

**Unravelling the Curves:  
A Pilates Journey with Scoliosis**

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## Abstract:

In this paper I aim to demonstrate how practising Pilates, in particular following the BASI® approach, can develop a deeper understanding of your body and mind. Emphasis on awareness and understanding of scoliosis and its implications, limitations or necessary modifications when creating a Pilates exercise plan, will also be a key focus.

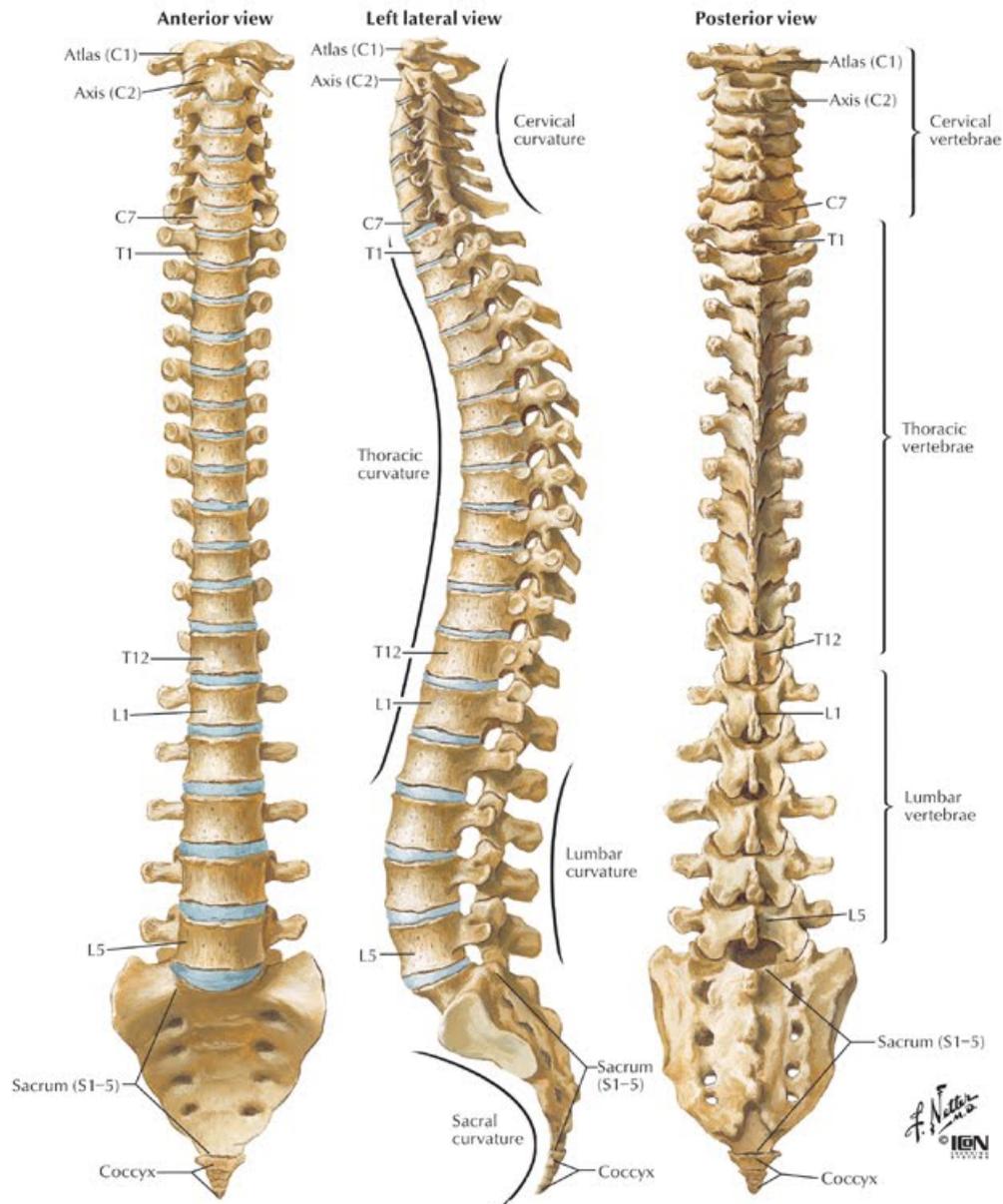
Using my personal experience of having scoliosis I will explore the physical aspects of this condition while also considering mental and emotional factors present to investigate how Pilates can benefit all these areas of a person's wellbeing.

