What Are the Best Exercises for Scoliosis?

Lise Stolze

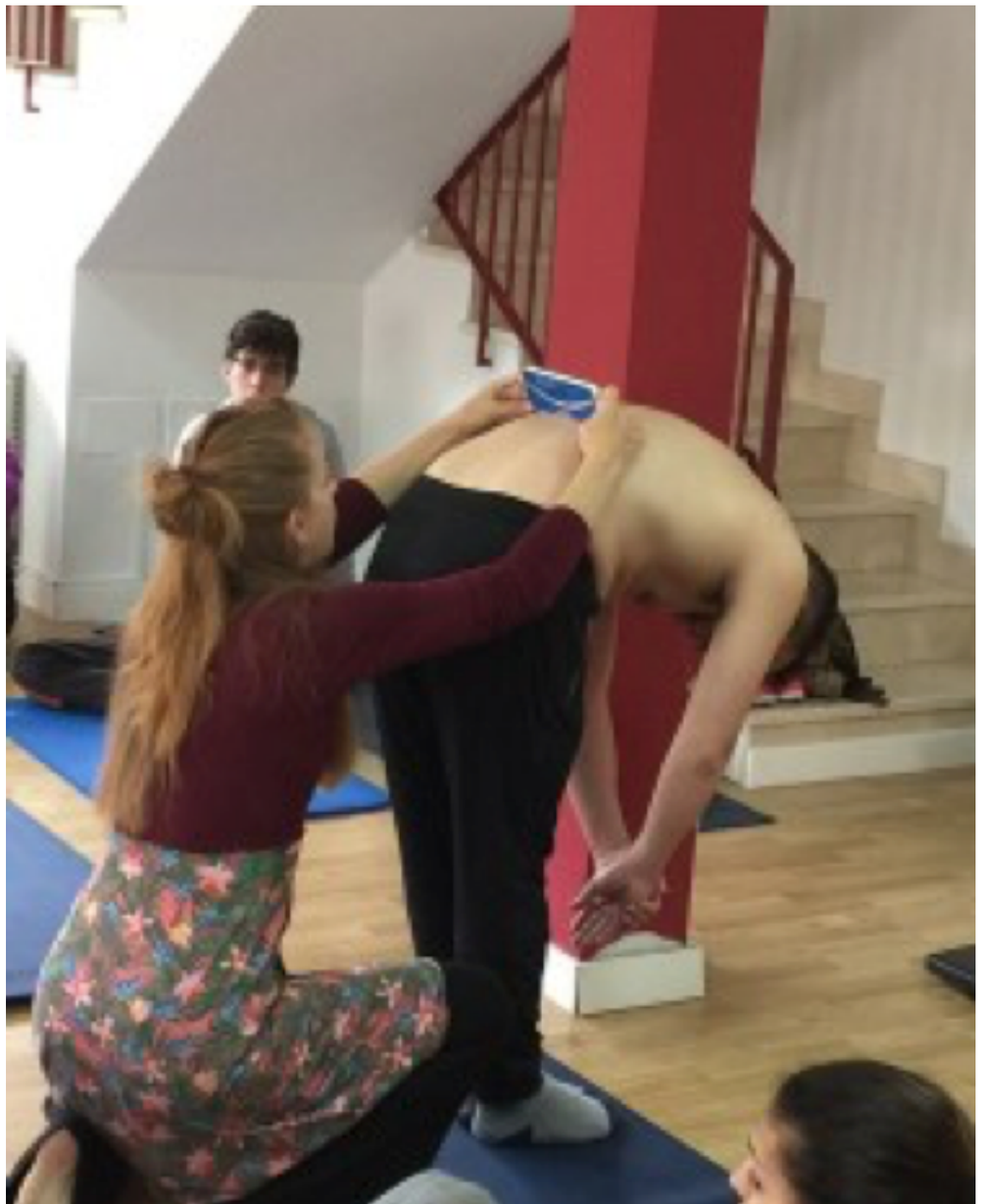
Polestar Educator, Physical Therapist, and certified C2 Schroth Scoliosis Therapist

Here are the questions scoliosis clients ask me about exercise:

Should I perform some exercises just on one side?
Should I choose exercises that rotate me to the opposite direction of the curve?
Should I do an extra set of movements to one side?
I just saw research that side plank exercises can reduce curve degrees…should I be doing these?

To answer these questions we must understand how scoliosis affects movement.

What is the Pathomechanism of Idiopathic Scoliosis? (the short version!)



I will be brief since this is a whole course in itself! We know that Idiopathic *(no known cause)* Scoliosis (IS) is a 3 dimensional spinal disorder that begins with anterior vertebral wedging due to RASO *(relative anterior spinal overgrowth)* during bone development. We also know that the rotational component of scoliosis exists as both inter-vertebral torsion *(rotation of one vertebra relative to another)* and intra-vertebral torsion *(an internal rotational distortion within each vertebra)*, most notably at the apical vertebra *(the vertebra most deviated laterally from the vertical axis that passes through the sacrum).*[1] This distortion contributes to less joint motion at he apex of the curve and more at the transition points of the curve.

We see this to a greater degree in adults and to a lesser degree in adolescents who have a more flexible curve before bone maturity. This is apparent in a supine lateral flexion X-ray that assesses curve flexibility.

Three Goals for our Clients with Scoliosis

Movement educators can keep 3 goals in mind when choosing exercises for clients with IS:

1. Achieve better postural alignment along the central axis
2. Provide a safe fitness option to increase flexibility, strength and fluid movement
3. Support sports, recreation and functional activities that enhance quality of life

We *Can* Improve Posture Through Exercise!

