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The joy of walking

James Earls[1]

ABSTRACT - Can we blend the experiential with the anatomical? Walking has been a source of inspiration for many thinkers often commenting on the physical, emotional and spiritual value it has for them. In this article we invoke a new anatomical model which helps draw apparently disparate strands together.

Keywords - Walking. Gait. Myofascia. Physiology. Psychology.

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A alegria de caminhar

James Earls[1]

RESUMO - *Podemos combinar o experencial com o anatômico? Caminhar tem sido fonte de inspiração para muito pensadores, que normalmente comentam o valorfísico, emocional eespiritual queisso tem para eles. Neste artigo, invocamos um novo modelo anatômico que ajuda a juntar fios aparentemente divergentes.*

Palavras chaves - Caminhar. Marcha. Miofáscia. Fisiologia. Psicologia.

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> ‘Is it not truly extraordinary to realise that ever since men have walked, no-one has ever asked why they walk, how they walk, whether they walk, whether they might walk better, what they achieve by walking, whether they might not have the means to regulate, change, or analyse their walk: questions that bear on all the systems of philosophy, psychology and politics with which the world is preoccupied?’
>
> Honoré de Balzac, Théorie de la Démarche

Walking can be a joy. When walking, ‘the body breathes I am alive’, says Frederic Gros (2014, p.144) in ‘A Philosophy of Walking’. Gros defines joy as the emotion felt during an activity of the body. It is the ‘flow’ one achieves, all too rarely perhaps, in sports; the thrill of the downhill ski, hang time in basketball, the unchallengeable soccer dribble.It is the radiance seen in the face during the child’s first ever few steps.

Why then, do so many lose that joy in walking? The accomplishment of upright gait has given our species so much and it is one of the defining characteristics of our species. Many alternative suffixes have been suggested for Homo sapiens - from those that emphasise our emotional skills, or interestingly, our lack of them, Homo avarus (greedy man), Homo adorans (worshipping man), Homo adans (loving man); or, our language skills - Homo loquens (talking man) and Homo mendax (lying man). My favourite however, was suggested in 1951 by the philosopher Gabriel Marcel - Homo viator, ‘pilgrim man’.

To be a pilgrim is to journey to a better place, a journey, more often than not, performed on foot. We literally *saunter* to a place of significance looking for, searching for, the ‘Sainte Terre’, the Holy Land.

In this increasingly secular world, fewer people are walking the ancient routes for their religious significance (though many still do), but instead, are using the well-worn paths for recreational hiking, taking an extreme solution to escape the rigours of their everyday lives.

Walking can disconnect us from the daily grind, detaching ourselves from the demands of WIFI, cell-phones and the crushing commute. But yet, so few of us find the ‘joy’ in the act of simply, rhythmically, repeatedly, putting one foot in front of the other.

Many modern-day pilgrims are escaping ‘the desk’. Walking away from the gradual, crippling, stultifying effects of the slump. Gros describes this eloquently in comparing composition created at a desk versus that generated while walking - the reader can ‘sense the seated body, doubled up, stooped, shrivelled in on itself. The walking body is unfolded and tensed like a bow, open to wide spaces like a flower to

the sun, exposed torso, tensed legs, lean arms.' When composed in walking, thought is 'born of a moment, an impulse, in it we can feel the body's elasticity, the rhythm of a dance. It retains and expresses the energy, the springiness of the body.' (GROS, 2014, p. 19-20)

Many writers have used walking as their meditation. Wordsworth wandered, Darwin circled the garden of Down House, Nietzsche marched up hills, and Dickens strode through London. Many mention this idea of 'elasticity'. Darwin, in his memorial to his lost daughter says, 'Her joyousness and animal spirits radiated from her whole countenance and rendered every movement elastic and full of life and vigour' and 'when going round the sand-walk with me, although I walked fast, yet she often used to go before pirouetting in the most elegant way, her dear face bright all the time, with the sweetest smiles'[1].

That brightness of youth, the joy of movement made even more poignant by Anne's premature death at ten years of age. In youth the tissues are fresh, building new strengths and capabilities, and are fluid. As we age, we accumulate the tears and trigger points, the adhesions and restrictions of injury, overuse, and, increasingly, underuse. Young tissue should be unadulterated. The youthful body should be full of potential and resilience but its elasticity should not be the preserve of the young.

