YOGA THERAPY & SCOLIOSIS
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HOW COMMON IS SCOLIOSIS?
• Scoliosis affects 2% to 3% of the population, or an estimated 6-9 million people in the United States.
• More than 80% of cases are idiopathic.
• Usually develops in infancy or early childhood.
• Typically diagnosed between 10-15 years old.
• While it affects males and females equally, females are eight times more likely to have their curve progress to a magnitude that requires treatment.

• Degenerative adult scoliosis usually occurs after 40 and may be related to osteoporosis.” (Fishman)

• Affects body image.

• Increases depression in adolescence that continues into adulthood.

• Left untreated can lead to respiratory insufficiency, heart problems, deterioration of the spine, gait disturbance, and balance issues increasing vulnerability to falls.

WHY THE TREATMENT OF SCOLIOSIS IS IMPORTANT

• Affects body image.

• Increases depression in adolescence that continues into adulthood.

• Left untreated can lead to respiratory insufficiency, heart problems, deterioration of the spine, gait disturbance, and balance issues increasing vulnerability to falls.

FUNCTIONAL VS. STRUCTURAL SCOLIOSIS

Functional Scoliosis

• Involves a lateral curve of the spine without a rotational component.

• It typically develops as a result of habitual asymmetric activities that cause an imbalance in the pull of the muscles on the spine. (Krenzmen).

• Because it is muscular in nature and does not involve the bones, it is easier to resolve than structural scoliosis with muscle balancing techniques.
FUNCTIONAL VS. STRUCTURAL SCOLIOSIS (CONT.)

Structural Scoliosis
- Involves a lateral curve of the vertebra in one direction with vertebral rotation in the opposite direction. (Krenzman).
- It occurs in the thoracic, thoraco-lumbar, or lumbar regions and is often accompanied by smaller compensatory curves above and below it in the opposite direction.
- This is the body’s way of keeping the head balanced over the body and keeping the eyes level with the horizon line.
- Is more complicated and time-consuming to treat because it involves the bones themselves.

NORMAL SPINE

Cervical Spine
- Made up of 7 vertebrae
- It is a lordotic curve, moving forward in space.

Thoracic Spine
- Made up of 12 vertebrae
- The curve is kyphotic, moving backward in space
- Each vertebra is attached to a set of ribs
- The ribs protect the heart and lungs and hold the diaphragm in place.
- A curve at the thoracic level affects the ribs and the organs within.
- A left curve can affect the heart.

Lumbar Spine
- Made up of 5 vertebrae forming a lordotic curve that moves forward in space
- More flexible in flexion & extension than the thoracic spine, but has less rotation

Coccyx (Tailbone)
- Made up of four fused vertebrae
- Curves in the same direction as the sacrum

COMMON SCOLIOSIS PATTERNS

Right Thoracic Curve
Apex is at T10 or higher

Right Thoraco-Lumbar curve
“C-Curve”, apex is at T11-L1

Left lumbar apex of curve is in lumbar spine. Usually to left

Right Thoracic Left lumbar
“S-Curve”. Double Major means the 2 curves are the same size.
THEORIES OF CAUSES OF SCOLIOSIS

• Injury to the embryo before birth
• Muscle imbalances from neurological disorders like polio or cerebral palsy
• Muscle weakness due to muscular dystrophy
• Fractures of the spine
• Tumors that prevent vertebral growth

THEORIES OF CAUSES OF SCOLIOSIS (CONTINUED)

• Radiation that affects bone growth
• Burns that cause skin and muscles to pull the spine out of alignment
• Possible hereditary factor
• Injury leading to muscle imbalance between the right and left sides of the body.
• Repetitive imbalanced movement in one’s occupation or sport.
• Poor posture
• Handedness

HABITS THAT MAKE SCOLIOSIS WORSE

Regardless of whether one has structural or functional scoliosis, poor positioning during everyday activities can make it worse. In fact, Weiss et al found that while scoliosis curve-specific exercises significantly reduced the curve in study participants, failure to apply corrective postures that decrease curve loading during activities of daily living nullified the results of the exercise and are implicated in progression of the condition, especially in those with greater than a 30 degree curve (Weiss et al).
CONSIDER THE FOLLOWING

