

EXPLORING QUADRUPEDAL MOVEMENT

Richard Scrivener gets down on all fours to explain the benefits of quadrupedal movement.

What is movement anyway?

With 360 joints, there are infinite ways that the human body can move. Some of the most popular movement disciplines include gymnastics, dance, Parkour, Capoeira, yoga, martial arts and acrobatics. Each respective discipline can take many years to become proficient in and a lifetime to master. To successfully move we must generate force and, while there are four fundamental forces that physicists recognise, as it relates to human movement, only gravitational and electrical forces are of importance. For example, gravitational force generates 'stress' on the skeleton, which creates adaptation resulting in improved bone density. This can be seen during walking when the foot strikes the ground; the head of the femur of a 70kg person feels a force of over =160kg, the equivalent of 2.4 times' bodyweight. Indeed, every time we interact with our world, we are exposed to force, with the ground representing our consistent reference for all movement.

It is the neuro-myofascial-skeletal structures that are given the task of making movement 'successful'. Given that we can organise our body in so many different ways (even when negotiating the same task, for example, picking something up from the ground), can

we really say that there is a 'right' or 'wrong' way to move? Can we really say that one system, programme or philosophy of movement is the best way? What all health experts can agree on, however, is that we just need to move: "Evidence now demonstrates that there is no minimum amount of physical activity required to achieve some health benefits."¹

Quadrupedal movement – Knowing your ABCs from your CPGs

Most people simply do not have the time or inclination to become a 'master' of a particular movement discipline, yet they want to move more and in such a way as to bring positive fitness qualities (mobility, for example) into their body. Animal Flow is a movement system that attempts to bridge the gap between the need for 'movement nutrition' and the degree of skill required to perform gymnastics, martial arts or aerial silks, for example. Animal Flow provides an accessible and progressive approach to having an 'improved connection with one's body'. Performed exclusively on the ground using bodyweight alone, Animal Flow uses three base positions from which movements can begin, pass through and end. These are easily remembered as the ABCs of Animal Flow, see chart below.

The Animal Flow programme can more broadly be described as a 'quadrupedal movement system', where the Flowist transfers between the three base positions in a continuous and variable sequence, thus interacting with the ground and exposing the body to gravity in an infinite number of configurations. 'Quadrupedal' refers to all four limbs being used to bear weight; although, depending on the movement being performed, this may change between three, two or one point(s) of ground contact,

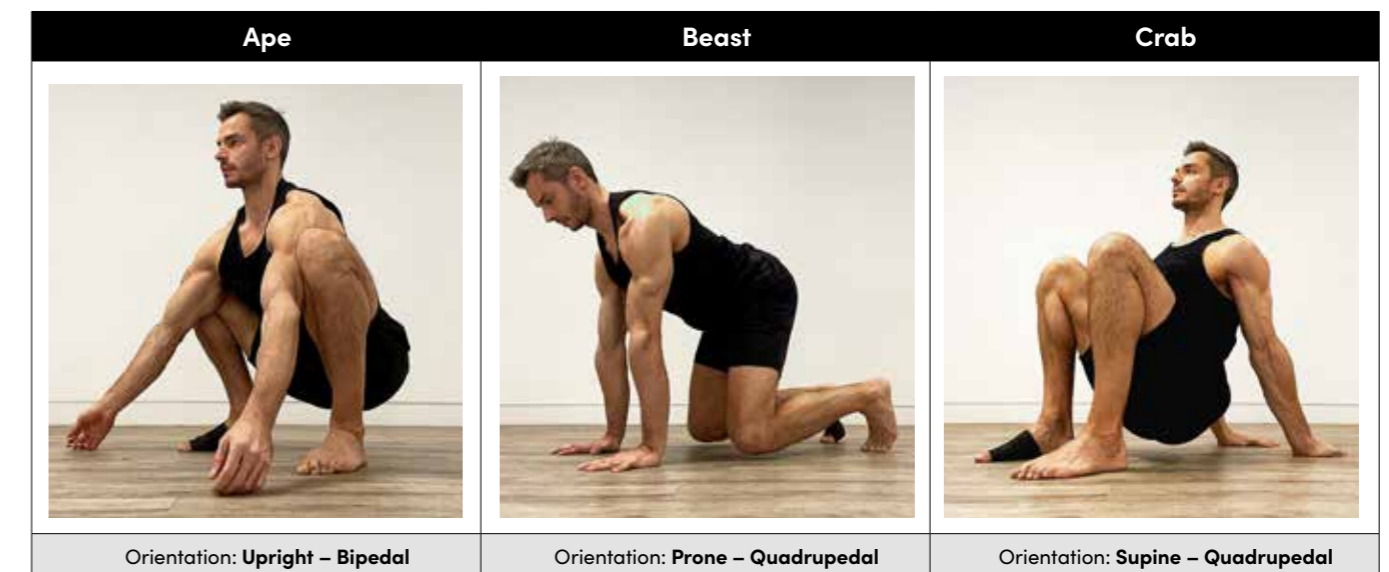
thus changing the stability demands placed on the body as a movement Flow is performed.

