Whole body integration using The Flow Motion Model™

By Gary Ward
Founder of
Anatomy in Motion

Introduction

Our previous articles discussed the AiM rules, philosophy and an interpretation of the human foot in motion and in closed chain biomechanical terms. This article will explore how the foot is much more than just a foundation in the gait cycle – it can also provide us with clues to restrictions elsewhere in the body.

As a quick recap, AiM's philosophy sets out that:

- Joints act: muscles react
- Muscles lengthen before they contract and
- The body moves around its perceived centre.

AiM's Flow Motion ModelTM is a description of the journey taken by every single bone and joint in the human body through a single footstep taking into account all 3 planes of motion (the sagittal, frontal and transverse planes) in closed chain biomechanics (weight bearing). It is observed that an inability to access its three dimensional movement potential creates an environment for dysfunction and symptoms to arise.

By observing the foot and its movement through the gait cycle, the response in the rest of the body through the kinetic chain can be determined. This article will discuss how the Flow Motion Model™can identify:

a) which movement in the body and foot is not occurring and

b) provide whole body movement exercises to re-educate the body to move more efficiently through improved joint motion.

This will allow the patient to access the positions outlined in the model (for simplicity's sake we will focus on a frontal plane element of the model).

The Flow Motion Model™

The gait phases:

STRIKE - Initial contact

SUSPENSION - Foot flat

TRANSITION - Mid-stance

SHIFT - Early heel rise

PROPULSION - Toe off (almost)

As described in Article One, the Flow Motion Model™is broken down into phases. Each phase represents a snapshot in time in the gait cycle and describes the position that the whole body adopts at each of these key moments. The model has identified 8 postural shapes that the body adopts through the five phases in order to minimise stress and strains on the joints and the surrounding tissue. To be in a position to access each phase of the model, your body needs to be capable of accessing all joint ranges in all three planes of motion.

This is a highly unlikely scenario for the vast majority of people. When tasked with simple movement or exercise drills, the majority will favour one joint range over another. This naturally shows up in their gait cycle.

For example:

- The person may prefer to laterally flex their spine left
- Perhaps the quality of spinal lateral flexion is better to the left or
- It hurts when they laterally flex right
- Either way if they favour left lateral flexion, they will avoid or struggle to access the movement to the right.

Let's explore in greater detail a scenario of a patient who **can access more lateral flexion of the spine to the left** and is experiencing strain in the left lower back . The AiM Flow Motion Model will demonstrate how to guide the patient into **reintegrating the reduced right lateral flexion** and reduce the stresses being placed on the back. The model predicts the impact on the joints and structures occurring throughout the kinetic chain in these whole body positions.

Scenario: Patient with limited lateral flexion

Symptom:

Patient attends the clinic predominately complaining of left lower back pain, some left achilles pain and right side groin/ psoas pain. They may have a history of experiencing right medial knee pain or right ankle sprain in the past (which lead to them to lead predominantly with their left foot)

Observation of the patient:

- predominantly laterally flexes to the left.
- experiences persistent closure of the vertebrae on the left hand side of the vertebral column
- persistent opening of the vertebrae on the right.

This creates a habitual shortening of the tissues and a compression between the joints on the left and a lengthening of the tissues and a gapping of the joints on the right.

People can both experience **tension based symptoms** or **compression based symptoms** on either side of the spine. In this scenario, it can be observed that where the tissues are short and the joints are compressed, the patient is experiencing compression based discomfort on the left side of their lower back.

In order to relieve pressure on the system, the patient needs to be taught how to laterally flex their spine to the right, open the closed joints on the left and encourage those tissues to come out of their persistent shortened state.

How do we do this?

Step 1 : Observation of patient's posture in ourselves:

Before discussing solutions to this patient's presentation, it is important that we can experience the patient's position for ourselves. This is so we can feel the tissue tensions and pressures on certain joints. We will also be able to experience what moves more freely and what feels restricted. This can help us, as clinicians, understand our patient's symptoms better. Try this at home by following a few simple options to check anyone's capacity to access this particular shape.

