



Our modern high tech lifestyles are gradually weakening the axial strength of our spines resulting in lower back, spinal, shoulder and hip pain to name just a few of the health and performance implications.

Modern lifestyles, occupations and sports training methods which involve minimal weight bearing loads and poor postures are causing severe muscle imbalances which are leading to a plethora of musculoskeletal injuries. Indeed bone health is deteriorating in both sedentary and active people.

It would appear that muscles in the body are getting tighter and tighter with the development of painful trigger points. These tight muscles require constant stretching and massage but this offers only temporary relief, eventually the tight muscles tear.

When twisting the body in an upright position (whole body axial rotation as seen in the game of golf where high axial compressive loading is combined with high torsional forces) joint injury to the structures of the spine and other peripheral weight bearing joints of the limbs is a real threat.

Perhaps one of the reasons that we are seeing elevated injury instances is due to the fact that we are no longer working efficiently against gravity.

Many live sedentary lifestyles where we sit watching TV, at computers and at work. Robots and technology do a lot of our manual work. We always wear shoes on flat hard surfaces, we avoid soft uneven, sloping surfaces.

Even the active are developing severe muscle imbalances and asymmetries from focusing on cardio fitness only eg swimming and

riding bicycles which do not provide gravity sensory information. Further repeated practice of fast open chain movements seen in so many sports add to this pandemic.

THE 'TWO' MUSCLE GROUPS

You could look at the body as having two functionally different muscle groups which carry out differing roles.

Firstly we have the 'anti-gravity' muscles (tonic muscles) which hold and support the joints against gravity. These mainly lie deep in the body, controlling one joint, are directly related to the strength of bones and good posture and they weaken easily. There are two types of anti-gravity muscles that work functionally together, these are anti-gravity postural muscles and anti-gravity torque producing muscles.

Secondly we have the 'movement' muscles (phasic muscles) responsible for moving the body. These are more superficial muscles related to high speed movement. They span over several joints for efficient whole body movement. These muscles become tight from overuse and are related to 'poor' posture.

Examples of the deep, tonic or postural muscles are muscles such as neck extensors, deep neck flexors, serratus anterior, upper/lower/mid trapezius, subscapularis, tricep, multifidus, lumbar extensors, deep transverses abdominals.

Examples of the phasic movement muscles are levator scapulae, scalenes, rhomboids, pec minor, latissimus dorsi, hamstrings, tensor fascia lata, rectus femoris, external obliques, thoracic erector spinae, long head bicep, psoas.

THE PROBLEM

In modern times people are not sufficiently maintaining their anti-gravity muscles (AGM).

This lack of anti-gravity muscle activity and lack of gravity sensory information triggers a loss of the crucial tone and stabilizing capacity of the AGM. If these are not trained the large superficial movement muscles of the trunk (ie. Flexors – external obliques and extensors – long thoracic erector spinae, and the latissimus dorsi, pecs, hamstrings, rectus formoris, psoas, adductor longus) will undesirably increase tone and co-contract as they attempt to compensate for the AGM in a vain endeavour to rigidly hold the spine upright and preserve some basic alignment of the pelvis and shoulder blade. The movement muscles paradoxically attempt to protect joints yet no individual joint support is offered by these tight muscles as the movement muscles attempt to hold the body in position. This process ultimately creates muscle imbalance.

Further to muscle imbalance other issues include loss of bone density, problems with intervertebral discs, joint instability.

The issue is that these movement muscles are not designed to hold the body and will tighten as a result. When these tight muscles (that are trying to hold the spine and limb joints in place) are asked to then move tears and injury will result.

The tightening of these movement muscles and the change in the musculoskeletal structure as a result diminishes ones ability to move efficiently.

It is key to note that the superficial movement muscles **NEVER** fatigue or give up unless they tear or the insertions become inflamed and painful. This is where the vicious cycle begins. The movement muscles continue to pull the spine into a poor position and weaken the anti-gravity muscle system.

With the large superficial movement muscles of the trunk dominating trunk stability, it is difficult to re-activate and develop control/tone in the fragile deep anti-gravity system.

Further issues created by this imbalance:

- The spinal structures, the girdles and proximal joints of the limbs are left unprotected.
- There is a loss of function of the movement muscles in their natural role in phasic (stretch shortening) functional movement.
- The spine becomes less flexible
- There is a loss of bone density

A TRULY EFFECTIVE FITNESS REGIME

In any truly effective fitness program attention must firstly be paid to developing proximal stability. This is done by increasing postural muscle tone to a level where the individual curves of the spine are held as well as developing the connections of the shoulder and pelvic girdles.

When activating the anti-gravity muscles exercise must initially be done at 30% maximum voluntary contraction.

Increased activation of the anti-gravity muscles is gained through increasing 'gravity sensory information' which is achieved during exercise that provides axial compression force (load) directly through the length of the limb. These exercises are known as 'closed chain' exercises. An example is a squat, leg press, lunging with weights or press ups, which is a weight bearing exercise where the distal end of the limb (hand, foot ect) is fixed on an unmoving surface. Closed chain exercise can also be achieved through using elastic resistance bands passing around or attached to the distal end of the limb.

'Open chain' non-weight bearing exercise that provides axial joint distraction where the limbs are moving freely on the trunk should be avoided.

Activation of the anti-gravity muscles can reach higher levels by accelerating/decelerating the body weight by slow moving exercise whilst statically holding the trunk. An exercise such as a walking lunge would demonstrate this.

Another form to increase GSI is by accelerating body weight in different directions quickly with holding the trunk statically. An example would be stomping quickly from side to side.

An effective golf fitness program should:

- Firstly developing proximal stability
- Develop the deep anti-gravity muscles
- Develop a strong and stable yet flexible spine
- Increase bone density
- Allow the two muscle systems to do 'their' job
- Create function of the movement muscles in their natural role in phasic (stretch shortening) functional movement.

HOW TO BREAK THE VICIOUS CYCLE OF MUSCLE IMBALANCE

Gravity Fit exercise tools and the Ramsay McMaster posture belt combined with their workouts aim to reactivate the deep anti-gravity muscle system; namely the trunk, limb connections and spine, the goal being to produce a stable but flexible spine.

GravityFit is the only system of exercise that specifically targets and strengthens the deep muscles that support your body – the Anti-Gravity muscles.

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Strong Anti-Gravity muscles

- protect you from injury..
- allow better movement..



- build power foundation..



The McMaster posture belt is used to target the deep postural muscles.

Closed chain exercise can be achieved through using the posture belt which utilises elastic resistance bands passing around or attached to the distal end of the limb.

SWITCH ON TO SWITCH OFF!!

Legendary golf physiotherapist Ramsay McMaster advocated that one must 'switch on to switch off'.

What he was eluding, and his focus was on, the deep postural muscles and developing proximal stability. Ramsay hypothesised that one must have postural muscle tone to a level where the individual curves of the spine are held as well as developing the connections of the shoulder and pelvic girdles if they were to see any improvement in the function of the movement muscle system.

As we have already discussed the superficial movement muscles **NEVER** fatigue or give up unless they tear or the insertions become inflamed and painful. The large superficial movement muscles of the trunk will continue to dominate trunk stability unless we firstly re-activate and develop control/tone in the fragile deep anti-gravity system.

This brings into question exponents of stretching and massaging tight muscles continuously as part of a workout regime. It could be argued that this is a futile exercise as without first 'switching on' the postural network the large superficial movement muscles will continue in their attempt to 'hold' the body in position.