To regain the 'joy' in our walk, to maximise that spring and ease we can take advantage of many of the body's natural mechanisms but we do need an expansion from traditional anatomy. The body of Homo sapiens is walking machine. As a genus we first went on a migration out of our homeland some 2 million years ago as Homo erectus but a second wave of Homo, Homo sapiens, began their pilgrimage only 200 000 years ago.

There are many aspects of our anatomy that have combined to make Homo sapiens walking machines with large brains. Changes occurred in the feet, the pelvis and the bones between them. The spine had to alter to allow lumbar extension, an essential element if we are to carry our heads continuously directly above the pelvis and escape the 'bent-hip, bent-knee' walking used by our cousins, the primates (See fig.1).

1 The Death of Anne Darwin, cited on http://www.darwinproject.ac.uk/death-of-anne-darwin.

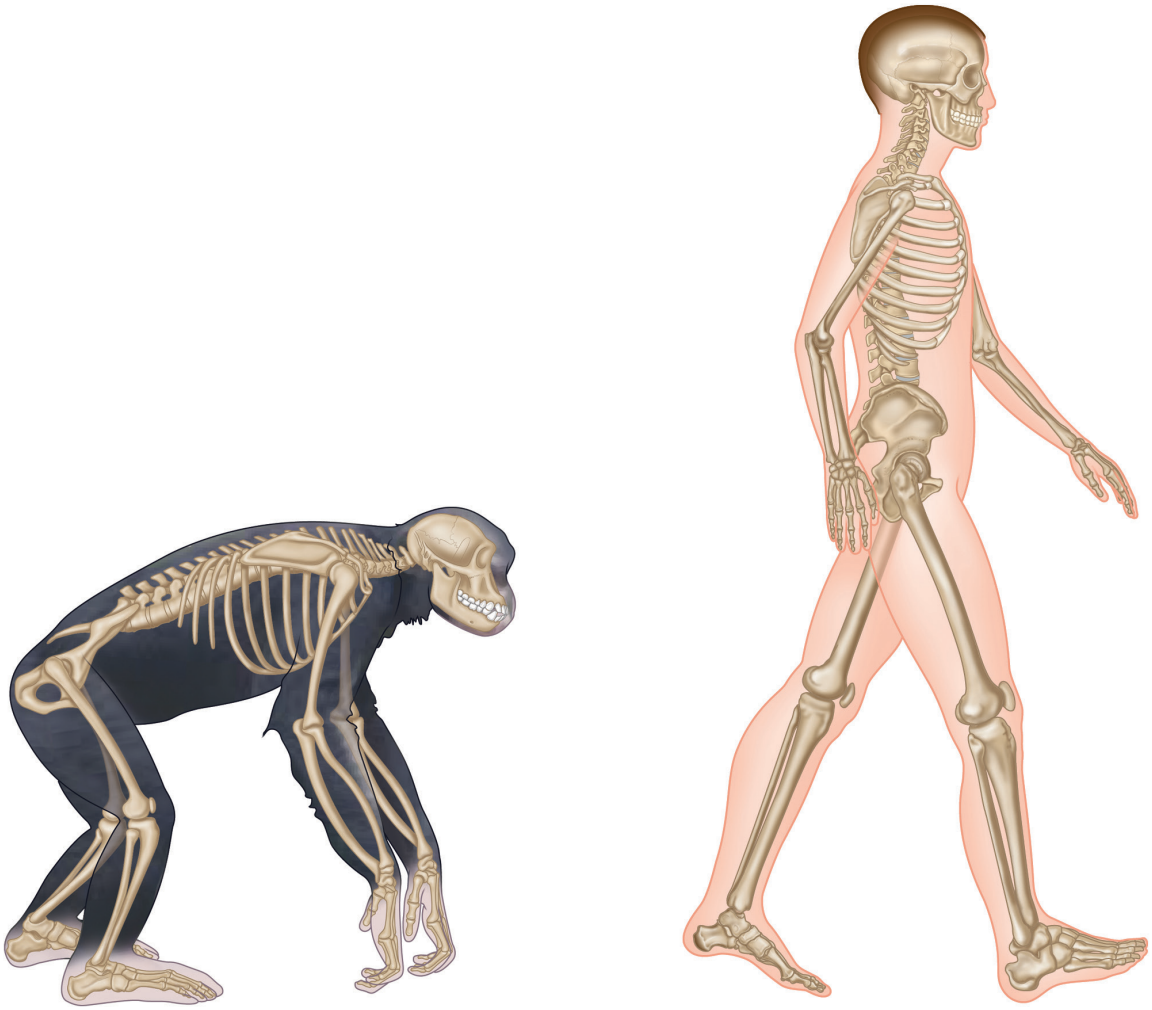

Figure 1 – The lumbar extension available in the human spine allows an upright gait. Without spinal extension, walking requires some degree of knee and hip flexion that that puts extra workload on the spinal erectors and thigh muscles. Another important skeletal change is the orientation of the ilia, from posteriorly facing to laterally thereby changing the function of the gluteal muscles from extensors to lateral stabilisers, an essential part of bipedal gait. Source: the author, 2016.

Try walking with your knees, hips and back bent to feel the required effort. Being upright, perhaps a little taller and wobbly, is actually more efficient. The changes in our feet and joints above allow us to progress into the 'tensed like a bow' position mentioned by Gros. As we will see below, he is describing exactly a major mechanism for achieving elastic ease, flow and, hopefully, joy.

In human anatomy the toes, knee, and spinal joints have a primarily sagittal plane axis. The hip joint has come up into relative extension from the flexed position seen in primates meaning that it has few degrees of extension available to it before coming to its ligamentous limit. The reduced range of motion in the front of the hip is a positive feature in the creation of the elastic bow. Movements in the frontal and