Why might one consider practising Animal Flow and what else does quadrupedal movement bring to the table? When time is short, you'll want to be sure that you get the biggest bang for your buck when it comes to precious workout time.

A common refutation I have encountered multiple times for the practice of quadrupedal movement is: "Humans are bipeds, so what is the point of quadrupedal movement?" But this type of question/comment respectfully misses the bigger picture, as we aren't training to become a better quadruped per se, we are training to improve the function of the 'human animal'; quadrupedal movement is merely a tool to support this endeavour. As Dietz and Michel explain, "The evolution of upright stance and gait, in association with a differentiation of hand movements, represents a basic requirement for human cultural development."²

Clearly, humans are bipeds – we walk tall on our feet – but neuroscientists suggest that even though locomotion is expressed differently in birds, fish, quadrupeds or humans, shared neuronal systems exist and have been well preserved throughout evolution. Specifically, bipedal and quadrupedal locomotion share common spinal neuronal control mechanisms known as 'central pattern generators' (CPGs). This means that when neuronal circuits are activated, they can produce rhythmic and alternating movements and these movements are engrained into higher brain centres³. During these automated movements, sensory feedback also becomes important in adapting a CPG-generated motor output for its use within a specific environment where there are constraints or obstacles.² ■■■▶

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■ **SO WHAT DOES THIS ALL MEAN?**

1CPGs are important and meaningful movements where a motor pattern drives muscle movement. CPGs are capable of producing rhythmic activity without receiving any external information. Walking, which uses contralateral (opposite) arm and leg actions, is one example of a CPG.

2Human locomotion represents a subconscious and automatically performed motor task. The neurons linking the control of arm and leg movements are connected – known as propriospinal circuits.

3Sensory proprioceptive feedback control is also important in adapting movements to unpredictable challenges (e.g., research shows the contralateral arm muscles are expected to be involved in stabilising the body during leg swing over an obstacle).

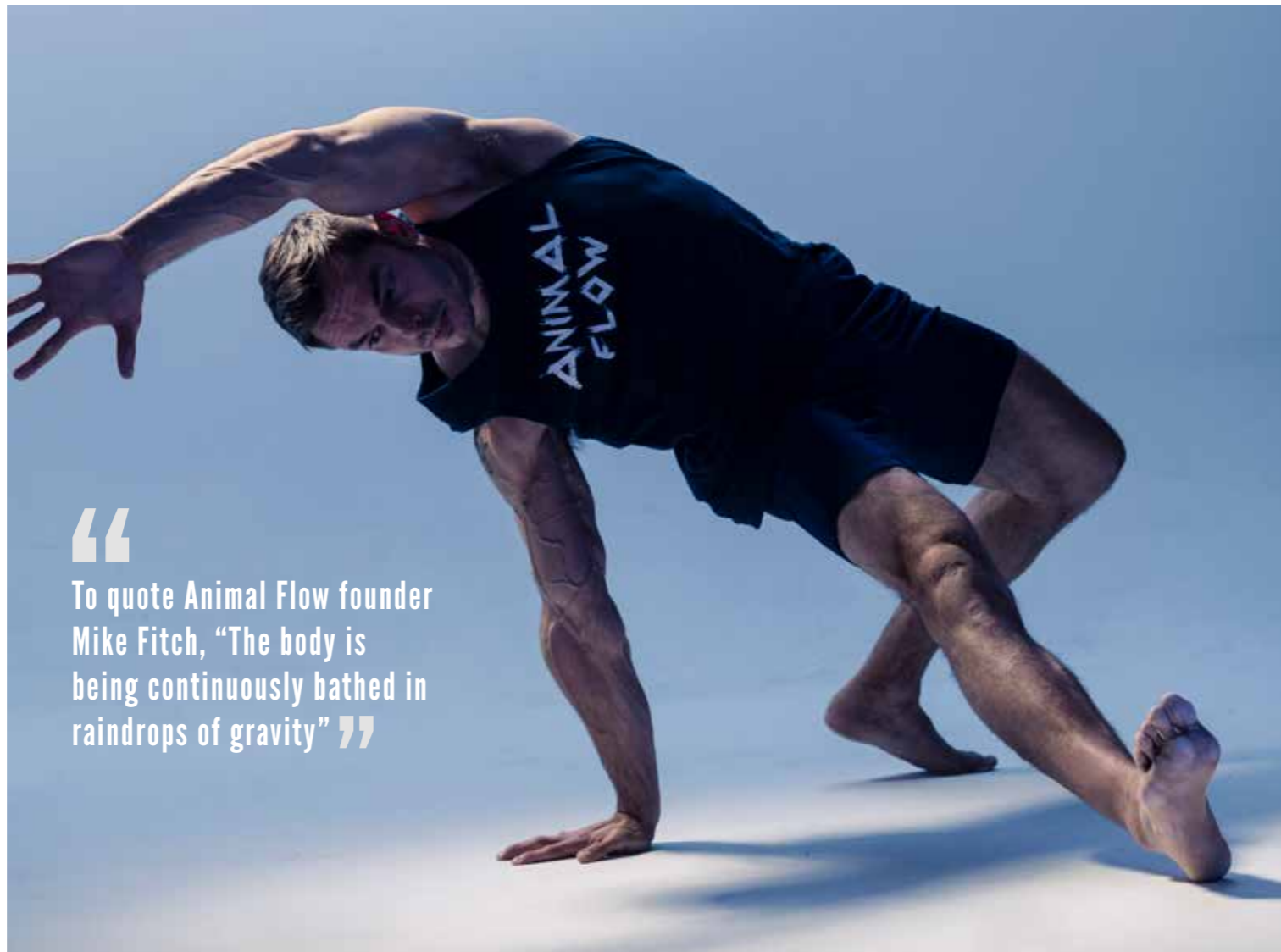
4The practice of quadrupedal movement, with both hands and feet on the ground, represents an opportunity to reinforce an existing CPG, build strength into the joints and tissues supporting it, and provide sensory input to the nervous system, testing the ability to negotiate one's surrounding space.

