



FOREWORD by Afni Shah-Hamilton

Ask a member of the public what a podiatrist is and you are most likely to hear "Is that the same as a Chiropodist?" or "Oh they cut toe nails!", when in fact we all know there is so much more to our profession.

Other professions already have a strong working relationship with one another, for example: physiotherapists, chiropractors and osteopaths. The role of a podiatrist in the biomechanics of the body and overall well-being of a patient is crucial and needs to be recognised by other professions. In a series of articles for the Podiatry Review, we will be looking beyond the 'conventional' podiatry box with Afni Shah-Hamilton, who already incorporates a wide range of therapies and treatments to enhance her overall patient experience.

Afni Shah-Hamilton graduated from University College London in Podiatry BSc (Hons) and completed her master's degree at Kings College London. Afni established a successful clinic in North London, Tiptoe Foot Care, where she specialises in pain management. Afni has helped a large number of patients with unresolved (or in some cases previously undetected) problems with the toes, foot or ankle that were causing long term knee, hip, back or neck pain.

Afni has further broadened her knowledge by studying a range of related areas including systematic kinesiology and Anatomy in Motion (AiM), to identify the root cause of long term joint pain and mobility issues.

The first therapy in review is; **Anatomy in Motion. Founded by Gary Ward** who explains the philosophy of AiM, how it was developed and introduces its key principles. This extension of biomechanics and traditional anatomic training could be used by podiatrists to enhance their treatments and give patients better outcomes.

Beyond Podiatry: An Introduction to the principles of Anatomy in Motion (AiM)



AiM

By Gary Ward
Founder of
Anatomy in Motion

The act of re-aligning the feet is second nature to many podiatrists, and when advising on insoles you will no doubt consider the impact on the arches, ankles and knees. However, the connections go much further than this and for many the detailed explanation of how the feet communicate movement to the whole body still remains an enigma.

*To work with the
human foot is to work
with the whole body*

This isn't unique to podiatry, I have found that the vast majority of healthcare practitioners are aware that the whole body is connected. As a result, they understand that working with just one part of the body in isolation will never quite cut the mustard; and yet they have rarely been shown in detail how it's connected or how the various parts of the body move together to provide efficient long chains of movement.

Anatomy in Motion (AiM) extends traditional biomechanics training to understand the full picture. It is based on the gait cycle but for podiatrists it provides an opportunity for you to widen your existing knowledge and use this greater understanding to lead to improved patient outcomes.

How can AiM help your clinical practice?

What if you could be presented with what is essentially a roadmap that explains these connections in full detail? Biomechanics has the chance to move from observation of isolated structures toward observation of the whole body, once you recognise and acknowledge that each part of the body is able to communicate movement to all other parts.

For instance, how does a foot communicate movement to the opposite shoulder? We may have seen a foot - shoulder relationship many times but can you explain and predict it? By studying AiM you can learn the interplay between all bones and joints and their subsequent impact on the soft tissue system, and, as a result, better understand and resolve physical problems that your patients are experiencing in their day to day lives.

Such an understanding can also help resolve a common bug bear of practitioners – where some patients inexplicably don't respond to the standard treatment. Perhaps orthotics work for one collapsed arch but does very little for another. Or one patient's back pain goes away, but another person's remains the same. By re-assessing our thinking and asking a few (better) questions we can obtain deeper insight and identify where bespoke solutions are needed. Is the foot position the underlying problem here or is it being caused by something else? An underlying structural issue that may not even be obvious to the patient? The clues are often all there once you know where (and how) to look for them.

What is Anatomy in Motion?

Anatomy in Motion is a movement oriented education system that provides an alternative approach to biomechanics. It is based simply on what the joints of the human body do and when they do it during the human gait cycle. It takes into account how upper body biomechanics can be influenced greatly by lower body biomechanics and vice versa.

Each bone and joint are connected in long chains that create clear and predictable patterns of movement that are both learnable and simple to work with. Importantly though, there is no single direction of influence. For instance, did you know that somebody's neck posture can affect the state of a person's feet? Looking only at the feet in this instance may not provide an adequate or lasting solution as the underlying cause potentially remains unresolved. By taking a wider view and then using our knowledge of the connections through the body, perhaps we could be in a better position to help?

Anatomy in Motion was created out of a personal curiosity to uncover exactly how we as human beings walk. It was founded on the line of questioning: if I move joint A, what happens at joint B? If I move joint B in that way then what happens at joint C? And therefore if I move joint A, can we always predict what will happen to joint C?