ASYMMETRIC BREATHING PATTERN

• Those with scoliosis tend to engage in an asymmetric breathing pattern that habitually rotates the thorax further than it already is.
• The breath automatically fills convex areas on the back and the front (i.e. the right thoracic area on back and the left chest on the front).
• This spins the body in one direction over and over, making the scoliosis worse.
• Corrective breathing involves breathing into the concave areas of the body which de-rotates the spine in the opposite direction (Weiss et al, Schroth) thereby correcting the rotational component of the scoliosis.

PROLONGED SITTING

• Reduces the thoracolumbar lordotic curve and promotes dysfunctional posture.
• “Those with a single primary curve in the thoracic or lumber tend to lean in the side of the convexity, thus exacerbating the curve. Those with an S curve tend to lean toward the concavity of the lumbar curve” (Weiss et al).
• Sideshifting to the opposite side is corrective in that it elongates the concave side and reduces the rib hump on the opposite side (Weiss et al).
OTHER CORRECTIONS FOR PROLONGED SITTING

• Positioning the hips above the knees at a 30 degree angle with the feet on the floor.
• Placing a large roll behind the sacrum at the base of the spine to facilitate the maintenance of a natural lordotic curve (or sitting on a large balance ball).
• Placing a yoga belt around the thighs to prevent them from rolling out and compressing the spine.
• Taking a break to walk around every 30 to 60 minutes to take a break from sitting.

PROLONGED STANDING

• Over time weight bearing on one side more than the other leads to muscle imbalance between the sides.
• The weight bearing side gets stronger while the other gets weaker.
• This increases vulnerability to falling, usually toward the weight bearing side.
• It also exacerbates the spinal curves (Weiss et al)

CORRECTIONS FOR PROLONGED STANDING

Encourage patients who stand a lot during the day to:
• Mindfully balance their weight over both feet
• and/or place more weight on the opposite side of their tendency
• Mindfully lengthen the concave side.
CARRYING ITEMS

- Carrying a backpack, large purse, or child on one side consistently causes muscle imbalance and exacerbates the curve (Weiss et al).
- Persons with scoliosis tend to carry the item on one side, which causes a further lengthening of the convex side and shortening of the concave side.
- Over time the muscle imbalances caused by asymmetrical carrying further exacerbate the scoliotic curve.

CORRECTION FOR CARRYING ITEMS

- Carrying items on the concave side lengthens and strengthens the concave side and is therefore corrective to the curve.
- This can feel incredibly awkward at first but becomes less so over time.

PULLING ITEMS

- Consistently pulling an item with the same hand causes a spinal rotation (i.e. as in a frequent traveler pulling luggage), which can exacerbate the curve.
- Changing hands can be corrective by rotating the spine in the opposite direction.
SLEEPING POSITION

• Advise back sleepers to start off their sleep making sure they are lying as straight as possible in the bed.
• Side-sleepers will tend to twist in the direction of their curve. Lying on the concave side and keeping the top hip aligned over the bottom hip will decrease this tendency.
• A pillow between the knees can be helpful.

Of course no one can monitor their position all night long but some mindfulness when awake may at least improve the situation.

HOUSECLEANING

• Vacuuming, mopping, and even dusting involve repetitive spinal rotation and are among the most painful tasks for persons with back pain from scoliosis.
• Teaching oneself to do them with the opposite hand may nullify the effects and may even help the curve.
• Delegating these tasks to someone else is also a good option.

EXERCISE

Everyone needs exercise and those with scoliosis are no different. But exercising without mindfulness can actually exacerbate the curve and increase pain.
• Weight lifting should be done in front of a mirror with mindfulness toward strengthening and drawing in the convexities and lengthening and breathing into the concavities.
• When using aerobic equipment, mindfulness is needed to keep the hips and shoulders aligned in the frontal plane, breathe into the concavities, and emphasize strengthening the weaker leg. This will avoid repetitive rotation of the spine in one direction and strengthen the body more in the direction of alignment.
EXERCISE CONTINUED

• Yoga practitioners with scoliosis should minimize classes that move quickly from one pose to another and emphasize instead alignment-based classes with a skilled teacher who has knowledge of the application of yoga for scoliosis. Of course we will discuss yoga at length a little later.

