

ANXIETY & PILATES

“Change happens through movement and movement heals”
Joseph Pilates

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Abstract

Although a psychological condition, the physiological basis for anxiety can be found in the limbic system. The 'fight or flight' response to perceived harm is a natural and healthy response, anxiety becomes a disorder when this fear response is uncontrolled, excessive and persistent (Schmidt et al., 2018). Anxiety disorders can have a huge impact on someone's life affecting social relationships, work, home life and physical wellbeing (Dye, 2018). Originating in the brain, anxiety effects the whole body through the sympathetic nervous system. Activating the parasympathetic nervous system can help to control symptoms of anxiety. Research has shown that exercise and specifically mind body interventions can reduce symptoms of anxiety (Gok et al., 2018). By promoting breath, enabling movement and providing sensory input Pilates can improve quality of life for people with anxiety disorders.

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The Anatomy of Anxiety

Although anxiety is considered to be a psychological condition, anything that is psychological, is also physiological. In the case of anxiety disorders, central to their physiology is the limbic system. The limbic system is a set of neural structures that is housed deep within the brain which plays a role in emotion, behaviour, motivation and memory. The limbic system is made up of the amygdala, hippocampus, thalamus, hypothalamus, basal ganglia, and cingulate gyrus (Jones et al., 2013).

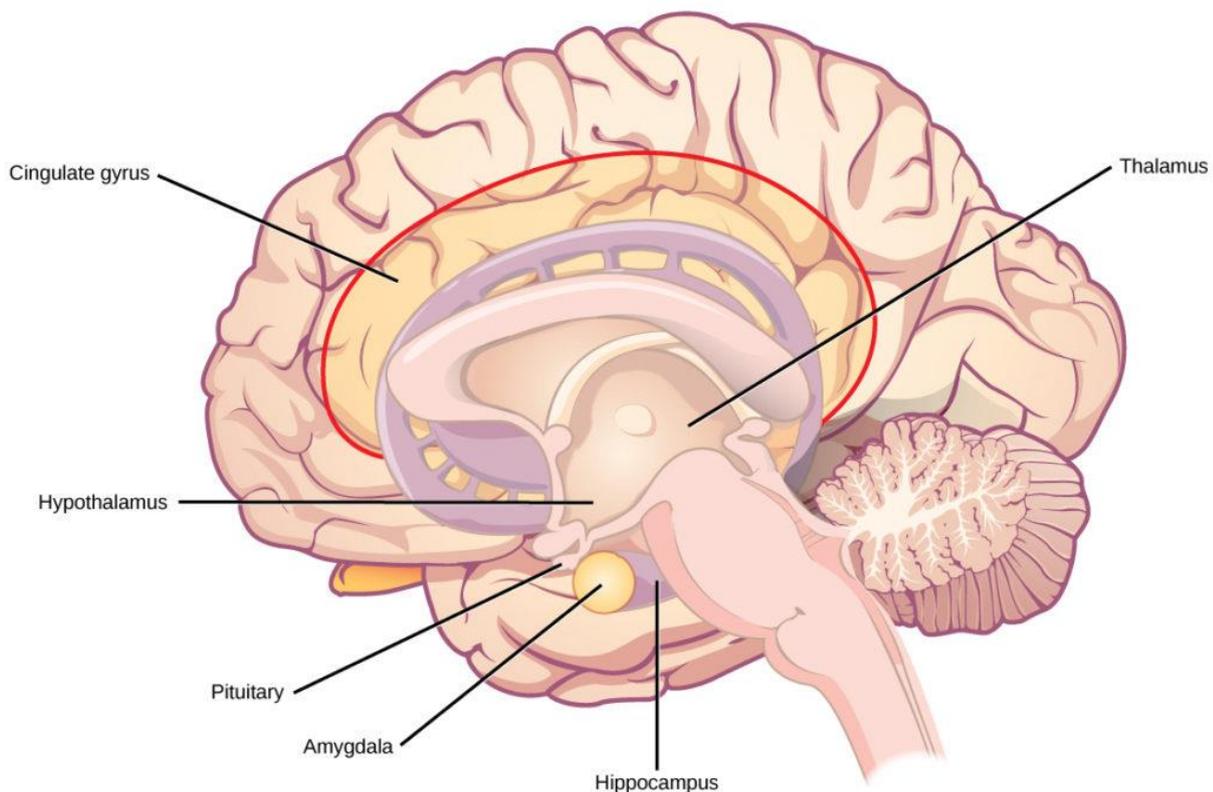


Figure 1: The Limbic System (Rye, 2016)

If a threat is perceived, sensory information travels through the thalamus to the amygdala where our fear response or 'fight or flight' response is activated through the sympathetic nervous system causing us to experience symptoms such as a raised heart rate, hyperventilation and sweaty palms. Adrenaline and cortisol levels (our stress hormones) rise as signals from the amygdala get passed on to the hypothalamus, pituitary and the adrenal glands. In a slower process, sensory information is simultaneously being sent from the thalamus to the part of our brain where we process information consciously. It is at this point that we decide if the response is justified or not (Jones et al., 2013).