Firstly, stand in a split stance with one foot forward, no more than a stride's length apart and bend your knee on your front foot - compare your left with your right:

Check in with yourself	Observational Comments
Is there a natural difference in comfort or ability to be in this position?	
Is the pressure under your front foot the same on both sides?	
Is it easier to commit forwards toward one foot more so than the other?	
Is it easier to commit sideways toward one foot more so than the other?	

Now stand with feet hip width apart:

Check in with yourself	Observational Comments
Bend one knee keeping the other knee straight, your hip should hike up (laterally tilt) on the straight leg side. Which side feels easier to do this?	
Keeping the knees soft, can you laterally flex your spine evenly to the left and right?	
Or do you favour one side?	
Can you laterally flex your neck left and right evenly? Or do you favour one side?	

It's likely that the side you find easier to commit to, both forwards and sideways is the same as the side on which you are more comfortable hiking the pelvis up (and adducting the hip). The foot on this side will likely be the more pronated. This could well be the side you laterally flex more easily towards, thus compressing that side of the lower back and increasing tension in the opposite side lower back tissues. Spending a prolonged amount of time in this position could lead to the tension in the tissues or the compression in the joints becoming problematic as they rarely have the experience of shortening from their lengthened position or decompressing via oppositional movements. With this in mind, what muscles do you feel working when you do your personal check in?

Observation of our patient

It's clear that a right lateral flexion is necessary for this particular client. In the Flow Motion model, right lateral flexion occurs when the foot is flat on the ground and pronating.

Could how well the foot pronates predetermine how well the spine can move? Or is the limited lateral flexion affecting the foot's potential? The interconnectedness of the body suggests it could be either. To create a foundation for the right lateral flexion, the right foot must be capable of accessing a tripod stance position (1st and 5th met heads and heel on the ground), as discussed in article 2, in order to achieve a good foot pronation.

This creates the environment for a pronating leg.

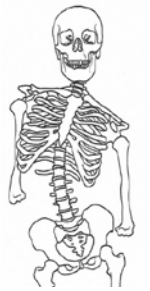
Foot pronation should occur in gait when the foot is in front of us in the stride.

Foot supination should occur as the foot passes beneath us and behind us.

A pronating leg incorporates:

- a flexed valgus knee
- an internally rotating femur which creates the environment for
- an anterior tilting pelvis
- a hiked (Laterally tilted) pelvis on the same side as the pronating foot and
- a pelvis that is rotating away from the pronating foot

All while making sure that the skull keeps its eyes on the horizon to keep us balanced when upright.



When a pelvis is hiking up on the same side as the pronating foot, the hip must be adducting. The angle of the pelvis establishes a foundation for the spine that is no longer level. In order for it to maintain the eyes on the horizon at the skull level, it must laterally flex back towards the skull, in the direction of the pronating foot.

In the absence of a right lateral flexion in the spine:

- the hike of the pelvis would be compromised on the right side of the body
- right hip adduction will be limited
- the Centre of Mass (COM) will be drawn towards the left due to the left hip adduction
- weight bearing increases on the more pronated foot.
- the patient is established in a dominant left weight bearing versus right weight bearing pattern.

Could this global position explain my patient's symptoms?

- ***Greater weight bearing on the left foot = larger amounts of ankle dorsiflexion and increased tension in the achilles***
- ***Perpetual abduction in the right hip due to the weight bearing increases tension in the TFL/ITB & persistent left hip hike pulls tension into the right adductor muscle***
- ***The pelvic hike creates an environment for a left laterally flexing spine which adds a compression into the left low back area.***

As a result, this person is spending more time on their left foot than their right. The dominant left lateral flexion means the body struggles to get back to the right. This causes a lack of right foot pronation as well as right pelvic hike and right hip adduction. All of these things can be construed as ***"missing"*** in the habitual and unconscious way of walking for this person.

Step 2: Find what's missing?

Movement, walking, is a learnt and habitual behaviour. People only access movements they can access and avoid those they cannot. Our goal is simply to restore motion that is missing using movement, specifically movement highlighted by the Flow Motion Model and deemed as necessary for key moments in the gait cycle.