THE IMPORTANCE OF SELF CORRECTION DURING ADL

Self correction during activities of daily living are at least equally important, if not more important, to preventing the progression of the scoliotic curve as scoliosis pattern-specific exercise.

BACK TO TREATMENT OPTIONS – SCOLIOSIS PATTERN SPECIFIC EXERCISE

A systematic review of the literature found that in 18 out of 19 studies involving a total of 1654 treated patients and 688 controls that scoliosis pattern-specific exercises can significantly reduce scoliosis curves (Negrini et al).

All successful programs included self-correction of posture during ADL and used asymmetrical exercise.

Improvement included reduction of the lateral curve, reduction of trunk rotation, and improvement in respiratory function.

A decrease in pain scores also occurred in a number of studies (Negrini et al).
LINK TO DEPRESSION

- Participation in scoliosis-specific rehabilitation programs during adolescence has been linked with higher incidents of depression that followed participants into adulthood (Płaszewski).
- This may have been due to the stigma of the diagnosis that "something is wrong with me."
- This early impact on self-esteem and may be difficult to overcome. Rehab professionals should be sensitive to this stigma.

THE SCHROTH METHOD OF PHYSICAL THERAPY

This method is often studied and consistently found to be effective in reversing scoliosis.
Katharina Schroth was born in 1894 and had scoliosis herself. She was dissatisfied with the treatment of the time, bracing, because it hindered physical activity.
Motivated to help herself, she developed a regimen of exercises aimed at activation of the muscles in the trunk concavities, correcting scoliosis using breathing movement in which the ribs are used as levers (Lehnert-Schroth).

SCOLIOSIS PATTERN-SPECIFIC YOGA THERAPY

Like the Schroth method, yoga therapy aims to activate inactive muscles and uses breath to de-rotate the spine. Specifically, the principles of Using Yoga Therapy to Manage Scoliosis are to:
- Extend and lengthen first.
- Strengthen the legs.
- De-rotate the spine using the breath and muscle balancing.
- Strengthen the muscles to support the lengthened extended posture.
- Supports self-esteem through the application of yoga philosophy.
YOGA THERAPY ADDRESSES THE SELF-ESTEEM COMPONENT THROUGH YOGA PHILOSOPHY

Krenzman in her book Scoliosis, Yoga Therapy, and the Art of Letting Go explains how yoga philosophy applies to the person with scoliosis.

Yoga philosophy supplies a list of “do nots” (Yamas) and dos (Niyamas) to live by.

THE YAMAS – WHAT NOT TO DO

Ahimsa (non-violence)
Encourages nonviolence toward oneself and others. It reminds clients to have a compassionate, accepting attitude toward themselves, to listen to the messages of the body and respect them, to refrain from practicing harsh thoughts about themselves, and not to push the body to the point of harm.

Satya (do not lie)
Reminds practitioners to check in with themselves, make an honest assessment of how the body is truly feeling, and respect limitations. It advocates speaking the truth to oneself and also speaking up and letting the therapist or teacher know when they are being pushed too hard in their yoga therapy practice.

Asteya (non-stealing)
Teaches practitioners to be respectful of others’ resources and time and not steal from others.

Brahmacharya (moderation, non-excess)
Encourages moderation. In terms of scoliosis, it might mean moderation in the amount of energy given to focusing and treating the condition. Everyone needs balance between work and play. It also applies to the practice itself – be moderate in the amount of effort while practicing the poses. Too much effort can lead to muscle tension and injury.

Aparigraha (non-possessiveness, non-coveting, non-grasping)
Teaches practitioners to do their work without being overly attached to the outcome.
THE NIYAMAS – A LIST OF “DO’S”

**Saucha** (Purity, cleanliness, neatness).
Encourage the client to create a practice space for yoga, to keep it neat and tidy, and stick to a schedule of practice.