This fear response is normally triggered in the presence of imminent threat. Although anxiety can be necessary and helpful psychological and physiological responses, anxiety becomes a disorder when this fear response is uncontrolled, excessive and persistent as this can have a huge impact on someone's life (Schmidt et al., 2018).

In anxiety disorders, the amygdala has consistently been found to be overactive (Schmidt et al., 2018). The amygdala plays a central role in strong emotional experiences such as rage and fear, but it also provides us with information regarding our day to day internal emotional state. Thus, the amygdala plays a role in both acute intense experiences of anxiety and in anxiety that is experienced consistently (Jones et al., 2013).

Although anxiety originates in the brain, it affects the whole body through the sympathetic nervous system. Our nervous system is made up of several subsystems. Firstly, we can divide the nervous system into the central nervous system (made up of the brain and the spinal cord) and the peripheral nervous system. The peripheral nervous system can further be divided into our somatic system (which controls voluntary movement) and the autonomic nervous system (which controls our organ functioning). Finally, the autonomic system is made up of the sympathetic system and the parasympathetic system.

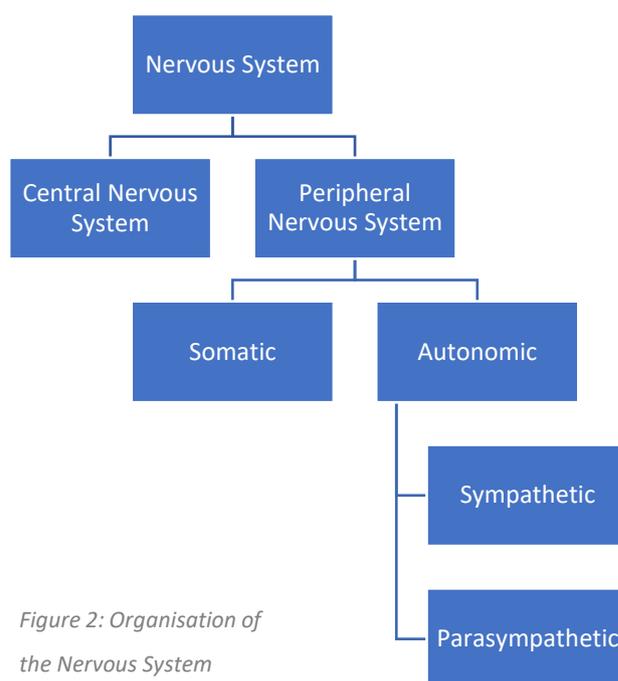


Figure 2: Organisation of the Nervous System

The sympathetic nervous system is responsible for the 'fight or flight' response which is overactive in people with anxiety disorders. This results in symptoms such as a pounding or skipping heart, tension, memory problems, muscle spasms, difficulty breathing, digestive problems and sweating. These are in addition to the psychological symptoms of excessive worrying, nervousness, restlessness, inability to relax, and fear of worst-case scenarios (Dye, 2018). In contrast, the parasympathetic nervous system is responsible for calming the body down and bringing all the bodily processes back into balance. Therefore, the management of anxiety seeks to activate the parasympathetic nervous system.

Introduction

The lifetime prevalence of anxiety disorders is estimated to be between 11.3% to 14.7% worldwide with women having a statistically greater likelihood than men of developing an anxiety disorder at some point in their lives (Dye, 2018). Anxiety often co-occurs with other disorders including depression and chronic illnesses such as fibromyalgia and asthma (Dye, 2018). Anxiety disorders result in a range of psychological and physiological symptoms (which have been described above) and these can profoundly affect quality of life impacting social relationships, work, home life and physical wellbeing (Dye, 2018). Joseph Pilates said that “change happens through movement and movement heals”. Through this paper and case study, I set out to show that Pilates can improve quality of life for people with anxiety disorders.