transverse planes are involved at every joint and are essential but impossible to cover in requisite depth in this article. More detailed and lengthy discussion is available elsewhere in the literature (EARLS, 2015).

There are two main moments of interest in the gait cycle - heel strike and toe-off. Heel strike whilst running has been under scrutiny over the last decade as a result of the barefoot movement. Whilst the jury is still undecided on any absolute ruling on the benefits of mid, fore or heel-strike, I think it is undeniable that heel striking is the by far the predominant strategy naturally chosen by Homo viator.

The other main area of interest is toe-off - some references prefer the term 'push-off' but I consider that an active choice, an occasional decision to speed up when running late. In a natural, relaxed, 'elastic' walk there is little effort, it feels like the posterior limb just releases from its contact with the ground and swings through and it is this mechanism I wish to explore further.

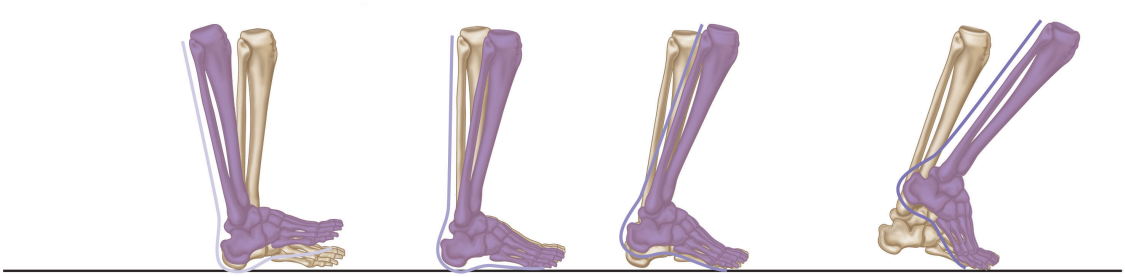

Figure 2 – The four rockers of the foot. From left to right:
Heel Rocker – following heel strike, we roll around the curvature of the calcaneus to bring the plantar surface in contact with the ground.
Ankle Rocker – once the foot is planted, the lower limb 'vaults' over the foot via the ankle rocker of the talar joint.
Mid-foot Rocker – as we reach the functional limit of the plantarflexors, the rear foot begins to lift and we roll on the ball of the foot.
Toe Rocker – the rising foot brings the toes into extension.
Loss of any one of the rockers will reduce the movement in the hip joint above and thereby limit the tensioning of the tissue. The rockers are also predominately aligned on the sagittal plane to facilitate a graceful forward movement in one 'rocking' motion. The medial orientation of the greater toe of the primate affects their ability achieve the same progression. Source: the author, 2016.

The evolutionary changes in the feet have allowed us to roll though from heel to toe over the, so-called, rockers (See Fig. 2). The calcaneus, the talus joint and first and second metatarsophalangeal joints are all aligned in the sagittal plane, creating a groove to progress over and straight ahead. Much of that progression is through momentum some of which is provided by muscular contraction and effort but a proportion is also delivered via elastic recoil (See Fig. 3).