I decided to begin my 'research' into this topic as soon as I became a BASI student and this paper displays how and why I developed the following Pilates program from June 2018 until present.

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## Anatomy of the Spine:



The spine or vertebral column is made up of 33 bones or vertebrae and acts as the body's central support structure, connecting different parts of the skeleton to each other. It allows us to stand upright, bend and twist while protecting the spinal cord from injury.

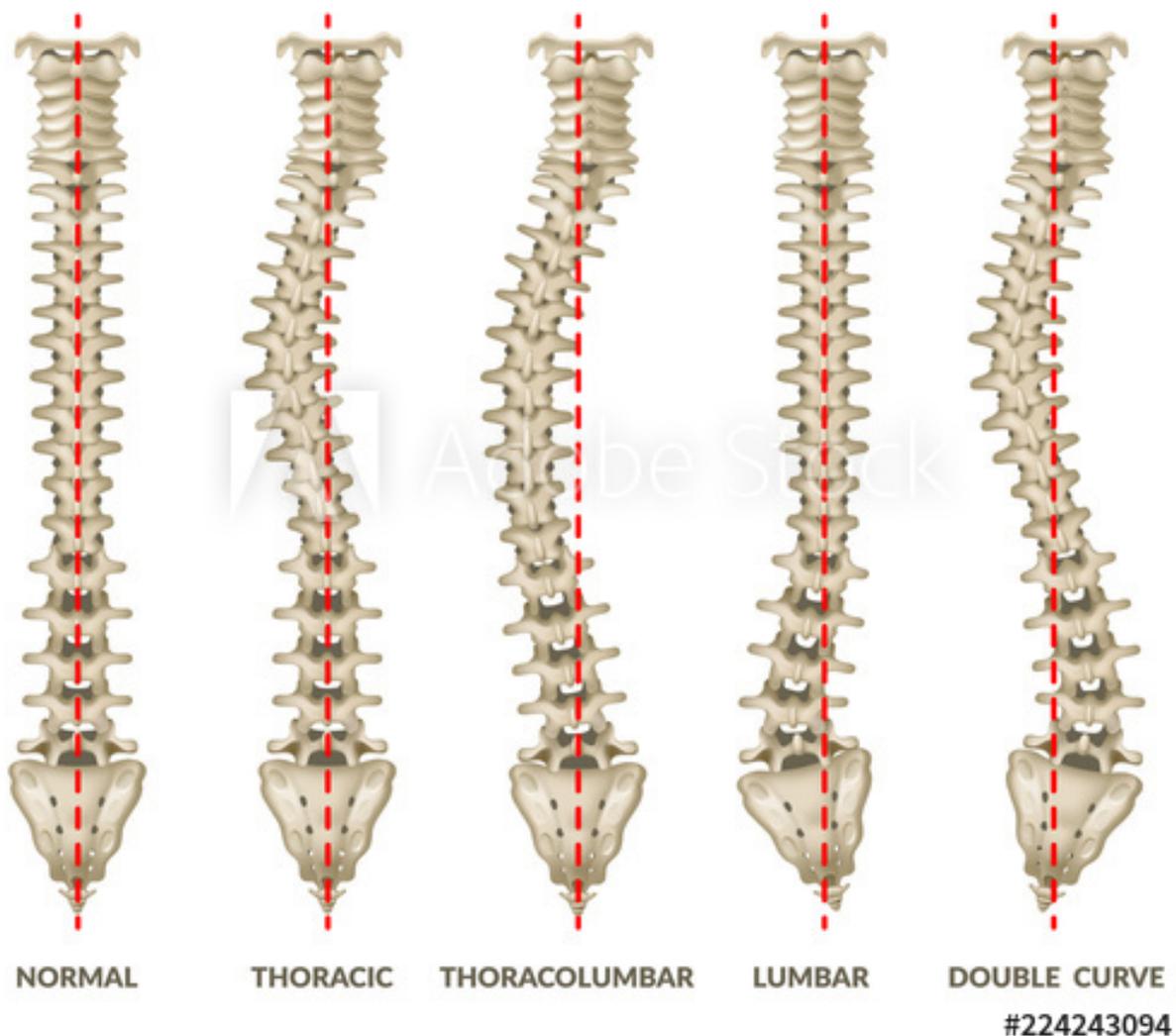
Viewed from the side a healthy adult spine has distinct natural curves often referred to as an 'S' shaped curve: the cervical and lumbar regions

appear concave to the back while the thoracic and sacrum are concave to the front.