A foot that does not follow the guidelines for a good foot pronation could be considered as ***'missing'.*** Rather than focus on eliminating pronation or indeed strengthening this foot with supination exercises, the foot needs to be taught how to pronate correctly. AiM teaches the bones how to experience the movement of pronation. This was covered in the previous article.

The specific focus may not be the foot, but could be the pelvis or the spine, the movements of which are equally 'missing' and yet may be influencing the foot. We look for the cause in the system. If the spine is influencing the foot instead of the other way around, our focus would be placed on the spine. Improvements in spinal motion will then give permission to other parts of the body to function better. AiM then uses the whole body position to integrate the movements of the missing parts, in this case, foot, pelvis and spine. All of the integrated motions work together in some way to create efficient movement. The model highlights these patterns to us at each stage of the footstep.

Step 3: How would we use the Flow Motion Model to address such a case?

In the Flow Motion model, foot pronation occurs in the Suspension phase of gait. It is the one chance we have in the cycle to generate a healthy pronation. In suspension phase, it allows the body to eccentrically load (lengthen) the supinator muscles of the foot. These are then responsible for contracting our foot into a supination shape. It gives the foot the potential to contract, shorten into a rigid lever and power us forwards into the next footstep. Feet that continue to pronate beyond Suspension phase are taking too long to eccentrically load up these extensors and generate a sub-optimal forward propulsion. This causes us to flex at the hip and drag our leg forward rather than experience an effortless propulsion push off moment.

Suspension phase (Frontal Plane)

The frontal plane in Suspension phase must follow these rules:

- Weight bearing in the front foot with COM sitting on top of the foot.
- Foot pronates, tripod stance
- valgus knee
- adducted hip
- hiked pelvis
- spine laterally flexes towards front foot
- the cervical spine laterally flexes away from front foot (to keep the eyes on the horizon)
- Pelvis, ribcage and skull in line (on axis)

Notice that this whole body position is compromised if any of the following is challenging:

- Hip adduction
- Foot pronation
- Lateral flexion of the cervical spine to the right

An inability to access any of the joint motions required for this moment in time would compromise the phase.

From our observation it appears that our client is stuck in left Suspension phase and struggles to get out of this position to access the right Suspension phase. In order to get out of this position, the muscles must be able to contract from their lengthened position. This means they have to improve their ability to access left Suspension.

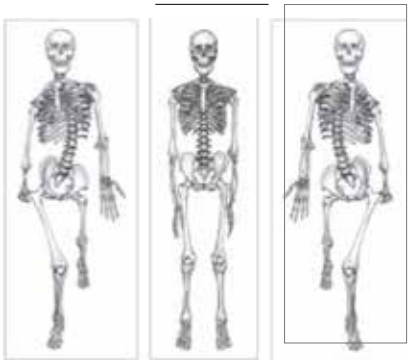
Suspension phase muscle loading:
Foot pronation loads the supinators
Valgus knee loads knee extension
Hip adduction loads the abductors
Hip flexion / Anterior tilt loads the hip extensors

As the foot pronates better on its tripod and the body begins to move more easily into the position of Suspension phase. It will begin to newly eccentrically load the extensor chain and develop the capacity to start to move its mass out of the left foot and across to the right foot.

Then to access the opposite position, right foot forward, the joints must now become capable of accessing the opposite motions. The patient's body must be taught how to access right suspension phase correctly.

Flip the image around and notice the skeleton is accessing its right foot forward shape in Suspension phase. We already know that this person cannot right laterally flex their spine nor hike the pelvis on the right. There is a good chance the rest of the joint motions you see are also challenging. We can now use this global position to re-educate the body to access joint motions it has not been able to for a long time. Teaching a hip to hike on a pronating foot with a spinal column that is laterally flexing toward it, introduces the person and their brain to a whole new position in space.

Ultimately this teaches the closed joints on the left to open, the abducted right hip to adduct and the foot that avoids weight bearing to bear weight, thus taking pressure off the left achilles, right adductor and left lower back.



Somewhere in between these two moments in time (right and left suspension) is the moment we should meet a neutral posture in all three planes in our gait cycle. This moment is close to mid stance as the non-stance leg is swinging through the midline in the sagittal plane.