**Santosha** (contentment).
Contentment with one’s one situation – or despite it – is a crucial practice and is a key component to happiness.

**Tapas** (self-discipline).
Encourage clients to do their practice religiously for 6 weeks without questioning or being attached to results.

**Svadhyaya** (self-study).
Awareness is the key to change and one of the key components to practice. In yoga we refer to this as “witness consciousness”. Encourage clients to
• Observe their inner reactions, judgments, and resistance.
• Notice which exercises they want to avoid and which ones they feel more attracted to.
• Notice where they feel tightness during poses so they can breathe into their tight spaces.

**Ishvara Pranidhana** (surrender).
This involves committing oneself to practice, but letting go of the result. This may be easy in the beginning when one notices all kinds of changes but as the changes become more subtle and a plateau of improvement occurs, it may be difficult to stay disciplined. This is akin to someone taking their medicine, improving, and then thinking, “I am better. I don’t need my medicine anymore.” This is when a setback may occur. This is human nature. That is when it is important to forgive yourself, perhaps see a practitioner for a visit to get re-inspired, and begin again.
**COMPREHENSIVE PHYSICAL PRACTICE**

**Asana** (yoga postures)
Tools to align the spine, increase mobility, relieve pain and tension, and improve posture and respiratory capacity.

**Pranayama** (mastery of the breath)
Allows access to deeper breath to tap into greater life force. In scoliosis there are specific breath techniques used to de-rotate the spine.

**Pratyahara** (withdrawal of the senses) allows a withdrawal from the outer world to the inner world within.

**Dharana** (single-pointed focus)
Involves focusing the mind on exactly what one is doing – concentrating on one thing.

**Dhyana** (deep state of meditation)
Facilitates a feeling of equanimity; experiencing “beingness” instead of “doingness”.

**Samadhi** (unity consciousness)
- Connectedness with all that is.
- Connectedness between the mind, body, energy, emotions, and spirit.
- Connection with life all around us.
- Realizing that disharmony within one aspect of the self affects all the other aspects.
- Realizing that disharmony within ourselves as a whole (such as resisting the body the way it is) leads to disharmony in our relationship with others and the world around us.

**WOULD ANY KIND OF YOGA DO?**

- ONLY scoliosis pattern-specific exercise has have been shown to improve the curve.
- ONLY yoga therapy using alignment-based practice is advocated.
YOGA THERAPY

• Applies the tools of yoga to relieve the suffering associated with specific challenges or conditions.
• In the case of scoliosis, is applied asymmetrically to address and correct the asymmetric nature of scoliosis.
• Encourages awareness off the mat and therefore lends itself to self-correction of posture throughout the day.

Like the schools of physical therapy that use scoliosis pattern-specific exercise to correct the curve, yoga therapy uses postures to:
• Elongate and de-rotate the spine
• Promote auto-correction of posture
• Strengthen the intrinsic trunk muscles through active holding
• Correct muscle imbalances between the front and the back and the left and the right through stretching the overtight muscles and strengthening the weak ones.

FISHMAN ET AL STUDY – SIDE PLANK TO CORRECT THE CURVE

• Studied side plank as a mean of strengthening the trunk muscles on the convex side of the scoliotic curve.
• While most studies have involved only those with idiopathic adolescent scoliosis, this study included those with degenerative scoliosis with age range 14-85.
• All 25 participants had a right thoraco-lumbar curve greater than 6 degrees.
• Each participant agreed to practice the side plank at home daily with the convex side down for an average of 90 seconds.

• Those with an S curve practiced a modified version of holding the left leg with the leg hand.

• Those participants considered compliant practice at least four times a week and attained a 40.9% improvement in their primary curve.

• It is proposed that the mechanism at work is the strengthening of weaker trunk muscles on the convex side: quadratus lumborum, iliopsoas, transverse abdominus, oblique, intercostal, and praspinal musculature, which, in turn, might straighten the spine.