### What Is Scoliosis?

In simple terms scoliosis is a curvature of the spine that extends beyond the 'normal' curves of a healthy spine. Scoliosis typically involves one or more lateral curvatures of the spine and is often accompanied by rotation of the involved vertebrae.

## TYPES OF SCOLIOSIS OF SPINE



Individuals with scoliosis may present with any of the following physical symptoms or a combination of all:

- Uneven shoulder heights
- One shoulder blade protruding out from the back further than the other
- Uneven waist line
- A raised 'bump' down one side of the spine
- Uneven hip heights
- Visual curvature of the spine
- Back pain
- A postural lean to one side

### What Causes Scoliosis?

In the majority of cases the cause or reason for Scoliosis is classed as 'idiopathic' which means there is no known cause.

Other causes may be congenital, as a result of infectious disease such as Tuberculosis or Polio, neuromuscular disorders such as Cerebral Palsy or Spina Bifida or tumours that can cause vertebral changes.

Risk factors for developing the most common type of scoliosis include:

- Age- Signs and symptoms typically occur during the growth spurt that happens just before puberty.
- Sex- Scoliosis appears to be more prevalent in girls and therefore have a much higher risk of the curve worsening and requiring treatment.
- Family history- Scoliosis can run in families, yet many people with scoliosis do not have a family history of the disease.

Mild forms of scoliosis may not appear to cause any real detriment to a person's health and wellbeing but more obvious cases may sometimes cause complications, including:

- Lung and heart damage- with severe scoliosis, the rib cage may press against the lungs and heart, making it more difficult to breathe and harder for the heart to pump.

- Back problems- adults who had scoliosis as children are more likely to have chronic back pain than people in the general population.
- Appearance- if a scoliosis worsens, it can cause more noticeable changes — including uneven shoulders, prominent ribs, uneven hips, and a shift of the waist and trunk to the side. Individuals with scoliosis often become self-conscious about their appearance which in turn affects confidence and mental wellbeing.

As indicated above, there are several common types of scoliosis curvatures; however the degree of curvature and its associated physical impacts will vary from one person to the next. As such scoliosis is a complex condition that requires an individually tailored approach when considering Pilates or other physical exercise programs.

## Case Study

### Client history:

I am currently 46 years of age and first became aware of my scoliosis at the age of 24 while training as a Massage Therapist. The person working on me noticed my spine wasn't straight and asked if I had been in a car crash!

I visited a doctor, who confirmed I had a 'curvy spine' saying that surgery was sometimes an option but 'it can kill you'! Having recently given birth to my first son who was born prematurely at 32 weeks and losing my Mum to cancer 4 months prior I was experiencing a very stressful time in my life. Hearing I had some kind of deformity of the spine or having surgery was the last thing I wanted to know about...

I read some material about scoliosis and as I glanced through images of twisted spines and warnings of pain, progressing curvature and physical restrictions my confusion and fears about the condition increased. I had always been physically active from an early age and was exercising regularly, loved hiking, step aerobics, cycling and all kinds of dancing. I attended dance and gymnastic classes while growing up and was surprised that any scoliosis had not been noticed during that time. How had it gone unnoticed until now I wondered? The doctor I saw indicated it was congenital but I wasn't entirely sure...plus I wasn't willing to face the prospect of some kind of physical impairment.

As such, my reaction to this discovery was to just 'carry on' as before...I already considered myself in great physical shape. I could do all the things I wanted with relative ease so having a scoliosis diagnosis became something external to my being and I didn't place any real sense of identity with the condition onto myself.

In the following years I would sometimes mention having scoliosis to people but I didn't really spend any great time or energy focusing on or worrying about the fact. I continued to enjoy pursuing the physical activities I enjoyed yet every now and again I would experience back pain, feel unbalanced and twisted or self-conscious of my asymmetrical torso when I paid it closer attention or was at the beach or swimming pool.