Of course, it doesn't stop at C, it keeps on going until you can see exactly how the foot and neck are communicating with each other through their movements. AiM documents specifically how these structures connect and the key to it all was movement, joint surface anatomy and the gait cycle.

Joining the dots – the Flow Motion Model™

The documentation process that underpins AiM began when I met a Biomechanics expert called Hamish Wolfenden, who specialised in the Windlass Mechanism (explains arch function in static positions, when the arch is able to deform without resistance). Our mutual interest at the time was ski

boot fitting and he introduced me to the gait cycle and how he used it to help formulate the perfect orthotic for ski boots and running shoes.

As he shared his theories and experience, I was able to structure my own thinking and explain to him what the whole body is doing at any particular moment in the gait cycle. This is how I came to document the movement patterns that occur in the whole body at each of his four key stages in the gait cycle. I then went a step further to document a fifth grounded phase and two swing phases before completing the model with an additional five phases that were taking place between the seven. This comprehensive twelve phase analysis is **AiM's central Flow Motion Model™**.

I thought I knew my biomechanics of human movement before I built the model and yet the act of doing so opened my eyes to a world of undiscussed information and perhaps some falsehoods as well. The world of closed chain biomechanics (analysis when weight bearing) is very different to the open chain biomechanics (examination when non weight bearing) that the majority of us are being taught. For me, it began to break the mould of traditional anatomical thinking.

To give an example, let us think about general rehab for a sprained ankle. What's the advice? The front page of a google search simply states "Rest, Ice, Compress, Elevate" (other than recommendations to visit a local podiatrist of course!). However, it's more than likely that a sprained ankle will have involved some structural damage to the area, which will then continue to prevent the affected joints from moving in the way they once could. If so, this is likely to have a natural knock-on effect up the kinetic chain and appropriate rehab needs to address this.

If it doesn't, you may find years down the line that the ankle sprainee visits your clinic with knee and low back pain. It's unlikely you would take the, by now, age old ankle sprain into account (the patient may even have forgotten about it by then) and yet it could hold the key to everything.

So how would AiM help? If following an ankle sprain you can no longer pronate your foot very well, the limitations in movement will lead to a consequential effect throughout the leg all the way up into the pelvis and onto the spinal column as well. As a result, the body can become very one sided, leading to physical discomforts across the body and a string of potential clues to lead you to the underlying issue, even if the restriction in the foot is not immediately obvious.



Fundamentally, the body organises itself in a particular way when it is moving and if part of that movement is taken away or restricted then a whole range of movement opportunities for that person are also taken away from them.

I have long seen my role as an AiM practitioner being:

- 1) To uncover what movements are lacking in the system
- 2) To determine what the knock-on effect has been to surrounding structures using the links established in the Flow Motion Model and
- 3) To then restore those movements to reflect the natural movements we see in the gait cycle through specific AiM exercises.

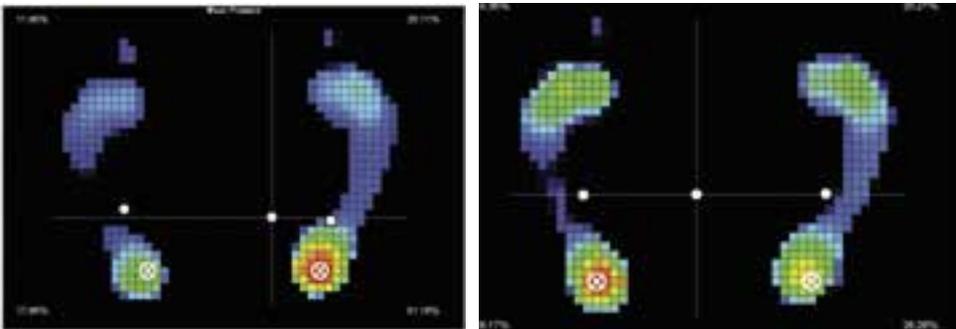
So, when the foot is flat on the floor we know:

- What we would like the foot bones to be doing
- What the ankle, knee and leg should be doing
- How the pelvis would respond
- What its impact on the spinal column would be
- and how that would affect the shoulder girdle, cervical spine and carriage of the skull.

The model therefore describes one whole body shape per gait phase that we should all be able to achieve in that moment.

A great question then to check is whether or not our body is capable of achieving that shape? And are we in balance i.e. does our body access the equal and opposite

shape when the other foot is on the ground? If you consistently access a phase differently on your left foot to your right foot then this will have far reaching consequences for your whole body. They may not be noticed today but could be predicted, once you have identified the restriction.