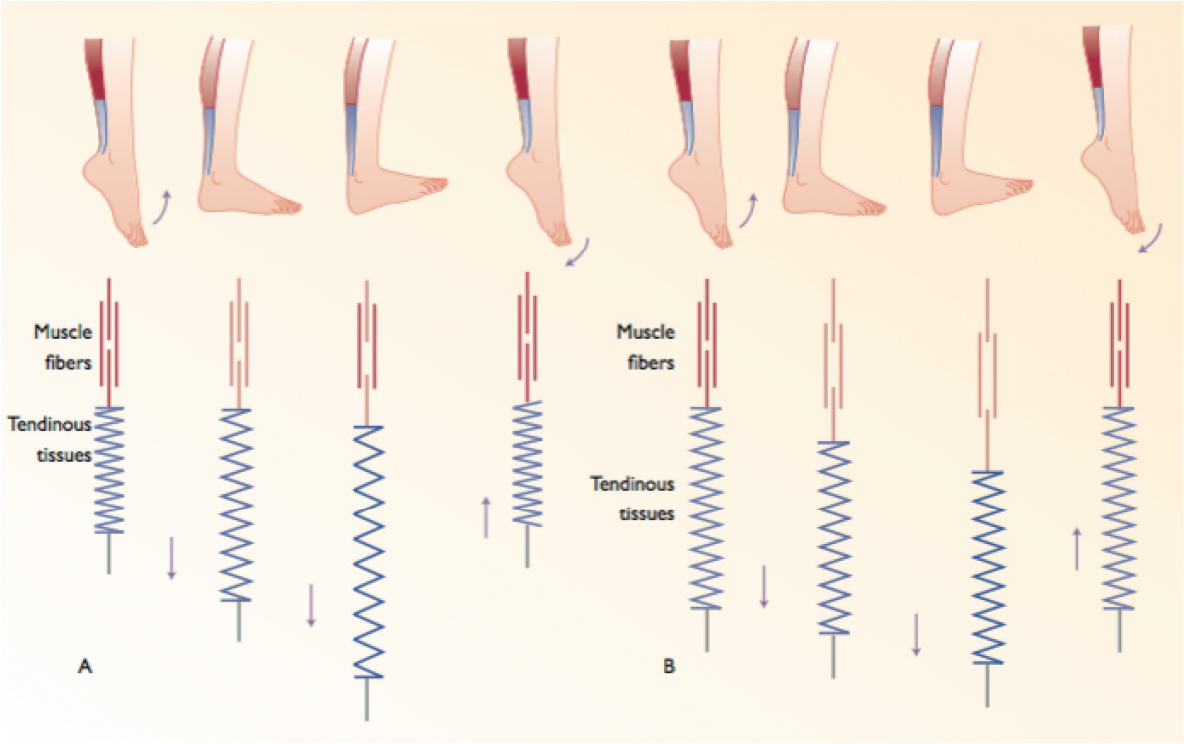

Figure 3 – Although showing the ankle plantarflexors, this diagram illustrates a mechanism that appears to be happening throughout the body in movement. B shows the traditional idea of movement being creating and controlled via concentric and eccentric contractions of the myosin and actin filaments (the straight lines). 'A' shows us the results of research by Fukunaga in which the contractile fibres move less and allow momentum to load and release energy from the elastic fascial tissues (the zig-zag llines). The mechanism shown in 'A' reduces effort and may contribute to the sense of ease when movement is flowing. Source: the author, 2016.

Dickens was very near the truth when, in reference to his prodigious and speedy walking habit, he jokingly referred to himself as the 'Elastic Novice'. With the recent resurgence in research into the roles of the fascial connective tissue, many investigators have discovered it plays a significant role in movement. In repetitive, rhythmical movements where momentum is involved, the muscles appear to save energy by remaining closer to an isometric contraction, allowing the momentum to lengthen and stretch the surrounding fascial tissues. By not having to eccentrically and concentrically contract, the muscles use many fewer calories and this must contribute to the sense of ease felt in a rhythmical gait.

One of the new models of anatomy that has been partially responsible for the increased investigation into the fascial tissues has been Thomas Myers' 'Anatomy Trains'. In Myers' book of the same name he describes twelve chains of myofascial continuity. Each is given a different name according to the layer, direction or function. Myers lays out the detail along with supportive evidence of their anatomy. One of the most interesting and significant for our discussion here is the 'Deep Front Line' (DFL, see Fig. 4).

