

Movement patterns are the product of strength and skill/comprehension.

Muscles produce movement so the quality of any movement is a function of muscle action. Muscles are, in turn, programmed by the nervous system so skill is also a significant factor.

Movement patterns involve chains of muscles acting in sequence. Large mover muscles cross joints to move the position of one segment relative to another. Around the joints there are deep stabiliser muscles that act to hold the joints and segments in effective positions. As the name implies, the stability provided by the smaller deeper layer of muscles determines the efficiency of the overall pattern and the level at which the bigger muscles are capable of functioning. The more stable the joints, the more powerful the movement.

Ground-based movements, like running, are especially subject to the strength of stabiliser muscles because of the large ground-reaction forces. Ground reaction force is equal in magnitude and opposite in direction to the force applied to the ground; that is the forces produced by the legs. The ground reaction force flows up the body across the joints – ankles, knees, hips/pelvis, and spine. Where joints are stable and strong a high percentage of the ground reaction force can be translated into the propulsion of the body. Weak joints on the other hand cause a loss of that energy and mechanical inefficiency.

The human body is a very clever and sensitive machine and forces that are too high to be safe are highly unlikely to be produced. Weak joints and muscles, therefore, result in two problems for movement: 1) inefficient and weak movements, and 2) a poor stimulus for improvement.

In young bodies weak muscles and inefficient movements create a long-term problem. Muscles strengthen and grow as a function of load. When our bodies are very young – just a few months old – we begin moving and this is the start of the process that stimulates muscle strengthening and growth:

**The movement efficiency cycle:**

*STRONG MUSCLES = EFFICIENT MOVEMENT = A GREATER STIMULUS FOR MUSCLE  
STRENGTHENING/GROWTH*




Anything that decouples this relationship has the potential to interfere with the development of movement patterns. Problems may be intrinsic to the body, such as very long levers (i.e. very tall or lean bodies) or overweight, or the result of extrinsic influences such as sedentary behavior. Once a pattern has become inefficient it tends to stay that way due to negative reinforcement. On top of this children tend not to involve themselves in things they perceive themselves to be bad at. They choose not to try rather than appear weak. Muscles remain weak because they are not stimulated to change through exercise behavior or by an efficient movement process.

Improving movement patterns such as running gait involves recoupling the efficiency cycle:

1. Identify and strengthen weak muscles, particularly the joint stabilisers
2. Retrain movement skills to be stable, balanced, and rhythmical
3. Practice and reinforce efficient movement *often*

## Why does my child run that way?

### *RELATED READING:*

-  *Quick movement*
-  *The Sport Performance Method*
-  *Calf raises & skipping for speed*

These and other resources are available free to use at:

<http://sportperformance.co.nz/resources.html>