Before AiM treatment, left, & after AiM treatment, right. Pressure is more balanced especially in the left heel.

What does the Flow Motion Model tell us?

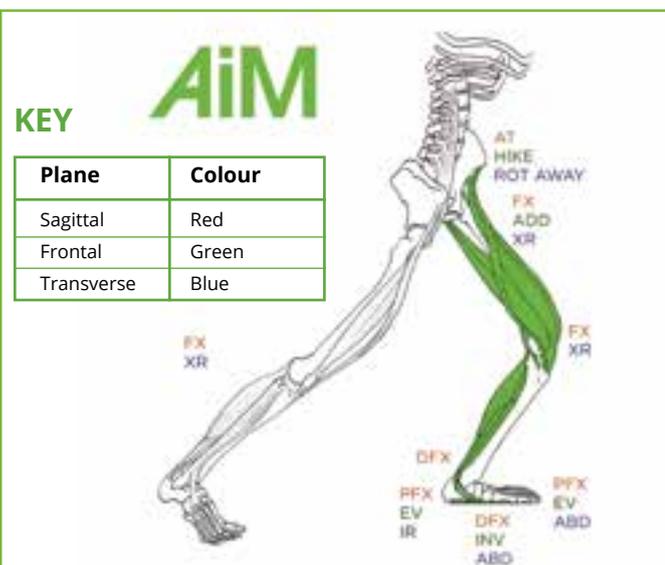
The Flow Motion model takes a snapshot of the gait cycle, call it a phase, and details each and every joint motion and direction of bone motion that should be taking place simultaneously throughout the whole body. By breaking this down into each plane of motion at each joint we obtain a very detailed and informative 'photograph' of that moment in the cycle.

As an example, a pronated leg is likely to incorporate a flexed knee, push a pelvis away in both the frontal and transverse planes while creating a greater amount of anterior tilt in the same side ilium. The Flow Motion Model allows us to predict that this will naturally contribute to changes in the spinal column such as lumbar extension and counter rotation to the pelvis and call the opposite shoulder to internally rotate. If you are capable of accessing this equally on both sides you will notice that you are free to move your pelvis, spine and shoulder girdle in both directions in all planes of motion. Balance and freedom in the body achieved

A race against time

A single footstep lasts between 0.6 and 0.8 seconds, this is not a lot of time for a lot of movement to take place. Yet we know that in a single footstep, each and every bone and joint must travel toward both ends of its movement potential (e.g. flexion and extension) and in all three dimensions at least once.

So, if you over rotate something in one direction, the chance of mirroring this in the other direction within such a small window of time is virtually impossible. Thus, excess movement in one direction is always balanced by lack of movement in another.



For example, if one foot pronates more than the other then this affects the timing of the movement through the other phases of the gait cycle. This in turn changes the movement possibilities at the different structures as we go up the chain. It's likely for instance that the pelvis rotates more in one direction than the other direction (away from the pronating foot) and may as a result be experiencing lower back discomfort. Whilst they might first notice the back pain, AiM tells us that they really need to pay attention to their feet.

This is just an example of the type of whole body insight that can come from observing the body in motion and studying the Flow Motion Model. It's the subtle changes in joint alignment as the whole body compensates for small changes that can highlight where the real need for treatment lies.



For a full understanding of the process including a treatment example visit <https://www.youtube.com/watch?v=EBHCvy9PHnc>

AiM's key rules

We have some key rules underpinning AiM, the first two of which oppose conventional wisdom.

Muscles lengthen before they contract

This rule states that, in motion, muscles lengthen before they contract. Muscles lengthen to decelerate the opening of a joint in a bid to protect it from excess. It is from this lengthened position that the muscle then begins to contract and bring the joint back towards its midline and beyond. As it approaches the opposite end range, the opposite set of muscles will now become responsible for decelerating this new dimension of motion.

In motion, think about the glutes decelerating hip flexion while the psoas decelerates the extension. Together they work as a team to achieve that outcome. You will also find that more than one muscle is involved in the deceleration of any joint motion even if they are not known for that

particular motion. For instance, your adductors are perfectly set up to join in and decelerate hip extension too.

Joints ACT: Muscles React

This rule states that, in motion, joints act but muscles react. As a result, it is the quality of joint motion that determines the effectiveness of the muscle. For instance, if your hip doesn't flex very well, it will fail to create a decelerative demand on the glute muscle and the contraction response will be negligible. Working that glute harder and harder into extension is unlikely to have the desired goal as the act of glute contraction fails to teach the hip to flex. Educating the hip to flex, then, which is simply part of a whole-body motion, coupled with foot pronation, is what will eventually remind the glute of its responsibilities around that hip.

