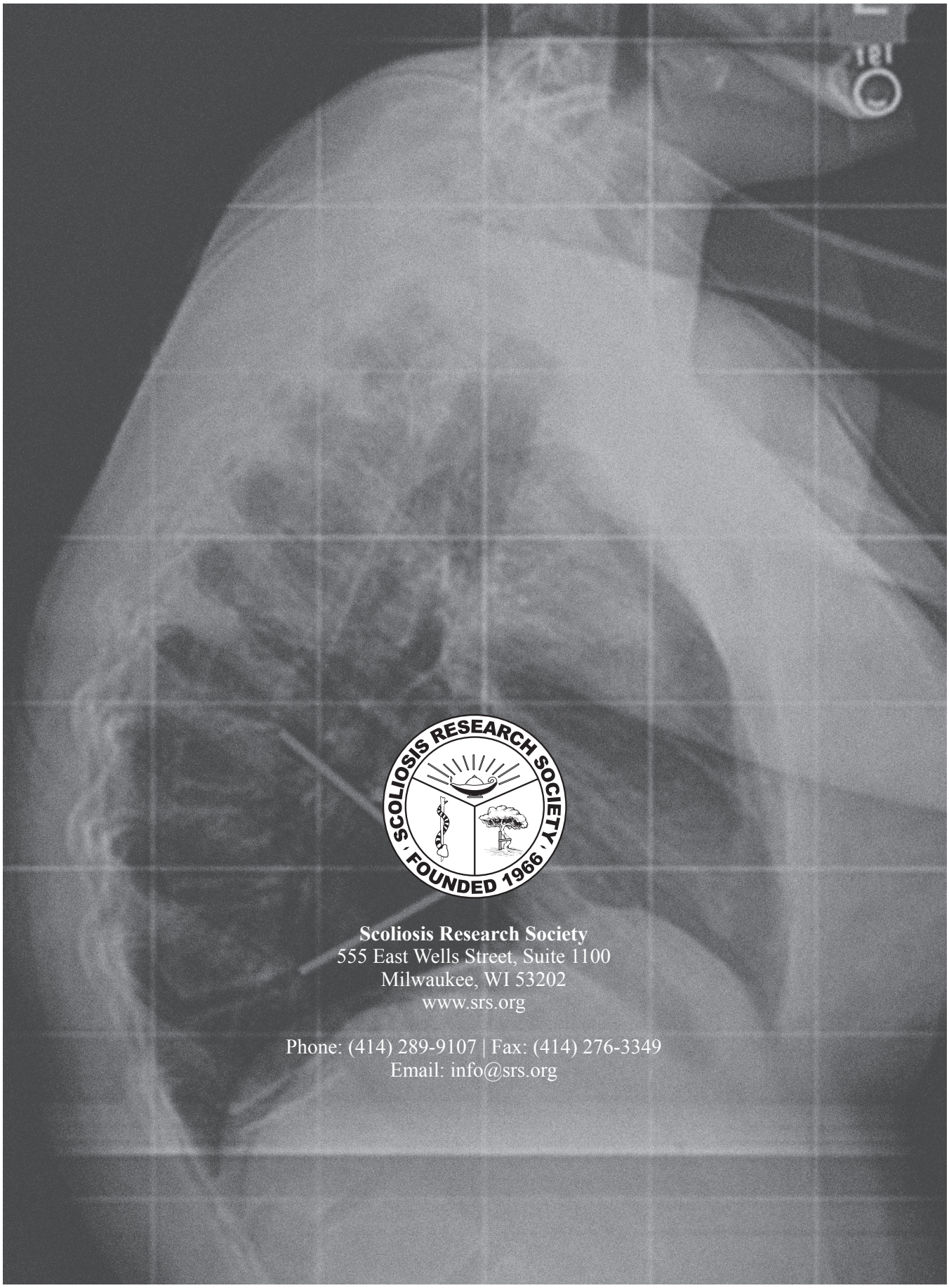

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