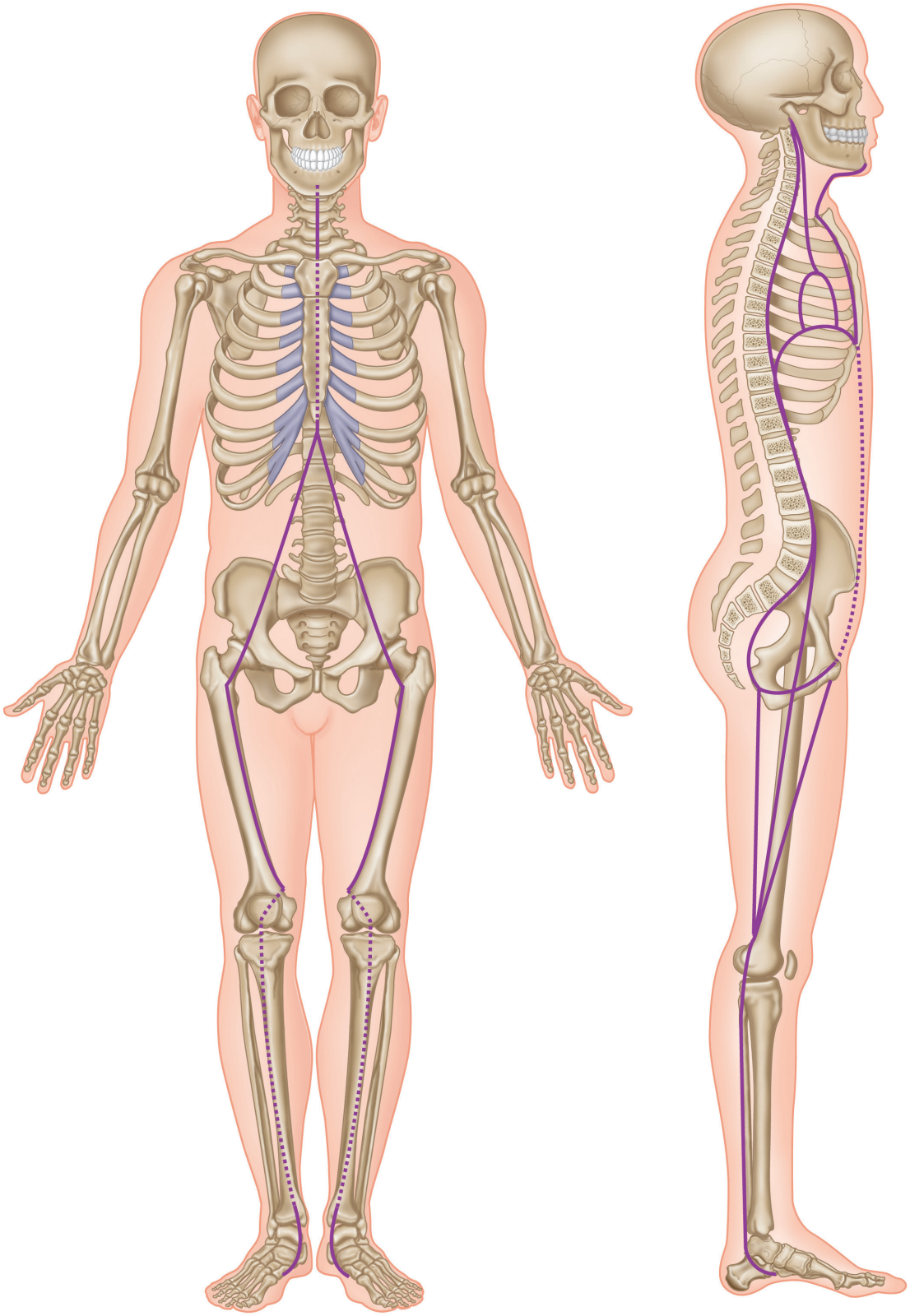

Figure 4 – The Deep Front Line of Myers represented by the lines inside for clarity. From the feet, the myofascia of the DFL includes the tibialis posterior and flexors hallucis and digitorum longus, the adductors, the pelvic floor and hip flexors, transversus abdominis, anterior longitudinal ligament, diaphragm, mediastinum, and tissue of the jaw and throat. For a detailed description, please see Myers, 2014. Source: the author, 2016.