When I lost my dear sister suddenly and unexpectedly in 2016 I turned to more regular physical exercise to help deal with my loss. I started doing HIIT classes several times a week; always enjoying the Pilates based components the most. Through this interest I discovered Reformer Pilates and this led to my decision to delve deeper and study Pilates, which in turn brought my attention and focus to having a scoliosis.

It felt instinctive to use myself as a case study for this paper and the following details how I created a personalised progressive Pilates program.

#### Client Information:

Occupation: Presently working as a Dance teacher and Print Finisher/Book Bindery- both roles are physically active and require long periods of standing, some lifting and repetitive hand/body movements that can cause strain.

Currently no significant health factors that may impact the Pilates plan other than the aforementioned Scoliosis. Partial tear to left MCL 2 years ago and right big toe tendon completely severed and repaired around 10 years ago.

#### Postural assessment:

Right foot everts slightly when standing

Left hip 'glide'- hip appears more pronounced with waist curving in more than the right side

Right shoulder appears lower than the left and when viewed from the side rotated forward

Right scapular is more raised than the left and there is a raised convexity in the right thoracic region which is more pronounced when in flexion or during the Roll Down.

Left concavity in thoracic region and slight convexity in left lumbar

#### When supine:

Left hip is lower than the right due to pelvic rotation which results in left leg appearing shorter at the knee when in tabletop position

Left thoracic area off floor/mat

## Right shoulder raised from floor/mat

Conditioning Program (progressive layering using the block system was utilised: exercises are listed in each block according to when they were used and level)

Block	Equipment	Exercise/s	Comments/Objectives
Warm Up	Mat	Foundation: Pelvic Curl Spine Twist Supine Leg Lifts/Changes Chest lift/with rotation	Achieving and maintaining a neutral pelvis and engaging the TA. These exercises allowed me to understand what was happening anatomically when I moved or changed position and how I needed to compensate for my curvature. I practised these regularly at the beginning of my initial equipment sessions and daily at home
	Mat	Intermediate Mat Warm up	Adding additional challenge and building on strength and stability achieved with Foundation exercises
	Cadillac	Warm Up Series	Understanding and improving my Roll Up technique-I was able to transfer this knowledge to performing the same exercise on the mat. Aided my confidence in an exercise I found extremely challenging
	Step Barrel	Chest Lift, Reach, Overhead Stretch	I sometimes used these particular exercises for a warm up as they provide a unique and wonderful feeling of thoracic extension and 'opening' and recruit abdominal strength and shoulder mobility and stretch
Foot Work	Reformer	Parallel Heels/Toes V Position Toes Wide V Heels/toes Calf Raises Prances (Prehensile) Single Leg Heels/Toes	Warming up the body in preparation for the rest of the session. Achieving a stable pelvis when supine and noticing any discrepancies in strength/flexibility/endurance between both legs. Finding hamstring engagement and ankle/foot/knee alignment and stability. Building up strength and stability to progress to footwork on the Cadillac and Wunda Chair
	Cadillac	As above without Prehensile	Building on the footwork repertoire of the reformer-hamstring flexibility, ankle/foot control-visual feedback allowing for self-correction
	Wunda Chair	All Footwork	Strengthening knee extensors, hip extensor

			control and pelvic lumbar stabilisation. Adding more challenge in the foot work block- once confidence and stability achieved on Reformer and Cadillac
Abdominals	Reformer	Hundred Prep Hundred Coordination Short box series	Building up abdominal strength and endurance using a mixture of reformer exercises that provided both isometric and isotonic muscle contractions. Establishing co-contraction of the back extensors and abdominals while working isometrically
	Cadillac	Breathing with PT Bar, Roll Up Top Loaded, Teaser 1	Adding increasing challenge to abdominal exercise through top loaded springs, longer exercise sequences demanding flow and coordination of movement and breathe, assistance of springs to improve Teaser mat exercise technique
	Wunda Chair	Full Pike	Increasing abdominal strength while focusing on strength and stability of shoulders/scapular
Hip Work	Reformer	Frog, Circles Down/Up, Openings Adding Frog Extended/Reverse	Achieving hip disassociation and pelvic lumbar stability- progressing into intermediate series once achieved- left leg tended to 'dominate' at times
	Cadillac	Supine Leg Series	Building on above with the advantage of legs working independently encouraging right leg to work equally to the left
	Cadillac	Supine Single Leg Series	Achieving balance, coordination and symmetry and maintaining pelvic lumbar stabilisation with increased exercise challenges
Spinal Articulation	Reformer	Bottom Lift- adding Extension once stability achieved and lowering spring tension for added challenge	Spinal articulation and hip extensor control
	Cadillac	Tower/Prep	Increasing the challenge of hamstring control and stretch, learning how to initiate spinal articulation with deep lumbar flexion
	Reformer	Semi-Circle	Emphasis on shoulder stability and extension of thoracic spine allowed tight shoulder/chest muscles to 'open' Allowing lumbar spine to go into hyperextension felt 'free and flowing' once the position became familiar

