Long-Distance Running with Mild to Moderate Scoliosis

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ABSTRACT:

This case study looks at an otherwise healthy long-distance runner with mild to moderate scoliosis and the imbalances that present in her musculoskeletal system due to this condition and possible challenges while training. This project discusses the potential result of such imbalances and the need for improving and maintaining better body alignment, including mind-body connection for overall health and decreasing chance for injury. Contraindications are also discussed for safety. This paper takes a look at Pilates, specifically the Body Arts and Science International (BASI Pilates) program as a beneficial strengthening and stretching program with sample list of exercises/session provided.
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Scoliosis is defined as a “three-dimensional torsional deformity of the spine and trunk: it causes a lateral curvature in the frontal plane, an axial rotation in the horizontal one, and a disturbance of the sagittal plane normal curvatures, kyphosis and lordosis, usually, but not always, reducing them in direction of a flat back.” [Negrini p 3]

“’Structural scoliosis’, or just scoliosis, must be differentiated from ‘functional scoliosis’, that is a spinal curvature secondary to known extraspinal causes (e.g. shortening of a lower limb or paraspinal muscle tone asymmetry). It is usually partially reduced or completely subsides after the underlying cause is eliminated (e.g. in a recumbent position).” [Negrini p 4]

“Functional scoliosis only affects the back muscles and does not structurally alter the body. It can result from such things as poor posture or repeated unbalanced activity, such as always carrying books on one side. It is much more common than structural scoliosis and usually much less noticeable since the degree of curvature is less, and almost always reversible.” [Asmarani]
According to the National Scoliosis Foundation, a patient-run nonprofit organization, scoliosis, “affects 2-3% of the population, or an estimated 6 million people in the United States, and there is no cure.” [National]

Scoliosis is a condition which affects both genders though females tend to be more susceptible to having a greater angular curvature (degrees) and therefore more likely to require medical care. Scoliosis is discovered more often during the pre-teen to early teen years, or 10-15 years old. However, this condition does not consider an individual’s age – since it is sometimes diagnosed in adulthood and socio-economic status and race also do not play a role. [National]

Because of this unnatural, often visible, lateral curvature of the spine, it may be easier to understand how and where the imbalances in a client’s musculoskeletal system lie.

Let’s consider the amount of work the human body has to do when a client is running. Now, this particular client is also a long-distance runner so she may be running up to 35 miles some weeks while training for an event.
Not only will this runner, require proper nutrition, specific gear, adequate sleep, an efficient breathing pattern (which may be affected by scoliosis) but also a tremendous amount of core stability and a balanced musculoskeletal system in order to increase speed, decrease effort and likely decrease injury. With a long-distance runner, who also happens to have scoliosis, some of the above can be a little more challenging to achieve sometimes and requires a good amount of body awareness combined with specific exercises to balance the postural synergists or “slings” (the “relative equality of muscle length and/or strength between agonists and antagonists or contralateral sides” [Trowbridge]) in order to maintain improved alignment. This balance can be obtained from completing a cross-training program on off-running days and can be successfully accomplished with Pilates. [Categories]

In scoliosis, we often find the client to have both upper cross and lower cross syndrome, where muscles of the upper-mid back such as the rhomboids and lower trapezius and cervical flexors tend to be weakened and often rest in a lengthened position while muscles of the chest, such as the pectorals, and posterior neck such as the upper trapezius, levator scapula, suboccipitals tend to rest in a shortened or tight position and are often over-used. [Vieux, Haettich] Likewise with lower cross syndrome, hip flexors – more often the iliopsoas along with hip adductors, erector spinae are often tight and over-used while rectus abdominis, obliques, gluteus maximus and medius and hamstrings tend to be inhibited and weak. [We’ve]

While the focus in many exercise programs is completing movements in the sagittal plane, with scoliosis we must not neglect the frontal or transverse planes and in fact, preferably doing many exercises unilaterally/contralateral.
The following is a BASI Pilates comprehensive session for this case study, an otherwise healthy 37-year old female, long-distance runner with scoliosis. It is with the understanding that exercises may be mixed-and/or-matched depending on a particular session since sessions are tailored to the client. A client’s co-morbidities should always be considered, in this case client does not present with any. If time is a factor, it would be appropriate to complete more blocks using the same piece of equipment instead of several.

