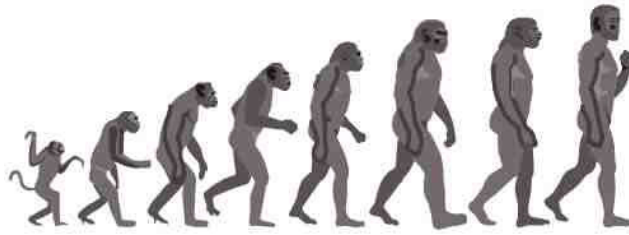


# Physical Adaptations to Bipedalism

## A story to help release tension in your Asana

by Sadie Hawson



### **Introduction**

My aim is to offer you a story about our physical adaptations from ape to man so you may consider and contrast the way we move with the way an ape moves. It is the story of our evolution from an animal on four legs to one on two. By bringing awareness to our vulnerable body parts, highlighted in this evolutionary story, we gain insight into where tension may be being held.

We are the only habitual bipedal mammal and no ape moves as fluidly in such an upright position. This upright stance came about through muscular and skeletal adaptations. Respecting our correct body alignment helps reduce the build up of tension in our bodies. In building strength in that alignment we can gain a more fluid ease to our everyday movement.

Bringing awareness to the vulnerable muscle areas may allow us to let go of tension and release into correct alignment and therefore hold a soft and steady asana.

We are all slightly different physically and we each need to recognise our own differences. We need to learn to accept our own body movement and work with it.

This story like our alignment flows from the feet up to the head, finishing with the arms and shoulders. We reflect in turn upon the: Feet, Knees, Pelvis, Spine, Head and Forelimbs.

### **Feet**

Apes are flat-footed with opposable toes just like our opposable thumb. This opposable toe helps apes to climb, move around in trees and manipulate things, including tools.

Humans have springy feet. We have evolved three arches to our feet: 1. medial longitudinal; 2. lateral longitudinal; and 3. transverse arch. These arches offer us a spring to our step and allow our bodies to absorb some of the impact of movement. Our big toes have only two bones while the rest of our toes have three. The two-boned big toe gives us a secure toe-off push, propelling us efficiently forward. This efficient walking and running forward action enabled us to become excellent hunters.

The large supportive bones of the feet and the arches of the feet are held together with short strong ligaments. Weakness and stretching of these ligaments causes flat feet preventing our body aligning properly.

The feet can also hold a lot of tension and are often scrunched up and tense without us being aware. This can translate to the rest of the body. Think how a Reflexology treatment can effect you?

### Feet & Yoga:

Exercising the muscles of the feet through toe exercises helps to restore our conscious connection with the feet and their muscles. This over time can re-establish the arches. Consciously feeling the physical contact of the feet on the floor, before looking at the feet, helps us to reconnect with their movement and actions. In *asana* practice we need to work to consciously release scrunched up and clasping feet so they are soft, strong and relaxed.

Making our leg muscles active in various *asanas* will work to restore the arches of the feet and contribute to a correct alignment. Contracting the *Gluteus Medius* helps lift the arches of the feet (see also pelvis muscles below).

### Knees

The knees of an ape do not align directly under the pelvis and the legs have a wider gate to them. In an ape the pressure on the knees, in an upright posture, lies on the outer side of the knee joint and would cause abnormal wear if they were to walk upright a lot.

Human knees stack directly below the pelvis and in an upright aligned posture the pressure on the knees lies directly in the centre of the knee joint. This perfect balance coupled with the knee's ability to lock out allows us to stand easily for long periods of time.

Our knees are great negotiators, being our most complex joint, they offer us a wide range of movement. They are a hinge joint and allow some gentle side ways and twisting movement (depending upon the knee). Situated between two very strong joints, the hip joint and the ankle joint, the knee is a shallower more flexible joint. The knee is weaker than the hip or the ankle joint and can damage easily by over compensating for any bad alignment seen in the feet or hips. Bad alignment means abnormal movement for the individual and will cause damage through abnormal wear.