If the whole body shape is unable to equally access the shape when each foot is weight bearing, the neutral shape can not be achieved when required in mid-stance. Instead, it can be observed that a person laterally flexes left when the left foot is forward and be neutral (or upright-ish) when the right foot is forward. This is a gait with limited movement and altered timings. In order to be able to access both of these shapes, a person must be able to move all of their joints in all directions and in each plane.

Failure to be able to do that leads to:

- an imbalance in any of the structures in the body,
- the aggregate outcome of which is to favour one side of your gait cycle more than the other
- directly affect the potential for foot function.

To be able to hike their pelvis on both sides, a person must have the capacity to both pronate their foot as the pelvis hikes; and supinate their foot as the pelvis drops. The model shows us that when the left leg is in Suspension phase, the right leg is in Propulsion phase, powering us forwards into our next step. Suspension phase is when the foot pronates as a mobile adaptor. Propulsion phase is when the foot should achieve its rigid lever. These two extremes of movement in the feet must occur at the exact same moment in time, one on the left and one on the right. One feeds the other. And in the absence of being able to achieve one, you compromise the ability to access the other and thus compromise the whole moment in time.

The realisation is that people need to be taught to access both pronation and supination movements in their feet. Foot pronation becomes harder the more pronated (e.g no tripod load) we are and a rigid lever becomes all but impossible for a foot that is beginning the foot step in an overly pronated position.

By paying attention to the feet, you have the opportunity to set the foundations for efficient and effortless movement throughout the whole body. Here AiM wedges are utilised to promote the movements of foot pronation.

Step 4: AiM wedges

AiM wedges are foam wedges designed with specific degree angles to encourage directional movement in the bones of the feet. They are used in movement to guide the foot to experience its 'missing' movements. The goal is to influence movement in the foot using a wedge and then make use of the movement when walking without the presence of the wedge.

They can be placed medial, lateral or posterior to the rearfoot and medial, lateral or anterior to the forefoot in order to encourage the motions in the foot bones that were discussed in article 2, for instance position a wedge lateral to the rearfoot to promote eversion and generate a directional movement.

A wedge can also fill space between where the tripod is not in contact with the ground, thus bringing the ground up to meet the met head. For instance a patient might find themselves with more weight in the big toe on the left foot and more lateral border on the right foot.

If we used a wedge to support the 5th met head on the left and the first met head on the right, this would even out the tripod and create more opportunity to access the whole body movement. Just standing on these wedges alone may even improve the pelvic hike and/ or the lateral flexion of the spine in a bilateral stance.

Once the base has been set and is able to access more of the pronation movement, we can build the frontal plane shape into the body. This includes:

- knee flexion
- pelvic hike
- ensure mass on top of the foot
- lateral flexion of the spine toward the newly pronating foot
- keep eyes on the horizon- to manage the cervical structures of the spine.

Joint Motion gives muscle something to do

In the absence of joint motion, muscles have less and less to do. As we promote a higher quality of joint motion, the body can begin to place more and more demand on the surrounding soft tissues, including muscle, tendon and ligament. The closer the body is able to access these global movement postures:

- the more balanced the joint system will be
- the more active the muscle system is
- the more organised the position and potential of the whole body.

This creates an opportunity for an efficient, effortless and energy conserving movement known as Flow.

Conclusion

Working with the Flow Motion Model gives a great insight into what factors may be causing the problems your patient is asking you to work with. In the patient example above, a complaint of lower back and groin pain is less about treating the symptoms and more about getting weight out of the left foot and into the right foot. Adding a system based approach to our symptom-lead thinking widens our toolbox and greater possibility of finding solutions for our patients, and in ourselves too.

If you have enjoyed this series of articles on Anatomy in Motion and Gary Ward's Flow Motion Model and you would like to learn more along these lines, you can find out more about his online programmes and live classrooms on the website **www.findingcentre.co.uk.** A great place to start is his book **What The Foot?,** videos on **You Tube** and follow Gary on instagram **@GaryWard_aim** or **www.facebook.com/anatomyinmotion** to see his perspective on bunions and all things whole body movement.