		Short/Long Spine	Increasing the flexibility of the lower back and hip extensor control. Deep concentration required as I initially found coming to the stopper and keeping the carriage stable very challenging. The 'uneven' roll down through my spine due to my convexity required extra focus, awareness and patience to be able to perform this exercise – a lesson that transferred to many of the more intermediate/advanced exercises as I encountered them
Stretches	Reformer	Standing lunge	Increase hip flexor and hamstring flexibility
	Reformer	Kneeling or Full Lunge	Focus on correct alignment and set up in each exercise – engaging back extensors more when in hamstring stretch, relaxing trapezius when in hip flexor stretch
	Cadillac	Shoulder Stretch Prone	Mobilising and stretching the shoulder rotators. Felt particularly beneficial for the right shoulder which rotates forward and was very tight initially. Over time was able to achieve balance in the amount of mobility between each shoulder. Preparation for further exercises on the Cadillac
Full Body Integration (F/I)	Reformer	Scooter	Trunk stability and maintaining a C curve while working dynamically
	Cadillac	Sitting Forward Side Reach Kneeling Cat Stretch	Achieving spinal mobility and abdominal strength. Sitting Forward and Kneeling Cat Stretch both provided a wonderful sense of elongation through the spine while Side Reach provided a sense of 'de rotation' - particularly on my right side
	Reformer	Up Stretch 1, 2	Trunk and shoulder stabilisation. Focus on keeping my scapular as stable as possible - particularly my right which has a tendency to 'wing'
Arm Work	Reformer	Arms Supine Series	Developing core/trunk stabilisation while building shoulder and arm strength
	Cadillac	Arms Standing Series	Deepening awareness of posture and alignment when working in an upright position
		Arms Sitting Series	Trunk stabilisation while

		Rowing Series	working muscles of the arms and shoulders. Rowing Series added challenge of coordination, precision and flow and 'rhythm' into intermediate arm work
Full Body Integration (A/M)	Reformer	Up Stretch 3  Balance Control Front	Coordinating the previous Up Stretch exercises with precision and continued trunk and scapular stabilisation work  Building strength in the shoulder flexors. Front Support: Mat regularly practised to assist with this
Leg Work	Mat	Gluteal Side lying Series (with ankle weights)	Hip abductor strength and pelvic lumbar stabilisation
	Reformer	Single Leg Skating	Finding ideal alignment of the pelvis/body to maximise the effectiveness of this exercise...keeping weight on supporting leg. Hip adductor and knee extensor strength
	Wunda Chair	Leg Press Standing Lunge Forward Backwards step Down	These exercises provided great challenge both mentally and physically. They highlighted the discrepancy of control and balance between my right and left side with my left leg initially being able to support me much better than my right. Hesitation due to a fear of falling required great focus and patience to be overcome. Progressing from 3 repetitions to 10 each side- initially using the chair adjacent to the Cadillac so I could use the vertical poles for support if necessary
Lateral Flexion/Rotation	Ladder Barrel	Side Over Prep	Lateral flexor strength and stretch and developing awareness of asymmetrical appearance and movement patterns when working- immediately noticed how lateral flexion to my left side felt 'easier' than going right
	Reformer	Mermaid	The stretch achieved during the rotation phase of the exercise felt particularly beneficial along with maintaining elongation of the spine throughout
	Cadillac	Butterfly	This exercise worked well in addition to the Standing Arms series for 'flow' and unlike some of the other advanced lateral/flexion/rotation

			exercises did not feel uncomfortable on my spine. The emphasis on oblique control and stretch
Back Extension	Reformer Ladder Barrel	Breaststroke Prep Swan Prep	Stabilising the lower back using abdominal engagement and posterior tilt to achieve movement in the mid and upper back extensors. Focus on elongation rather than height and utilising the breath to amplify this. Supported this with Back Extension: Mat exercise
	Cadillac	Prone 1 and 2	Initially I just practised executing Prone 1- focusing on smooth articulation of the spine while keeping the abdominals engaged. Once I could achieve this I progressed to Prone 2, using the Shoulder Stretch Prone as a preparatory exercise. I was afraid of whether I had the ROM to be able to do this exercise and whether my spine should hyperextend. With the assistance of another instructor initially guiding the PT bar, I overcame the fear of getting 'stuck'. The stretch through the shoulders and allowing the springs to assist me into back extension eventually became a sensation I was able to achieve and enjoy!