Joints give muscles something to do

Joints give muscles something to do... it's a key term I have lived by for years and is highly impactful. Now consider all of the joints in the human foot. How likely is it that they are capable of accessing all of their movement potential and creating an opportunity for those foot muscles to get back on board? Observing the feet in the closed chain, when the foot is on the ground and the body is moving above it, as well as in the open chain whilst sat on your podiatry chair brings about a whole different level of appreciation for what the foot has to undergo in every step that it takes.

Next time...

I'll be discussing more specific information on this approach for the feet in the next issue but some key takeaways worth considering beforehand is that the majority of the muscles in the foot are supinator muscles. Given that muscles must lengthen before they contract in motion, it makes sense that we must pronate the foot to give these muscles their best opportunity for a supinatory contraction.

To create the perfect environment for a foot pronation to take place we must teach the bones of the foot to move into the optimal position of pronation. This will kickstart the muscles of supination and these muscles will contract against the movement to initiate a shortening from their lengthened state. This decelerates the motion of pronation. Remember that the better a foot is at moving from a pronated foot shape to a supinated foot shape the more likely the foot will become more centred in its resting state.

Allied to these two key rules are a set of wider (but fundamental) observations:

- A joint rests centred only when it can access both end ranges of its anatomical structure
- A hip that can flex but not extend will rest flexed
- A foot that pronates but cannot supinate, will rest pronated
- Only when a joint is centred at rest, can it have no tension or compression placed upon the structure
- As soon as movement away from its resting centre is experienced, joint closure and joint opening takes place which knocks on to shortening and lengthening the surrounding tissues
- Resting in non-centred spaces, leads to compromised joint and muscle function
- Naturally the further away from centre you rest, the greater the risk to the structures.

As you can see, it's potentially a different way of thinking about biomechanics and gait and it's apparent in all movement – even something as simple as a squat. Lowering into a deep squat demands a deceleration from the glute muscles as they move into a lengthened position. They then contract back as you return to a standing (rest) position.

In summary

So, to summarise what we have been talking about, AiM provides an alternative approach to biomechanics based on what the joints of the human body do and when they do it during the gait cycle.

Some of its key elements are:

- 1 **Flow Motion Model** – 12 detailed phases of joint mechanics through the gait cycle
- 2 **Joint surface anatomy** determines the movement possibilities from one bone to the next resulting in a clear explanation of one structure communicating movement to the next
- 3 **Muscles lengthen** before they contract – muscles contract fully from a lengthened position and as such serve to decelerate eccentrically structures as they move away from centre
- 4 **Joints ACT: Muscles REACT** – the ability for a joint to move optimally is what optimises muscle function (not the other way around)
- 5 **Re-educating joints** to move well and in sequenced movement patterns enables a person to reorganise their own structure and move through problems they may have been stuck in for years.

When we apply these ideas to the human body, we can use the Flow Motion Model to help us understand the global movement patterns that a person is unable to access (or accessing too much) that is causing their problem. This allows us to identify a restricted gait phase and we can then use that phase to guide us to specific joint interplay that is problematic in the system. Finally, we can use human movement (in the form of specific AiM exercises) to restore or re-educate the lost patterns so that the person can reorganise their system to take pressure off the joints and soft tissue that was flashing the alarm bells of concern. We will explore some of these exercises further in my future articles.

Ultimately, a deeper understanding of biomechanics opens up a new perspective that can help practitioners from all branches of the healthcare industry, including podiatrists who wish to venture beyond podiatry.

AiM is a specialist therapy and individuals should undertake and qualify in the course before any treatment commences.

About Gary Ward

Gary Ward is the founder of Anatomy in Motion and creator of the Flow Motion Model. As well as treating patients directly, including a



number of professional athletes, he has been teaching AiM for the past fifteen years, to bodyworkers from all areas of the industry in all corners of the world.

Through mapping AiM's Flow Motion Model he has given hundreds of practitioners and thousands of patients the opportunity to better understand the cause of their problems and to overcome them using three-dimensional movement to restore any lost or forgotten movement patterns.

Gary has written a book all about the AiM philosophy entitled *'What the Foot?'* and has contributed to a number of other books and articles on the subject. In 2016, he took part in an episode of 'Doctor in the House' for the BBC assisting his friend Dr Rangan Chatterjee.

For more information and to undertake either a lower limb or upper body courses, see website: www.findingcentre.co.uk instagram: GaryWard_AiM