### Knees & Yoga:

The complexity of the knee makes it easy to hold a lot of tension here; there are a lot of connections that can knock out of alignment. Keeping the knees soft, not locked, works the muscles of the legs gently and allows us to engage with our posture. Pulling the kneecap up promotes tension in the body but allowing the knees to lift softly promotes ease in our *asana*. It is a careful balance.

Keeping knee alignment during movement, with a conscious awareness of softness to the knees, will help to release tension in our *asana* and in our dynamic movement.

When weight bearing, in standing *asanas* our knees need to track the angle of our feet and be turned to do so from the hip joint. If the hip does not turn out, neither should the knee or the ankle/foot. If we don't consciously check our hip-knee-foot alignment the knee, as the weaker joint, will negotiate any difference in direction. A negotiating knee will hold adverse tension and may wear abnormally.

In bent leg seated postures some protection of the knee can be gained by flexing the foot, this partially strengthens the knee joint and allows us to feel the turnout at the hip more.

Consciously rotating the leg from the hip joint and keeping the hip-knee-foot alignment in dynamic and static movement will strengthen the leg muscles in correct alignment. This may in turn reduce the risk of abnormal wear by promoting correct alignment in everyday activity.

Strengthening the leg muscles also works to support the ligaments and tendons of the knee's shallow joint.

## The Pelvis and it's Muscles

Apes use the wall of the abdomen to support the viscera of the trunk. Their weight can be spread down their limbs but the majority of the weight falls on the abdominal wall, due to the horizontal nature of gravity.

An apes pelvis is elongated and angled backwards. They do not walk smoothly, the *Gluteus Maximus* only works to abduct the leg and so an ape walks with a gate to their stride. The elongation of the lower part of the pelvis is of benefit when climbing.

In humans the whole weight of our trunk, head and forelimbs pushes down into the pelvic bowl a much smaller area than the abdominal wall. The weight is focused into the pelvic girdle; the pelvic floor or diaphragm of muscles and the connective tissue. The weight of the body is then transferred from the pelvic girdle into the legs and feet.

The pelvis is made up of three parts - two sides and the sacrum (base of the spine). The pelvis is the attachment point for the strong muscles of the legs. There is some movement between the bones of the pelvis to allow us to move freely.

Humans have a rounder more bowl-like pelvis than the apes. The ileum bone of the pelvis however is expanded posteriorly and this is why the sciatic notch is so deeply concave. Our *Gluteus Maximus* muscle also abducts like that of the ape. Because we have an interplay with the other *Gluteus* muscles (*Maximus*, *Medius* and *Minims*) in the second part of our stride we have a smooth movement in our forward propulsion.

### The Pelvic Area & Yoga:

Be aware in your asana of the alignment of the legs bones and muscles and how they attach and find support from the pelvic girdle.

Understand that bent knees bring more freedom to the movement into our pelvic area but increased vulnerability to the alignment of the legs and our pelvis (SI joint).

Engage the *Gluteus Medius* muscles of the pelvis to lift the medial instep of the feet.

The application of the different bandas of the pelvic region brings awareness to this area and allows us to become more consciously aware of the support offered by the muscles of the pelvic girdle.

The key to releasing tension in this area is an awareness of the pelvic diaphragm. In asana be aware of the gentle movement of the pelvic area associated with our breath. A down ward movement on our inhalation and a lift on our exhalation. Awareness of this movement will help release tension in both dynamic and static movement.

### Spine

An ape has a C shaped spine, perfect for its crawling posture. When an ape stands it constantly needs to pull forward which costs it a lot of muscular effort.

As humans we have four beautiful curves in our spine which counter balance the body to make our upright posture effortless. Our lumbar curve shifts our weight, just behind the hips allowing us to maintain an upright posture almost effortlessly.