**WARM UP:**
Mat:
Pelvic Curl
Spine Twist Supine
Chest Lift
Chest Lift with Rotation

**FOOT WORK:**
Reformer:
Foot work (parallel heels, parallel toes, v- position toes, open v-position heels, open v-position toes) 8 reps each
Prances, 5-6 reps each side

**ABDOMINAL WORK:**
Reformer:
Double leg, abdominals legs in straps, 5-8 reps
Double Leg with rotation, abdominals legs in straps, 3-5 reps each side

**HIP WORK:**
Reformer:
Supine leg series (frog, 8-10 reps; circles down, circles up, 5-8 reps each; openings, 8-10 reps)

**SPINAL ARTICULATION:**
Reformer:
Long Spine, 6-8 reps
STRETCHES:
Step barrel: shoulder stretch lying side (option: rather than doing more reps, do lesser reps with longer holds, 1-2 reps each side, holding for 3-4 breaths each rep)

In lieu of “FULL BODY INTEGRATION Advanced/master”), since this client is at a fundamental to intermediate level, and instead of “LEG WORK” if time is limited, considering this client has scoliosis, adding additional stretches would be appropriate.

STRETCHES Cont.
Ladder barrel:
Gluteals 1-2 reps, holding for 3-5 breaths each side
Hamstrings 1-2 reps, holding for 3-5 breaths each side
Adductors, 1-2 reps, holding for 3-5 breaths each side
Hip flexors, 1-2 reps, holding for 3-5 breaths each side

ARM WORK:
Avalon Chair:
Arm Sitting series (chest expansion, biceps, rhomboids, hug a tree, circles up, circles down, salute)

LATERAL FLEXION/ROTATION:
Avalon Chair:
Rhomboids with Rotation, 3-5 each side

BACK EXTENSION:
Wunda Chair:
Back Extension single arm 5 reps each side

While there are some exercises which would not necessarily be appropriate for this population due to the increased potential for spinal compression (ex. roll over, jack knife, boomerang, control balance – because of feet rolling over head, rocking/prep);
Future sessions may include, most of the other exercises as part of the BASI repertoire, including appropriate use of apparatus.

Pilates offers a great list of movements where we can incorporate an exercise on just one side of the body or opposites and allow facilitation of those muscles which tend to be inhibited to follow through their designed movement pattern and range of motion;
likewise stretching body unilaterally. Additionally, the use of apparatus is a huge benefit in providing the client proper support and or appropriate and progressive resistance.

Body Arts and Science International (BASI) Pilates teaches us the importance of that mind-body connection which is addressed in the ten principles, “where a far greater part of the human potential is realized when the mental aspect of conditioning is integrated into the learning and re-education process.” [Isacowitz, Study Guide] with these principles, BASI Pilates offers improved function in long-distance running, improved core stability, improved balance of the musculoskeletal system and over-all improved mind and body wellness.
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dummies-part-1/>.

"We’ve Heard So Much of the “CORE”, What About the “SLINGS”?. Singapore
Physiotherapy for Musculoskeletal Conditions, We’ve Heard So Much of the
CORE What About the SLINGS Comments. This Article was contributed by
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**Additional resources:**

Fitness Development, Editor: Lee A. Howard, 2007. Electronic version:

"Scoliosis Treatment Alternatives Comprehensive Scoliosis Treatment for All Ages."
Scoliosis Research. The site was developed by Dr. Brett Diaz, D.C., Director of
Clinical Services at Scoliosis Treatment Alternatives in Irvine California, The
However, evidence confirming the assumption of beneficial, long lasting influence of scoliosis specific exercise on respiratory function is lacking. Purpose. We aimed to analyze respiratory function in adults with history of participation in a scoliosis specific exercise program, in comparison to normative values and to age-matched subjects, with reference to confounders: smoking and physical activity. Materials and methods. Plaszewski, M., Nowobilski, R., Kowalski, P. et al. Airway function in adults with mild-to-moderate scoliosis treated in adolescence with specific physical exercises. An ongoing, case-control study. Scoliosis 7, O55 (2012). https://doi.org/10.1186/1748-7161-7-S1-O55. ABSTRACT: This case study looks at an otherwise healthy long-distance runner with mild to moderate scoliosis and the imbalances that present in her musculoskeletal system due to this condition and possible challenges while training. This project discusses the potential result of such imbalances and the need for improving and maintaining better body alignment, including mind-body connection for overall health and decreasing chance for injury. Long-distance running, or endurance running, is a form of continuous running over distances of at least 3 kilometres (1.8 miles). Physiologically, it is largely aerobic in nature and requires stamina as well as mental strength. Among mammals, humans are well adapted for running significant distances, and particularly so among primates. The endurance running hypothesis suggests that running endurance in the genus Homo arose because travelling over large areas improved scavenging opportunities and