Pilates for Anxiety

For people who have anxiety disorders, there are several lifestyle changes that have been shown to help manage symptoms of anxiety and improve quality of life. These include improving quality and quantity of sleep, reducing caffeine and alcohol intake and regular exercise. Exercise has been found to reduce symptoms of anxiety significantly (Dye, 2018).

One of the most effective treatments for anxiety is something called Cognitive Behavioural Therapy which requires an element of mindfulness in recognising anxious feelings and bodily reactions to anxiety and how thought patterns link to anxiety (Dye, 2018). Mind body interventions (such as progressive muscle relaxation, meditation, guided imagery, yoga and Pilates) likewise focus on the interactions between the mind, body and behaviour and also require mindfulness (Gok et al., 2018). Mind body interventions look at the way in which these interactions affect emotional, mental, social, spiritual, and behavioural factors, which impact directly on health (Gok et al., 2018).

One of the things that sets Pilates apart from other forms of exercises are its principles which include awareness, balance, breath, concentration, centre, control, efficiency, flow, precision and harmony (Isacowitz, 2014). These principles result not only in body awareness but, as Joseph Pilates described in his book *Return to Life*, ‘complete coordination of the body, mind and spirit’. Thus, Pilates is valuable for people who experience anxiety not only because it is exercise, which by itself has been

shown to improve quality of life, but also because it is a form of mind body exercise with principles that when applied, enhance wellbeing.

There is a growing body of research that shows that Pilates is effective in reducing anxiety levels (Vancini et al., 2017). For example, Pilates has been found to reduce anxiety in clients who are obese, people with chronic conditions, the elderly, people who sedentary and students (Fleming & Herring, 2018; Vancini et al., 2017). Three ways that Pilates can reduce anxiety include breathing, improving posture & enabling movement and sensory input.

Breath is one of the principles in Pilates and forms the foundation for all the movements. Breathing oxygenates the blood, improves circulation, encourages concentration, recruits the appropriate muscles for movement, provides an inner rhythm for the movements and calms the mind and body (Isacowitz, 2014). Deep and controlled breathing suppresses the sympathetic nervous system and activates the parasympathetic nervous system which calms the body down, countering feelings of anxiety. Furthermore, this can also reduce feelings of fatigue and increase energy levels (Fleming & Herring, 2018).

Pilates can also improve posture and enable more efficient movement. Anxiety can result in unwanted tension in areas like the neck and shoulders and through a balanced program of Pilates, muscular balance and improved posture can result in a body that is more comfortable to move in (Memmedova, 2015). Regular movement can also reduce symptoms of anxiety as movement improves heart rate, stimulates the release of neurotransmitters which can improve mood, leads to increased oxygen supply to the brain and large movements with arms above the head can activate the limbic system which also facilitates the experience of positive emotions (Fleming & Herring, 2018).

Finally, there has been growing interest in the role of sensory input in mental health and how we regulate our emotions based on the type of sensory input we are receiving. Deep pressure and proprioceptive input (such as pushing against resistance or working with body weight) help regulate our mood and emotion and can help reduce feelings of anxiety (van Jaarsveld, 2014). Thus, the equipment work in Pilates offers unique benefits to clients with anxiety.

Working with an Anxious Client

When working with clients that have anxiety, our approach to teacher should be considered. The main principle is to create an 'emotionally and anxiety safe environment'. This may mean that the client needs encouragement, reassurance and affirmation throughout sessions. As with any client but especially when working with clients with anxiety, care needs to be taken to avoid expressing frustration or using negative language such as 'that's wrong' or 'don't do it like that'. Clients should be carefully observed for any signs of stress, anxiety or tension as clients should work at an intensity and pace that they are comfortable with. Finding the 'just right' level of challenge when designing sessions is important as the client should feel confident executing the movements but also challenged so that they can experience a sense of accomplishment. Care should also be taken in ensuring a balance of familiar and new exercises so that clients don't become overwhelmed. Furthermore, some consideration should be given to how busy the studio is when sessions take place as a busy studio may be overwhelming (Duncan & Prowse, 2014).

Case Study

Tobeka is a 24-year-old student who has struggled with depression and anxiety for the past two years which has had a significant impact on her life. The first time she came for a session, she asked if her husband could stay and watch for a bit. I later found out that it was because she was feeling incredibly anxious. Tobeka had done modern dancing in high school and had been practising yoga at home so she caught on quickly to the movements but would at times become anxious about 'doing it properly' so required encouragement in this regard. She had been interested in Pilates for a while and she knew that exercise was beneficial in managing anxiety. Having a regular session was helpful for her as it created accountability and provided motivation.