■ **PLACING THE HANDS ON THE GROUND**

The somatosensory system gives us information about the external environment (through touch, namely physical contact with skin). Via proprioception, this system also acts to understand position and movement of our body parts from the stimulation of muscle and joints. Tactile and proprioceptive stimuli are the mechanical forces produced when skin makes contact with an external object or surface (such as the ground), when limbs oppose the force of gravity, and when muscles contract and body parts move. When placing the hands on the ground, we are creating more stimuli and providing the body with more 'information'. Thus, quadrupedal movement practice may enhance the understanding one has of where the body is in space. Indeed, Matthews and colleagues demonstrated improvements in joint reposition sense after four weeks of quadrupedal movement training – this improvement manifested as the ability to move the arms accurately from 90° to 110° shoulder flexion while blindfolded, hinting that when ocular (vision) feedback was removed, the post-quadrupedal training intervention had fine-tuned proprioceptive feedback. In the comparative group that continued with their 'regular' training, the joint reposition benefits were not seen.

■ **BODY ORIENTATION**

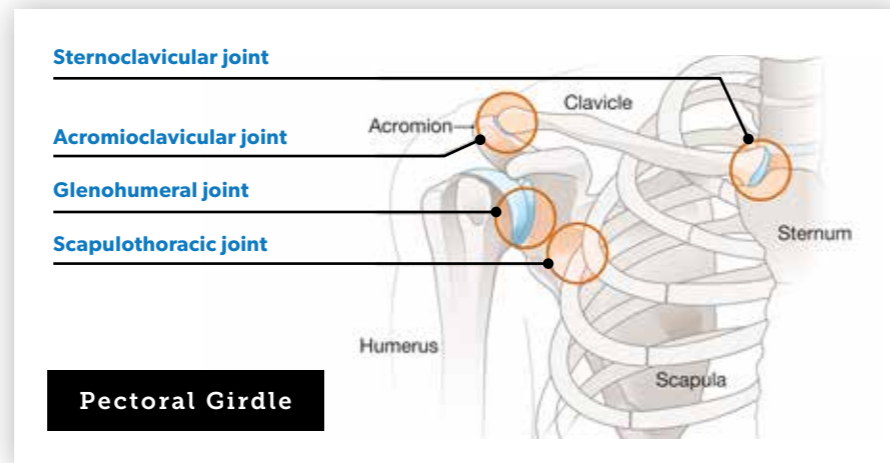
When placing the hands on the ground, two very important things happen: 1) we create a 'closed kinetic chain' set-up where the bodyweight moves around the fixed hands (vs the hands moving around the body as in



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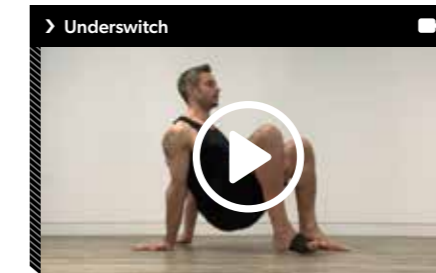
an 'open kinetic chain' set-up); and 2) we change the orientation of the body relative to gravity – specifically, we become more horizontal to the ground (vs vertical, like when moving as a biped). In both cases, the spine is challenged more to create, stabilise and dissipate dynamic forces.

