
Nikki Chan, Contemporary dance instructor
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Core Stability in Dance

Charmaine Tay, January 2021

We have been told in dance that we need to stabilise our core muscles. This is amidst a variety of corrections we get from our dance teachers, from “suck in your tummy”, “find/engage your centre” to “pull up from your belly button’, but what exactly does that one very important correction really mean? Given that the core is physically located at the centre of the body, core stability is the ability to control the centre of the body whilst moving, creating a stable foundation from which the limbs can move freely from[8]. The stabilisation of the core allows for smooth and efficient transfer for forces throughout the body and allow dancers to have control of their movement freely.

Signs of poor core stability

When dancers have poor core stability, they may find it difficult to maintain a good posture and/or dynamic alignment when executing movements and often develop excessive tension elsewhere when moving. Tension can be found in the hip flexors or shoulders, where they are seen to hike their hips to lift their legs, use excessive amounts of strength from the quadriceps or raise their shoulders when they jump and turn. Core stability requires a mix of coordination, control, body awareness and strength. The ability to stabilise the body and maintain balance whilst executing a series of complex movements results in dancers looking effortless when they perform[7]. (Perhaps its why dancing is thought to be easy to do by the untrained eye!)

Good core stability also minimises the risk of injury throughout the body as the core acts as a stabiliser for the limbs and spine in movement[6]. Although studies have shown that improving core

strength can have a causative effect over core stability[3] but it is important to note that improving core stability is more about improving control rather than strength in the torso. Therefore, having a six-pack may not always signify a stable core. The core muscles are actually a deeper set of muscles (that's right, we have different several layers of muscles!) that might not be visible on the surface and are often difficult to feel in isolation and are designed to function as a team.

It really doesn't take a lot of strength to perform a good pirouette but it takes an exceptional amount of control, stability and coordination. This is what we understand core stability to be.

Understanding the anatomy

Our spine is made up of bones (vertebrae), intervertebral discs (shock absorber), muscles (for stabilisation of movements) and ligaments (to hold the bones together and prevent excessive movement). They are arranged in a way that allows for mobility, especially in the lumbar section of the spine (lower back), where some people have more range than others, particularly if they are hypermobile. Read more on hypermobility here. The more mobility there is, the more stability there needs to be. When the core muscles are weak, extra stress is placed on the ligaments and intervertebral discs as they try to hold the spine in place when you move. The lack of core stability is a common cause of lower back pain[4].

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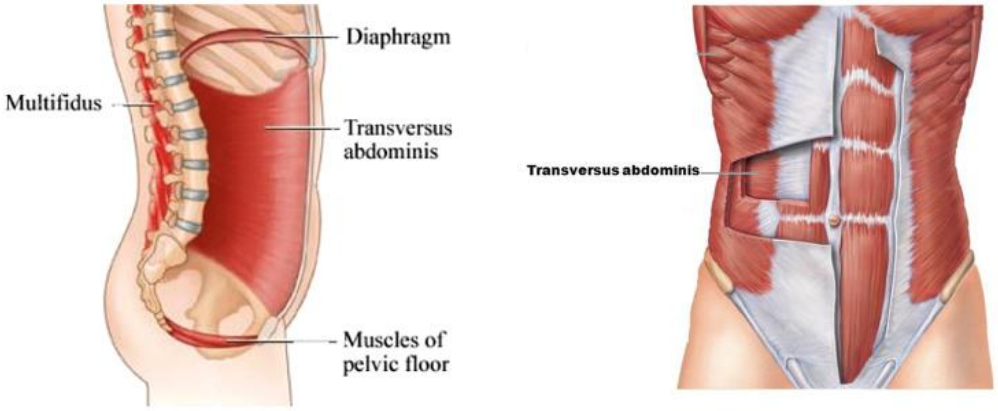

Figure 1. Side and front view of the core muscles and it's locations

Next, we have a series of deeper muscles that help to stabilise and support the position of the spine. This is what is known to some as the "true core muscles". This consists of:

Transverse abdominus: a large muscle beneath the six pack that acts like a corset to stabilise the trunk

Multifidus: a series of small muscular bundles located on either side of the spinal column acting to stabilise each segment of the vertebrae.

Pelvic floor: a group of muscles and ligaments that stretch between the pubic bone and tail bone. This is the base of the core and also supports the pelvic organs.

Diaphragm: the main muscle for breathing and when contracted, acts as the lid of the core.

These deep core muscles are mostly made up of slow twitch muscle fibres which are made for endurance, compared to the outer layers (abdominals, erector spinae (large back muscles), obliques etc.) that are made up of fast twitch fibres. Although the outer unit of muscles are more powerful, they fatigue quickly as they are fundamentally made of a different type of muscle fibre. They are designed more for movement than stability, and work with a lot of power for a short period of time. Thus, a different type of training is needed to improve the stability of the core.

Activation of the core

If you find yourself frequently straining your muscles in your extremities when you dance, have lower back pain from dancing or have difficulties maintaining balance in movement, especially during transitions between steps, working on core stability exercises may help you overcome this. Pilates exercises and conditioning work on an exercise ball are both highly effective ways to learn to engage, strengthen and control alignment that is crucial for dance training[2]. Performing these exercises while lying down on the ground removes the forces acting on the legs so you can focus on correct muscle patterning.

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It is important to understand that core stability exercises are all about the smaller, deeper muscles and very fine degrees of activation and control, which are much harder to achieve at the beginning but the results of working on these muscles is definitely worth the effort. It is easy to let larger muscles mimic the movements, but those larger muscles are not built for constant activity and cannot cope with doing the work of our deeper core muscles that is needed to sustain alignment for a longer amount of time.

Core stability requires your core to respond rapidly to changes in position and load, so don't stop at holding positions (such as a plank or laying supine balancing your legs on a yoga ball). Simply bracing the abdominals to immobilize the spine might not be the most effective when it comes to movement, so add variations of movement to challenge the stability of the spine, such as extending a leg and rotating it to the side while maintaining a stable core, or transferring your weight from one leg or arm to the other without shifting the position of your hips! These exercises may look simple

and might not give you the same kind of muscle ache you normally get from your larger muscle groups, but they do wonders for stabilizing your spine and pelvis in all kinds of dynamic positions. From there, you will gain the ability to adjust the level of control needed with different dance movements.

One common mistake young dancers make is to hold their breath during dance combinations that require secure and stable core activation[5]. This puts the diaphragm muscle in a position where it has to do a large amount of support work alone to hold the core in place, rather than distributing the work to the rest of the deeper core muscles. However, this is not sustainable as the support is immediately lost once breathing resumes. Moreover, the breath-holding strategy may make the movements look more rigid than stable and places a huge strain on the pelvic floor musculature, increasing the overall appearance of tension.

Keep working on engaging those deeper core muscles for that stable movement and fluid transition and look out for our upcoming video on core stability!

End

Currently a dance science and anatomy lecturer at the dance department, as well as a body conditioning, advance ballet and jazz at the musical theatre department of LASALLE College of The Arts. Charmaine also provides private coaching for dancers from the Elite programme for local and international dance competitions. Charmaine is the first Singaporean to graduate with a MSc in Dance Science from Trinity Laban Conservatoire of Music and Dance in 2013.

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