Tobeka wanted to gain core strength and during our first sessions I observed that she was very flexible and hyperextended her knees and elbows. The combination of a weak core and lots of flexibility meant that I worked with a more strength-based programme. Despite being generally flexible, Tobeka was tight in the shoulders and neck from stress related tension and had a slight kyphosis.

The goals for our conditioning programme which is based on the BASI block system (Isacowitz, 2014), were to increase core strength and posture but also improve overall wellbeing as Pilates can form a part of anxiety management. A lot of focus was placed on breathing but also on moving with a sense of ease while maintaining concentration on the movements to in a sense, create a haven free from anxiety through movement. Something that I was aware of was the need to ensure that Tobeka felt a sense of accomplishment through our sessions.

Our first session was a matwork session as this gave me a chance to introduce the fundamentals of Pilates and assess her posture and movement patterns through movement. In week 2 I introduced her to the reformer and as we progressed I introduced her to each piece of equipment one at a time. I also made sure that we repeated blocks from one session to the next introducing only one or two new sets of exercises at a time to ensure a balance of familiar and new. Each session would start with some deep breathing after roll downs, either lying on the mat or alternatively standing sweeping the arms to the ceiling while inhaling and lowering them on an exhale. As time progressed, we moved from exercises that inherently feel very stable (lying down with the body supported by the floor or equipment), to exercises that feel less stable requiring more core strength and confidence (where the body is suspended as in front support or suspended and balanced while the equipment moves such as side split on the reformer).

Conditioning Program

Week 1

BASI BLOCK	EXERCISE	REASONING
Warm Up	<ul style="list-style-type: none"> Roll Down 	Opportunity for postural assessment and allows Tobeka a chance to become aware of how her body is feeling.
Foundation	<ul style="list-style-type: none"> Introduction to lateral breathing Pelvic Curl Spine Twist Supine Chest Lift Chest Lift with Rotation Single Leg Lifts Leg Changes Leg Circles 	Lateral breathing is the foundation for the movement patterns in Pilates and teaches body awareness. The following exercises introduce the concepts of control and precision with pelvic lumbar stabilisation.
Abdominal Work	<ul style="list-style-type: none"> Hundreds Prep 	A slightly more challenging abdominal exercise.
Spinal Articulation	<ul style="list-style-type: none"> Rolling Like a Ball Spine Stretch 	Introduces the concept of fluidity in movement while still working on abdominal control.

Bridging	<ul style="list-style-type: none"> • Cat Stretch • Modified Front Support 	Stabilising the shoulder joints in a position that provides proprioceptive input as it is a weightbearing position.
Lateral Flexion & Rotation	<ul style="list-style-type: none"> • Side Lifts 	Requires balance and concentration of the abdominals and back.
Back Extension	<ul style="list-style-type: none"> • Basic Back Extension 	Introducing the concept of reverse articulation
Cool Down	<ul style="list-style-type: none"> • Rest Position • Roll Down 	Bringing focus back to the body, noticing where the balance has changed between mind and body. Focus back on deep breaths into the body, bringing awareness to a slow and deliberate pattern, which can be replicated in everyday situations.

Weeks 2 – 5

BASI BLOCK	EXERCISE	REASONING
Warm Up	Mat <ul style="list-style-type: none"> • Roll Down • Lateral Breathing Supine • Pelvic Curl • Spine Twist Supine • Chest Lift • Chest Lift with Rotation 	Beginning to focus the mind and awaken the body as well as find postural control. Using the same exercises introduced in the first week keeps an element of continuity that can decrease anxiety.
Foot Work	Reformer <ul style="list-style-type: none"> • Parallel Heels / Toes • Small V Toes • Open V Heels / Toes • Calf Raises • Prances • Single Leg Heels / Toes 	The focus here on pelvic lumbar stabilisation and bringing awareness to the breath and movement pattern. Working against resistance provides proprioceptive input that helps regulate emotions.
Abdominal Work	Reformer <ul style="list-style-type: none"> • Hundred Prep • Hundred Or Step Barrel <ul style="list-style-type: none"> • Chest Lift • Reach • Overhead Stretch 	The hundred prep and hundred are building onto what was introduced on the mat. The hundred especially requires good breath control. The step barrel exercises open up the front of the chest to start correcting the slight thoracic kyphosis.
Hip Work	Reformer <ul style="list-style-type: none"> • Frog • Down Circles / Up Circles • Openings 	As Tobeka is flexible, here focus was more on maintaining pelvic lumbar stability and thus the range was kept small.
Spinal Articulation	Reformer <ul style="list-style-type: none"> • Bottom Lift • Bottom lift with Extension 	This builds on what was introduced on the mat with the pelvic curl.
Stretches	Reformer <ul style="list-style-type: none"> • Standing Lunge Or Step Barrel <ul style="list-style-type: none"> • Shoulder Stretch Lying Side 	Postural alignment was focused on in the standing lunge and was used to release the hamstrings which had been working in the previous block.
Arm Work	Reformer <i>Arms Supine Series</i> <ul style="list-style-type: none"> • Extension • Adduction • Up / Down Circles • Triceps 	Focusing on keeping the shoulder girdle and scapula stabilised as we work through the series. The legs in table top continue to build abdominal strength while the body is supported.