1Closed kinetic chain movements – The joints of the lower-body limbs are built for bearing weight, less so our pectoral girdle, elbows, wrists and hands. The pectoral girdle is made from the glenohumeral, acromioclavicular, sternoclavicular and scapulothoracic joints:

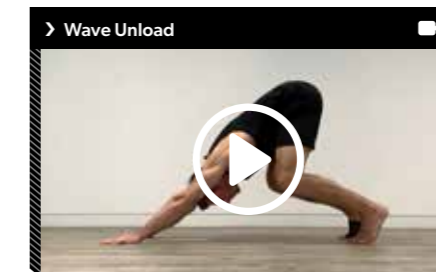


During open chain movements, the scapulae glide around a stable ribcage to assist in positioning the glenohumeral joint for reaching, pulling and pushing actions. However, when connecting the hands to the ground, these structures become more fixed and stable and the body now moves around them. By effectively 'reversing' the usual set-up one might exercise with (open to closed chain), the 17 muscles that attach to the scapulae are required to control and resist forces rather than generate them. For example, the subscapularis rotator cuff muscle has the precise role of internally rotating the arm on the shoulder joint via its concentric (shortening) activity. However, with the hands grounded and the body moving over the hands, the activity of this muscle changes. If the torso moves away from the arm, as seen in the Animal Flow Underswitch movement (Beast to Crab), the subscapularis must act to decelerate the motion by eccentrically slowing the torso, otherwise the weight of the body cannot be controlled and the movement becomes unstable and 'messy'.

Furthermore, once landing with control in the active Crab form, the subscapularis is now exposed to a longer muscle length as the hand is placed behind the hip (facing away), thus creating a 'long and strong' stimulus in a position of glenohumeral joint external rotation (an excellent position to open up the chest and shoulders, supporting postural integrity). If the same Underswitch action is reversed (from Crab to Beast), subscapularis is now required to assist in creating relative internal rotation by pulling the scapula towards the fixed humerus – a novel stimulus leading to well-rounded muscular activity across a full range of motion and, thus, contributing to shoulder health.



2Horizontal body orientation – Challenging the body to create and resist movement in the transverse plane while vertically oriented (i.e., upright) is not possible, but the moment we orient horizontally, it's game-on! Gravity now acts through our centre of mass, which will be located approximately halfway between the base limbs (the points connected to the ground). Therefore, when prone for example, such as in the Animal Flow Wave Unload movement, there will be an anti-extension challenge (felt through the anterior hips and abs).



In contrast, when supine, such as in the Animal Flow Crab Reach movement, there will be an anti-flexion challenge (experienced mostly through the posterior hips and low back).



And when rotating between ABCs, such as in the Animal Flow Full Scorpion movement, the body must contend with changing stability demands for every degree of motion experienced. To quote Animal Flow founder (and good friend) Mike Fitch, "The body is being continuously bathed in raindrops of gravity." And that's a pretty cool motor control stimulus!



■ **INTEGRATE YOUR ABCS?**

As Katy Bowman states, "Movement is not optional as we have led ourselves to believe."⁵ We should try to move more often and in different ways. We may also consider that a particular set of movements creates loads and adaptations only in those tissues pulled and pushed during that activity. If you only ever run or bench press, then you generate strength in the specific tissues and joints supporting running and bench pressing, yet a relative weakness is created in the surrounding areas not strengthened by the repeated movements. Animal Flow represents an excellent opportunity to provide 'movement nutrition' within one's existing workout week, 'covering one's bases' by injecting local and global strength. The ABCs and quadrupedal actions expose us to novel joint and tissue stimuli, increase proprioceptive input and reinforce existing CPGs, which all make for a more well-rounded human animal. Experience the benefits for yourself and use this Animal Flow drill in your warm-ups and movement breaks to complement your existing workout schedule. **fp**



RICHARD SCRIVENER is a personal training coach and educator with over 20 years' experience within the industry. Richard works as a health, fitness and nutrition lecturer, a health and fitness course developer, and a strength and conditioning coach (athlete focused). Richard is also an Animal Flow master instructor, teaching in the UK and internationally. Always seeking to stay on top of the latest research and trends, Richard uses his experience to provide a personalised training approach which incorporates the most effective evidence-based strategies.