INSERT RESULTS OF MY PERSONAL EXPERIMENT

PERSONAL EXPERIMENT

• R Thoracic curve of 6 degrees with L Lumber curve of 12 degrees as measured by goniometer.

• After 5 weeks of performing the side plank with the right side down, the thoracic curve is 5 degrees and the lumbar curve is 8 degrees.
CONTROVERSY OF SIDE PLANK STUDY

• Krentzman in Scoliosis, Yoga Therapy, and the Art of Letting Go recommends doing the pose for lumbar curves only with the lumbar convexity downward. She recommends doing a modified balancing half moon pose for thoracic curves.
• Writers at https://spiralspine.com have cited cases where doing the side plank actually worsened the curve.
• The side plank is very challenging to perform correctly for many people and form needs to be monitored.
• The curve needs to be measured periodically and one's exercise program adjusted to the individual.

THERE IS NO ONE SIZE FITS ALL SOLUTION.

HOW TO BEGIN - YOGA THERAPY ASSESSMENT

(The assessment form is in the handout)

• Observe the client from the ground up from the front, back, and sides and note observations.
• Note asymmetries between the left and the right and the front and the back.
• Use the body as a road map for treatment using breath and yoga postures.

ONE SIZE DOESN’T FIT ALL

Definition of insanity: Doing the same thing over and over expecting a different result.
• Listen to the client’s experience – they are the driver of the bus!
• Check the client’s form from time to time and make sure the poses are being done optimally.
• Check the curves at least once a month to make sure nothing in the regimen is making the curve worse.
• Ask questions about posture in ADL to make sure postural habits are kept in check.
• If something isn’t working, change it.
Possible observations in right thoraco-lumbar scoliosis:

• The spine is curved to the right with the apex of
  the curve between T11 and L1.
• The left hip is hiked up
• The left hip is rotated forward with right hip rotated back
• The right shoulder is rotated forward
• The head is shifted to the left and rotated to the right.
• The right shoulder blade may be higher than the left
• There is a convexity (a rounding out) in the right shoulder blade or right ribs causing the muscles in that area to be overstretched with the appearance of a “rib hump.”
• There is a concavity (a sinking in) at the same level of the spine on the left side.
• The muscles above and below the convexity may be overtight.
• There is a small left cervical or lumbar curve in the opposite direction above and below the thoracic curve with its own convexity.
• The whole rib cage is shifted to the right with a shortening of the left side of trunk.
• The ribs are rotated to the left.
• In standing the left foot is forward of the right.

To see the concavities and convexities more clearly, have the person clasp their hands in front and bend forward into flexion, releasing the hands.
**EDUCATING THE CLIENT**

• Share observations with sensitivity.
• “You may want to get an x-ray to confirm, but this is what I am seeing.”
• Explain functional versus structural scoliosis
• Ask questions regarding their positioning during daily activities
• Demonstrate what you are seeing with your body.
• Ask them to observe themselves in the mirror.

**SCOLIOSIS SEQUENCE**

1. Body Awareness: - Start with a body scan or other awareness exercise in supine to focus attention to the inside world of the body.

   Example: 1 “Become aware of the feet. Become aware of the ankles...” And so on up the body.

   Example 2: To bring awareness to the asymmetries, you might say, “Become aware of the left heel and how it is touching the floor. Now right heel. Become aware of the left calf and how it is touching the floor. Now left heel...” Continue this pattern up to the back of the head.

   Example 3: To incorporate the self-esteem component I like to use a Thich Nhat Hanh meditation that goes like this: “Awareness of the feet... smile to the feet. Awareness of the calves... Smile to the calves...” and so on.

   Tip: Be sure to give enough of a pause between instructions that the person has time to do what you are asking.

   Resources for body scan meditations are listed in the handout.
2. WARM-UP

- Rachel Krentzman in *Scoliosis, Yoga Therapy, and the Art of Letting Go* offers a nice warm-up series geared especially to scoliosis.
- I also like the joint freeing series offered by Makunda Stiles in *Structural Yoga Therapy*. Demonstrations of the series can be viewed at https://www.youtube.com/watch?v=aj4AtPQGH2I or https://www.youtube.com/watch?v=FvqzIAddIGk.
- Joseph LePage also offers an easy warm-up in *The Yoga Teacher’s Tool Box*.