The anatomy of the Deep Front Line is complex and made more difficult by a number of changes of direction. We can summarise the portion important to the position of toe-off as being the:

Deep posterior compartment - flexors hallucis and digitorum longus and tibias posterior;

The adductor compartment;

The hip strong hip flexors of iliacus and psoas;

The diaphragm;

The mediastinum and thoracic contents including the lungs;

The structures of the throat and jaw, including the hyoid complex.

Each of these areas is connected to one another via the body's fascial tissue that carries force from one section to the next. The flexor muscles of the deep posterior compartment influence and are influenced by the adductors via the connective tissue on the medial aspect of the knee. The anterior adductors lead us to the hip flexor complex via the tissues of the septum and the anterior hip joint.

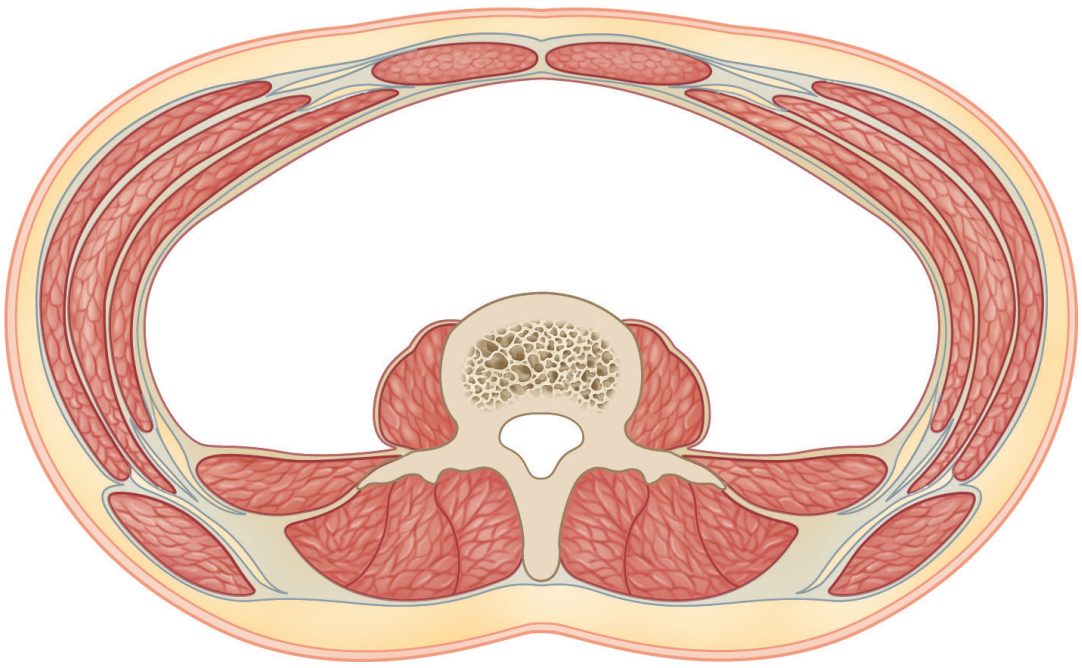

Figure 5 – This cross-section through the lumbar region shows the fascial continuities from the abdominal muscles into the muscles of the low back (and vice versa, the body knows no primacy of direction). The transversus abdominis and its relationship to the umbilicus via the lamina posterior to the rectus abdominis is also connected and continuous with the fascia supporting the abdominal organs (not shown). Source: the author, 2016.

In cross-section we can see the fascial continuity from the muscles of the low back into each layer of the thoracolumbar fascia (see Fig. 5), especially that of the transversus abdominis and thereby to the umbilicus and the peritoneum. As Myers' points out (2014, p. 201), 'the umbilicus is a rich source of emotional connections…, being the source of all nourishment for the first nine months of life'.

When we look at the body's position prior to toe-off and look at the continuity of the Deep Front Line we can visualise the internal bow that has been created by the body's forward momentum (See Fig. 6). The flexors of the toes are lengthened; the anterior adductors and the hip flexors are all in some form of stretch. The abdominals, and the so-called 'core system' are stimulated and the organs opened. So too is the thoracic cavity and the organs of breath and the head is held up, with the cervical spine in extension.

