# **Scoliosis and Seating**

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Scoliosis, or curvature of the spine, is well-known to many polio survivors. It occurs in a large percentage of individuals due to muscle imbalance as a result of paralysis or weakness.

Changes in appearance as well as changes in the way the body functions can result from scoliosis; fortunately, these issues can be alleviated or ameliorated with proper treatment.

## Complications

Problems associated with scoliosis include pain, decreased pulmonary function, decreased digestion, and reduced use of the arms.

In general, pain in thoracic (upper spine) curves is not a frequent complaint, but is much more common in lumbar (lower spine) scoliosis.<sup>1</sup> Pulmonary function may be compromised when a more severe curve limits the lungs' ability to expand, presenting particular danger for polio survivors who are often at risk for respiratory complications from other factors as well.<sup>2</sup> Severe scoliosis that affects the position of the head can cause individuals to aspirate food and liquid into the lungs. Pressure from the ribs and spine on the intestines and stomach affect their ability to function properly.

The ability to use the arms depends upon solid support from the trunk. As scoliosis affects trunk balance and positioning, arm use declines and is less efficient. Polio survivors know that energy conservation is key to living with the late effects of polio and addressing scoliosis to optimize function of the arms is no exception. This is especially true for manual wheelchair users, who use their arms for mobility in addition to their daily activities. Because of the musculoskeletal alignment changes that occur with scoliosis, longterm wheelchair users with scoliosis are at high risk for orthopedic injuries and pain in the spine and shoulder areas.

## **Treatment of Scoliosis**

One treatment of scoliosis is proper trunk support. (Other options often used include braces, corsets, and jackets, as well as internal structures such as rods in the vertebral column.) For wheelchair users, the wheelchair back and cushion can be modified for proper support. Addressing scoliosis through the wheelchair seating system begins with an assessment of the individual's sitting posture and ability to function. The position of the pelvis is always evaluated first, as changes in the pelvis affect the positioning of the trunk, head, and extremities (arms and legs).

When a person's pelvis sits higher on one side than the other, it is called a pelvic obliquity. If the obliquity is flexible, the scoliosis may be partially or completely corrected once the pelvis is level. This is accomplished by adding a pelvic build-up, or small pad, under the wheelchair cushion on the side where the pelvis is lower. Leveling the pelvis equalizes the pressure. For a fixed obliquity, a build-up is added under the higher Fall 1998 🔳 Vol. 14, No. 4

side of the pelvis to accommodate the deformity and better distribute pressure.<sup>3</sup>

For someone who does not sit in a wheelchair, a folded towel on a chair seat can be used to support or correct a pelvic obliquity. The towel should be placed so that it is under the lower side of the pelvis if the pelvis is flexible, and under the higher side if the pelvic obliquity is fixed. It can be difficult to make this determination; sometimes the towel is placed under first one side and then the other, using the more comfortable arrangement.

The next concern is the curvature and rotation of the spine and the position and mobility of the scapulae (shoulder blades). Lateral supports attached to the back of the wheelchair can be used to correct or support curvatures. A three-point system should be used to provide a balance between maximum force and pressure relief.

If a "c" shaped curve causes an individual to lean to one side, the first support should be positioned at the top of the curve, allowing at least two finger widths at the armpit. The second support should be placed on the other side

CONTINUED ON PAGE 2

Motor Neurons and Units 3
Five Ways to Find Peace 6
Sleep-Disordered Breathing 8
Have You Heard 9
More About Crutches11

inside this issue ....

at the apex of the curve or slightly below it. The third support will be at the pelvis to prevent shifting. This is often accomplished by the contour of the cushion, hip guides, or the wheelchair armrest.

If an individual has an "s" shaped curve rather than a "c," lateral supports should be positioned at the apex of each curve. Unfortunately, it is difficult to provide this type of lateral support to a non-wheelchair user. For some, a brace or corset can provide this effect.

For individuals with severe curvatures of the spine, a standard wheelchair back does not conform as needed for pressure relief and comfort. In these cases, a wheelchair back that is custom contoured to the individual offers the best solution.

Often gravity causes a flexible scoliosis to worsen when a person sits upright in a wheelchair. Tilting or reclining the wheelchair back a few degrees counteracts this and allows the lateral supports to be more effective. A wheelchair tilt occurs when both the back and seat of the wheelchair move; a recline occurs when only the back moves and the seat is stationary (as with most car seats).

Each has its advantages and disadvantages. A reclining back allows the hip flexors to be stretched and can provide a comfortable resting position, especially with the legs elevated. Tilting allows a person who uses a more complex seating system to sit in the same position at the hips and can prevent shifting or loss of proper position. For a person using a custom contoured back, a tilt is preferred over a recline, because reclining would change the position of the contoured back relative to the person.

A polio survivor with scoliosis investigating a mobility aid such

Nina Gilden Seavey, writer and director, signs the companion book to the 90-minute documentary, *A Paralyzing Fear: The Story of Polio in America*, at the opening in Washington, DC, on September 14, 1998, for Alan Fiala, PhD.

The film aired on many PBS stations in October 1998. *Polio Network News* invites comments from polio survivors or their family members on the documentary. Please send your thoughts to the International Polio Network.

The cost of the companion book is \$29.95, with an additional charge for shipping and handling. To place an order, call TV Books, LLC, at 800/331-3761 or contact a local bookstore.



as a scooter, must consider their seating needs. Many scooters and some wheelchairs cannot be modified to address scoliosis. An occupational therapist or physical therapist who specializes in seating can evaluate both positioning and mobility needs to recommend the appropriate choice of equipment.

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3. Bergen, A.F., Presperin, J., & Tallman, T. (1990). Positioning for function: Wheelchairs and other assistive technologies. Valhalla, NY: Valhalla Rehabilitation Publications Ltd.

### **OTHER SCOLIOSIS RESOURCES**

National Scoliosis Foundation, publishers of *The Spinal Connection*, 5 Cabot Place, Stoughton, MA (Massachusetts) 02072 (781/341-6333, 781/341-8333 fax, 800/NSF-MYBACK [673-6922], or scoliosis@ aol.com).

The Scoliosis Association, Inc., publishers of *Back Talk*, P.O. Box 811705, Boca Raton, FL (Florida) 33481-1705 (800/800-0669).

Scoliosis Research Society (www.srs.org).