Better posture can be achieved by emphasizing the most fundamental principles of all intelligent movement disciplines: axial elongation and breathing. Scoliosis curve concavities are constantly under compression by gravity. Axial elongation encourages a natural re-alignment of the spine by using neuromuscular activity to reduce multi-plane compression and collapse of the concave side of the scoliosis curves. Once the concavities (which include the ribs) are expanded, then breath can be used to further open the collapse through:

1. Tactile cueing of the concavities
2. Unilateral nostril breathing
3. Guided imagery

The most effective position to learn decompression of the concavities is in a spinal neutral position, out of gravity. Once there is neuromuscular re-patterning, movement can then be transferred to functional positions against gravity like standing, sitting, walking, squatting and lifting where it is more difficult to maintain axial decompression. There are many neutral spine exercises in the Pilates and yoga environment that can be used in this initial phase of re-patterning.

The Side Plank Research Controversy

A research article was published in 2014 claiming that scoliosis curves can be reduced by doing side planks on the convex side of the curve, and was sensationalized in a WSJ article.[2] But the research had many flaws[3] and while interesting, it cannot make that claim. Muscular activity on both the concave and convex side of a scoliosis curve is inefficient and exercises that address each side are optimal for IS, including the Side Plank. Consider benefits of the Side Plank based on curve type:

1. **Single Primary Thoracic Curve:** performing side plank on the convex thoracic side (concavity up) can help strengthen elongated muscles on this side by placing them in a relatively shortened position, and helps to expand the concave side, working these muscles eccentrically.
2. **Double Curve**, **Primary Thoracic**: The same can be true for the thoracic curve in this case but now the lumbar curve may be more compressed and specific cueing and/or modification of the exercise must be considered.

3. **Double Curve**, **Primary Lumbar**: Performing side plank on the convex lumbar side may be beneficial, but the thoracic concavity may become more compressed, and will require special cueing or modification.
4. **Single Curve – Lumbar or Thoraco-lumbar**: Performing side plank on the lumbar or thoraco-lumbar convex side may strengthen elongated muscles on this side by placing them in a relatively shortened position and helps to expand the concave side, working these muscles eccentrically.
5. **Adults with Degenerative Scoliosis (Lumbar)**: receive the same benefits in the Plank as a Single Lumbar curve but any lateral instability (listhesis), renders this exercise contra-indicated.

In all curve types, performing the Side Plank on the **concave** side of the primary curve is much more challenging but also beneficial. Performing a scoliosis assessment to determine the curve type is essential. In adult degenerative scoliosis, an X-ray must be obtained and collaboration established with a health care practitioner specializing in scoliosis management.

Safe Exercises for Spine Mobility

Life takes us out of neutral spine…shouldn't we train our scoliosis clients how to move their spine effectively out of neutral? The answer is of course yes…. but which movements and how much? This depends on your assessment of the client: Are they in pain? How much movement does the apex of each curve have? What is the curve type? What other muscle imbalances or degenerative changes exist? What are their goals?

Considering that the scoliosis spine tends to move more at the transition points and less at the apices, we may want to limit end range movements and emphasize elongation in postural shapes that minimize compression of the curve concavities. This may be more difficult for those with a double curve. Adults with degenerative changes and adult modifiers[4] have special needs and neutral stabilizing exercises are indicated. So it is important to make critical decisions with your client based on your evaluation and their goals.

Recreation and Sports: Can they Be Done with Scoliosis?

Everyone with scoliosis should be free to enjoy activities that increase quality of life! What does you client love to do? Sports activities such as dance and gymnastics involve many compressive spine positions for scoliosis….as do golf and tennis. **Each person must be evaluated and informed about the risk that their chosen activity may have on their spine**. Considerations for age, curve type, activity frequency, muscle imbalances and degenerative changes must be made. Clients should be educated about scoliosis spine mechanics and progression to help them make an informed decision about the activity they choose.

A fitness or movement session with your client could focus on training to maintain axial elongation and expansion of the concavities during sport. Just as likely and equally important, a session could simply focus your client back to their center line!

Education and the Need for Individualized Programs

Polestar founder Brent Anderson, PT, PhD, OCS reminds us of the importance of working within our own scope of practice. It is crucial to invest in your education to increase your effectiveness and level of safety with your scoliosis clients. Find a professional you can partner with, join a network of practitioners with like interests, and take courses to keep yourself current with scoliosis research. If you are the client, make sure that your Pilates teacher or therapist has the training to create safe and effective exercise programs for you and your needs.

References:

[1]Dickson RA, Lawton JO, et al. The pathogenesis of idiopathic scoliosis. Biplanar spinal asymmetry. *J Bone Joint Surg Br*. 1984;66(1):8–15.

[2] Fishman LM, Groessl EJ et al. Serial case reporting yoga for idiopathic and degenerative scoliosis. *Global Advances in Health and Medicine.* 2014;3(5):16-21.

[3] Salvatore M, Zaina F, et al. *Letter to the editor: Serial case reporting yoga for idiopathic and degenerative scoliosis*. Global Adv Health Med.2015;4(1):79-80.

[4] *Schwab F, Ungar B , et al. Scoliosis Research Society-Schwab adult spinal deformity classification: a validation study. Spine (Phila Pa 1976). 2012 May 20;37(12):1077-82.*

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Lise Stolze, MPT, DSc PMA®-CPT, is a certified C2 Schroth therapist, Polestar Educator, and owner of Stolze Therapies in Denver, CO. She has co-created Pilates Adaptations for people with Scoliosis with Schroth Scoliosis Therapist and BSPTS educator Hagit Berdishevsky, PT, MSPT, DPT, Cert. MDT. Lise has published her research on Pilates and Low Back Pain in the **Journal of Orthopedics and Sports Physical Therapy**.