The four curves relate to the pelvic, lumbar, thoracic and cervical areas of the spine. These curves offer us a fantastic shock absorbing facility for our bodies. This is due to the inherent strength in these curves, the structure of the spinal disks and its flexibility.

The spine is a beautiful piece of evolutionary engineering but it is prone to tension/injury at each change in direction.

### The Spine & Yoga:

Free movement of our spine is said to be the key to ease of movement in our lives. Know the saying "*you are as old as your spine*".

In dynamic movement allow your movement to radiate out from the spine and be soft. Radiating your movement out from your spine will allow your body (energy levels) to work efficiently and effectively.

Because the spinal disks dehydrate during the day making us shorter and reducing their ability to act as shock absorbers, lying in semi-supine for 20 minutes will re-hydrate the disks of the spine rejuvenating the shock absorbing effects of the disks.

Gentle flexing of our spines allows us to feed it with nutrients it otherwise would not receive. Offer space to your spine and consciously allow your natural spinal curves to remain in *asanas* to ensure ease of movement and a feeling of release.

### **Skull**

An ape's skull is attached to the spine at the back of the head this means the majority of the skull's weight is pulling forward. Strong muscles are therefore required to hold it up. Much muscular effort goes into lifting the head and larger muscles are used to give facial expression.

Humans have their heads centrally balanced on the vertical column so our heads stay upright with very little muscular effort. The strong muscles used in the ape to hold the head have become finer and less defined. Finer muscles however offer a subtler very beautiful communication device. Our emotions are played out on our faces.

Thrusting our heads forwards while working or studying, puts our skull off balance, causing strain and tension in the supportive muscles of the head, in our neck and shoulders.

### The Head & Yoga:

Practice centring the skull on its balance point and feeling lightness of movement around the head. If the spinal curves are right the head will be balanced effortlessly.

Gentle neck exercises release tension from around the support muscles of the skull.

Consciously releasing and opening out the facial muscles, frees the face, the neck and the shoulders for ease of movement.

Wearing an inner smile during yoga practice lifts the face and the spirit.

### **Fore Limbs**

The forelimbs of an ape are longer than the hind limbs. Orang-utans and Gibbons must hold their forelimbs over their head to walk otherwise they would trail on the ground. They offer them a strong and powerful form of locomotion and also some dexterity.

Opposable digits allow for delicate food foraging and tool use.

In humans arms are no longer used for locomotion but forelimbs are used for very fine detailed movements, often repetitive, and then the occasional large muscular effort. When foraging our limbs were rested between movements. In the repetitive movements of today's upper limb tasks, we may not take a break and we may numb the sensations of

limb to focus on the task. We often lack the muscular effort we occasionally require. Both actions may cause tension / injury to the forelimbs and shoulder girdle.

#### Upper Limbs & Yoga:

Neck and shoulder mobility exercises loosen out areas of tension. Full attention to the movement and visualising the opening out of the chest and the sliding of the shoulder blades down the back will help release tension in many *asanas*. The conscious letting go / lowering of shoulders is a very effective tension releaser.

Working the full range of movement in the wrist joints helps the repair process after a lot of fine and repetitive work, reducing the risk of repetitive strain injuries.

Heightening awareness and sensation of the arms during asana may bring awareness to any tension that may be building from everyday tasks, encouraging change of posture or breaks.

Building strength in our arms in preparation for the activities we want to do reduces the risk of injury. Ensuring the right weight bearing activities and repetitions for the individual, is key to building strength and reducing tension. Curtailing our activities in everyday life to reflect a realistic measure of our arm strength may occur through knowledge of our strength during asana practice.

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*"We are all different, know your own body, know yourself."*

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The Story of our Physical Adaptations to Bipedalism was inspired by:  
Kenneth S. Saladin "Anatomy and Physiology - The Unity of Form and Function" [Fourth Ed] 2007 McGraw-Hill International