3. ASYMMETRIC BREATHING

Breathing can be introduced during the opening awareness exercise and continue to be incorporated throughout the practice. It can also be introduced before or after the warm-up on its own.

**Breathing guidelines for de-rotation of the spine:**

Cue to focus breath into concave areas. The therapist can place hand onto these areas to facilitate awareness.

**R Thoraco or R Thoraco-Lumbar Scoliosis**

Breathe into L Thoracic/R chest.

If there is a L compensatory curve, also breathe into R lumbar/L low belly.
L Thoraco or L Thoraco-Lumbar Scoliosis
Breathe into R Thoracic/L chest.
If there is a R compensatory curve, also breathe into L lumbar/R low belly.

L Lumbar Scoliosis
Breathe into R Lumbar/L low belly.
If there is a compensatory R thoracic curve, breathe into L thoracic/R chest.

R Lumbar
Breathe into L Lumbar/R low belly.
If there is a compensatory L thoracic curve, breathe into R thoracic/L chest.

S-Curve (R Thoraco, L Lumber)
Breathe into L thoracic/R chest AND R lumbar/L low belly.

S-Curve (L Thoraco, R Lumbar)
Breathe into R thoracic/L chest AND L lumbar/R low belly.

Because this sort of breathing is challenging, keep these points in mind:
• In flexed forward positions (downward dog, child’s pose) it is easier to breathe into the back of the body.
• In backward bending positions (pigeon, quad stretch, hip flexor stretch) it is easier to breathe into the front of the body.
• Just having the client focus on the front or the back can accomplish the desired de-rotation of the spine and may be more accessible.
LEGS UP THE WALL

See video

SUPPORTED DOWNWARD FACING DOG

See video

ALTERNATIVE TO SUPPORTED DOWNWARD DOG
SUPPORTED SEPARATE HEAD TO KNEE

See video

SIDE PLANK

See video
BALANCING HALF MOON

See video

LOCUST

See video

YOGA SIT UP

See video
LOWER ABDOMINAL STRENGTHENER A
See video

LOWER ABDOMINAL STRENGTHENER B
See video

PIGEON
See video
8-STEP ROLLING SERIES FOR SHOULDERS & THORACIC BACK
FINAL TIPS ON WORKING WITH CLIENTS WITH SCOLIOSIS

• Be mindful not to overwhelm the client. Start with breathing and 1-3 assigned poses based on what the client responded well to during the assessment and what is realistic for them to practice.

• Talk with them about how to adjust their activities of daily living to support improvement of their curve. Again, give them one thing to change at a time so that they are not overwhelmed.

• Remind them that working with neuromuscular re-education can bring about emotionality and that this is perfectly normal.

• Give them a supportive rest period (savasana) at the end of their session to help them feel grounded enough to drive safely home.

• Write down the client’s pattern, along with where the convexities and concavities are on the front and back sides. It is common for clients to forget what their pattern is. This may be due to a decreased body awareness or simply because they can’t see their own back! Each visit, revisit what their pattern is so they can work with it properly.

• For each pose given, write instructions for the areas they should breathe into as well as any adjustments that you verbally give them while you are with them. For instance, for the person with R thoraco scoliosis in the supported downward dog you might write down the following:
  “Move your left hip toward the door” (to elongate the short side of trunk)
  “Press your left leg deeply into the floor” (so the left hip moves toward the floor and lines up with the right hip in relation to the floor)
  “Keep your hands even on the chair.”
  “Breathe into the L upper back”
  “Breathe into the R chest.”
• Better yet, take pictures or video the session with the client’s device.
• Use a level throughout the practice to accurately inform your instruction.
• Use a T-Square to make lines on the client’s yoga mat to inform their alignment.
• Teach them how to use “lines” in their environment to further assist their alignment during practice (wood floors, tile lines, vertical lines like door frames).

QUESTIONS?

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