### Conclusion:

As I was fairly new to equipment based Pilates I was learning as much of the BASI repertoire as possible before beginning the process of questioning its benefit or contraindication to my scoliosis. Questions such as 'How do I compensate or can I modify for this and is it of benefit to my shape/condition to perform this move?' were continually raised in my mind. I had already been practising mat Pilates and continued to do so throughout this program. I found this benefited me greatly in achieving and maintaining ideal alignment during movements. Knowledge of the muscle focus and objectives of the Mat exercises was something I could transfer to the equipment repertoire and assisted me greatly when learning new movements and putting together my program.

There is a mountain of information on Scoliosis now yet much of it is conflicting information, some schools of thought indicate certain Pilates

moves are unsafe while others claimed they can 'fix' or 'reverse' scoliosis! The subject is very complex and informed me how specific Pilates training for scoliosis will be where my study focus will progress! The program that I developed is based on my experience to date and input from books etc on the subject of scoliosis. I incorporated breathing and stretching techniques from Annette Wellings' wonderful book, 'Curves, Twists and Bends' plus self-massage and tools such as a foam roller for fascia release before and after sessions. This is still an ongoing process for me and it will take much more time and experience on my part to piece together the puzzle that scoliosis is.

What I can conclude so far is that exercises that encouraged elongation, de-rotation and mobility of the spine provided me with relief from backache, a sense of being lengthened and strengthened and more aligned. Aiming to find balance and symmetry in my movement instead of focusing on the asymmetry of my body has been a real insight for me. Rather than thinking of any limitations or restrictions I may have from scoliosis my focus shifted to achieving MY best on any given day and being thankful for that. The importance of having a correct set up/alignment before commencing each exercise was also apparent. I regularly used an instructor or fellow student to assist me in this. Awareness of one's posture and alignment is crucial and you can do it alone but following this program taught me that an extra set of eyes is always better! I recently discovered Karena Thek's Scolio-Pilates book and am really excited to try some of her propping techniques for correcting alignment. It is my aim to incorporate this into my future programs and in time be able to assist others with scoliosis to do the same.

Overall I have allowed myself to be guided by the principles of Pilates and my own enjoyment of learning and being in motion. Immersing myself in understanding and experiencing the comprehensive BASI block system, incorporating precision, awareness, breath, control, flow....all of the principles have served as my guides and I know they will continue to do so.

Following this program required me to pay closer attention to my scoliosis, my posture and alignment and to notice imbalances in different parts of my body I had never felt before. Trying to decipher whether it was lack of strength, experience, flexibility, stamina that prevented me from doing certain things was a big focus initially and I would feel frustrated when I could not achieve a particular movement. This taught me patience, persistence and also 'letting go of ego' during my sessions.

Certain things were not going to just happen overnight! At times I felt very self-conscious of my shape in classes or study groups or disheartened when I couldn't seem able to move my body in the way I wished, yet I am now feeling more positive about my curvy spine, which is of huge importance to me. Throughout my program my body became stronger, more stable and flexible and I was able to achieve many movements I thought I wouldn't be able to. This served as a huge boost to my confidence and lessened my anxiety about scoliosis restricting me.

Pilates has not 'fixed' my curve and I do not expect it to. It has improved my alignment, posture and movement. For so long I associated my scoliosis with an intensely challenging time in my life and now I associate it with my attitude of resilience, positivity and gratitude and the value of that is immense... As I worked through each stage of my plan I felt soars in my confidence when a new movement or understanding was perceived. Pilates is helping me to explore how I feel about my physical appearance and limitations and to accept them with grace, but most importantly it has brought delight and joy in feeling my body gain in strength and flexibility and gratitude for all that my body can do in harmony with mind and spirit.

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