Lateral Flexion/Rotation	Reformer <ul style="list-style-type: none"> Mermaid Or Step Barrel <ul style="list-style-type: none"> Side Lift 	The mermaid stretches the whole side body while encouraging deep breathing while the side lift builds strength.
Back Extension	Reformer <ul style="list-style-type: none"> Breaststroke prep Or Step Barrel <ul style="list-style-type: none"> Swan Prep 	Back extension is working on countering the kyphosis and will eventually lead to improved posture.
Cool Down	Mat <ul style="list-style-type: none"> Rest Position Roll Down 	Bringing focus back to breath and the body.

Weeks 6 – 9

BASI BLOCK	EXERCISE	REASONING
Warm Up	<ul style="list-style-type: none"> Roll Down Deep Breathing while Standing Cadillac <i>Warm Up Series</i> <ul style="list-style-type: none"> Roll-up with RUBar Mini roll-up Mini roll-up oblique Roll-up top loaded 	Beginning to focus the mind and awaken the body as well as find postural control. The new warm up series is a way to show Tobeka that she is progressing while still working with familiar concepts that were introduced in the mat work warm up.
Foot Work	Cadillac <ul style="list-style-type: none"> Parallel Heels / Toes Small V Toes Open V Heels / Toes Calf Raises Prances Single Leg Heels / Toes 	Practicing this series on the Cadillac helps to change the focus and challenge her body. Pelvic lumbar stability, abdominal and hamstring engagement are all focused upon moving through the series whilst maintaining the breathing pattern.
Abdominal Work	Cadillac <ul style="list-style-type: none"> Breathing with Push Through Bar Or Wunda Chair <ul style="list-style-type: none"> Standing Pike 	Breathing with Push through Bar focuses on deep breathing and connecting this to movement. The standing pike requires body awareness to recruit the abdominals.
Hip Work	Cadillac <i>Double Leg Supine Series</i> <ul style="list-style-type: none"> Frog Circles Down / Up Walking Bicycle 	Pelvic lumbar stability is challenged in this series as feet placed in the spring straps have much more instability than <i>reformer</i> .
Spinal Articulation	Cadillac <ul style="list-style-type: none"> Tower Prep Or Reformer <ul style="list-style-type: none"> Short Spine 	Using these to focus on control of the abdominals whilst articulating the spine. Challenges Tobeka's confidence as she is upside down.
Stretches	Cadillac <ul style="list-style-type: none"> Shoulder Stretch 	Helping to release tension in the front of the body to improve posture.
Full Body Integration F/I	Reformer <ul style="list-style-type: none"> Round Back Flat Back Or Cadillac <ul style="list-style-type: none"> Sitting Forward Side Reach 	Working with precision requires lots of concentration and body awareness.
Arm Work	Reformer <i>Arms Sitting Series</i> <ul style="list-style-type: none"> Chest Expansion 	The sitting series is a progression from the supine series requiring more core strength and control.

	<ul style="list-style-type: none"> • Biceps • Rhomboids • Hug-a-tree • Salute <p>Or Wunda Chair</p> <ul style="list-style-type: none"> • Shrugs • Triceps Press Sit 	The Wunda Chair shrugs help to relieve tension in the neck where Tobeka carries it.
Leg Work	Wunda Chair <ul style="list-style-type: none"> • Leg Press Standing 	Requires balance and core control.
Lateral Flexion/Rotation	Wunda Chair <ul style="list-style-type: none"> • Side Stretch 	Working on pelvic stability and getting her body into the correct alignment.
Back Extension	Wunda Chair <ul style="list-style-type: none"> • Swan Basic <p>Or Cadillac</p> <ul style="list-style-type: none"> • Prone I 	Both build on the basic back extension introduced on the mat and reverse kyphosis.
Cool Down	Mat <ul style="list-style-type: none"> • Rest Position • Roll Down 	Bringing focus back to breath and the body.