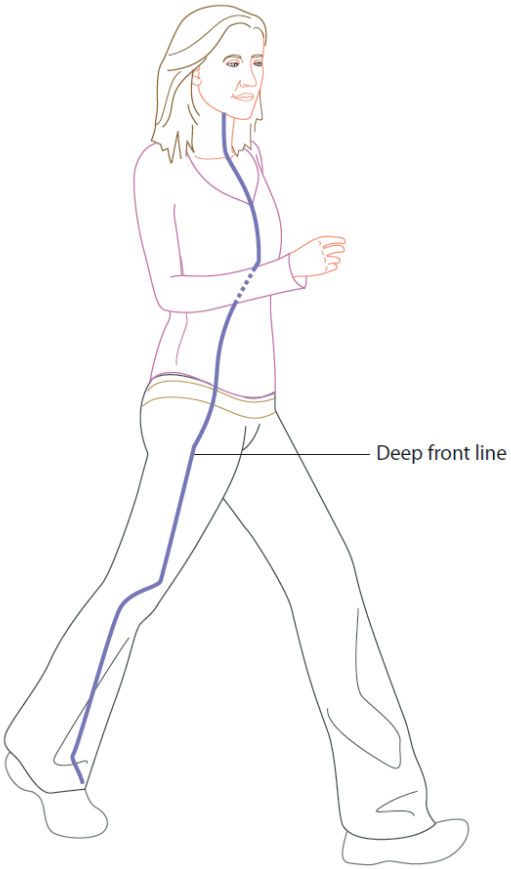

Figure 6 – Once we have progressed over the four rockers of the right foot, the knee, hip and spine should all be in extension. This is an ideal position to load the 'bowstring' of the Deep Front Line as each portion of the myofascia should receive some momentum to help load elastic energy into the supportive connective tissues. This position can only be achieved if the joints and their associated tissues are compliant enough and also the emotional state of the walker must allow the head and chest to be lifted. Emotional or physical distraction that cause the head to drop will reduce the consistency of the stretch and load of the 'bowstring' and require extra muscle work to be produced. This mechanism may help explain the self-fulfilling cycle of positivity, when we are 'up', we quite literally have a 'spring in our step'. Source: the author, 2016.

The upper portion of the Deep Front Line is a meeting place of the anterior longitudinal ligament, the upper attachments of the pharynx and laryngo-hyoid complex. Each of them having a relationship with the sphenoid and, thereby, its associated gland, the pituitary.

The tensions ascending from the lower limb to reach the skull also have to pass though the mediastinum, the fascial home of the heart. With each step, with each extension, the physiological, emotional and, for many, the spiritual centres of the body are being 'massaged' - squeezed and released, squeezed and released. Each swing of the leg provides movement, stimulation and nourishment to the organs of digestion, breath, blood and brain.

To achieve the flow and ease of walking we need to understand the blended work of Fukunaga and Kawakami on elastic recoil (See Fig. 3), Komi and Blazevich and their understanding of the stretch shortening cycle and, finally, the appreciation of myofascial continuities such as those put forward by Myers. Together, they give us a new lens through which we can see the influence of movement. Momentum changes the demand on the muscular tissues, they no longer have to create movement, their role is to control it.

The forces of momentum, ground reaction force and gravity all have to be dampened within the tensegrity arrangement of the body. The muscles appear to fine-tune the reactions, minimise stress and work, and maximise the capture of elastic energy.

At the moment of toe-off, almost all the anterior tissue of the body is opened and tensioned. The muscles have acted to capture the kinetic energy in the fascial net, ready for it to be released as we roll off the heads of the first and second metatarsals.

We know within our sense of ourselves that the whole body walks - it is more than the sum of the anatomical parts. Can we now answer some of the questions for Balzac? Can we walk better and what do we achieve by walking?

I hope we can capture the 'joy' of walking. By unfolding ourselves we open our organs, we lift our heads, we stimulate the energies of the breath. We bleed some of its efficiency if we lose the ability to extend our toes, if we can no longer extend our hips or straighten our spine. All of these things are related, they all help the tensioning of the myofascial bowstring Myers has called the 'Deep Front Line'.

Achieving the flow of walking, to experience the nurturing, the solace, and stimulation of joy through our walk and to create the 'elastic' ease that accompanies them can all be tied-up together via the myofscial continuity that is the Deep Front Line. Progressing into its bow can be akin to opening the heart, the mind and the

womb and finding that sacred land inside. The place from which you can create the poetry of Wordsworth, the theories of Darwin and the philosophy and the joy that is your movement.

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