Weeks 10 – 12

BASI BLOCK	EXERCISE	REASONING
Warm Up	Mat <ul style="list-style-type: none"> • Roll Down • Lateral Breathing Supine • Roll Up • Spine Twist Supine • Double Leg Stretch • Single Leg Stretch • Criss Cross 	Beginning to focus the mind and awaken the body as well as find postural control. The intermediate mat warm up series continues to work on concepts already developed, especially with the rollup which is more challenging without the spring assistance that was there on the Cadillac.
Foot Work	Wunda Chair <ul style="list-style-type: none"> • Parallel Heels / Toes • Small V Toes • Open V Heels / Toes • Calf Raises • Single Leg Heels / Toes 	This is the most challenging piece of equipment to do the footwork series on as the body is not supported. Trunk stabilisation requires concentration and good core control while moving through the different positions.
Abdominal Work	Reformer <i>Short Box Series</i> <ul style="list-style-type: none"> • Round Back • Flat Back • Tilt • Twist <p>Or Wunda Chair</p> <ul style="list-style-type: none"> • Cat stretch 	Again, the less supported position on the short box requires concentration, control and confidence. Round-a-bout and Climb-a-tree were omitted as they were too challenging. The upside-down position in cat stretch requires confidence and strength.
Hip Work	Cadillac <i>Single Leg Supine Series</i> <ul style="list-style-type: none"> • Frog • Circles Down / Up • Hip Extension • Bicycle 	Working with one leg at a time requires even greater Pelvic lumbar stability as Tobeka's core strength and control has progressed.
Spinal Articulation	Cadillac <ul style="list-style-type: none"> • Tower 	A progression from the tower prep requiring more control.
Stretches	Reformer <ul style="list-style-type: none"> • Kneeling Lunge 	This requires more balance than the standing version.

Full Body Integration F/I	Reformer <ul style="list-style-type: none"> • Up Stretch 1 & 2 • Long Stretch Or Cadillac <ul style="list-style-type: none"> • Thigh stretch with RUbar 	Working in a more challenging position upside down. The thigh stretch requires abdominal control and good body awareness to work to the fullest possible range.
Arm Work	Reformer <i>Arms Kneeling Series</i> <ul style="list-style-type: none"> • Chest Expansion • Circles Up / Down • Triceps • Biceps Or Cadillac <ul style="list-style-type: none"> • Chest Expansion • Hug-a-tree • Circles Up/Down • Punches • Biceps 	Taking the arms series to kneeling or standing brings in more of an element of stability and coordination. It is more challenging for the core, pelvis and upper body whilst adhering to a strict breath cycle.
Leg Work	Reformer <ul style="list-style-type: none"> • Side Split • Single Leg Skating 	These exercises require balance and control as the body is not supported by the equipment and the equipment is moving.
Lateral Flexion/Rotation	Reformer <ul style="list-style-type: none"> • Side Over on Box 	Focusing on alignment in a challenging position with concentration of the abdominals and back extensors.
Back Extension	Cadillac <ul style="list-style-type: none"> • Breaststroke 	A progression form breaststroke prep requiring good coordination and long breath cycles.
Cool Down	Mat <ul style="list-style-type: none"> • Rest Position • Roll Down 	Bringing focus back to breath and the body.

Conclusion

Although originating in the limbic system, Anxiety effects the whole body through the sympathetic nervous system. In contrast, activating the parasympathetic nervous system can help to control symptoms of anxiety. The ‘fight or flight’ response to perceived harm is a natural and healthy response, but anxiety disorders refer to anxiety that is uncontrolled, excessive and persistent. Anxiety disorders can affect social relationships, work, home life and physical wellbeing. Research has shown that exercise and specifically mind body interventions can reduce symptoms of anxiety. Pilates is unique because of the way in which principles such as concentration, control and precision are applied. Pilates can improve quality of life for people with anxiety disorders by promoting breath, enabling movement and providing sensory input Pilates can improve quality of life for people with anxiety disorders. As Joseph Pilates said, “change happens through movement and movement heals”.

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