

Trainers should take the individual's muscle imbalance into account when prescribing training

personal problems

report: Dax Moy

In the current era of 'functional' training, core stability and balance-oriented training, it's easy to get carried away with learning the 'how' of exercise: how to balance on a stability ball; how to integrate movement patterns and how to devise exercise programmes that have a high transfer into 'real life' situations. After all, these are fun elements that demonstrate a greater application of knowledge, skills and abilities to our clients. Or do they?

Interestingly, when asked, many of my students (all qualified personal trainers and therapists) had little real foundational knowledge of what makes their exercises 'functional' beyond the fact that they have a carryover into real life. I call this a 'lack of why'.

This lack of 'why' is a disease of almost epidemic proportions within our industry and one which, in my opinion, will keep us from ever reaching professional status if left unchecked.

Simply put, too many fitness instructors are prescribing exercise based upon the latest trends, personal preferences and outright exercise mythology. This is like visiting your doctor and being prescribed medicine on the basis of 'it works for me so let's give it a go!' I'm sure you wouldn't be too impressed if this happened to you, so what about your



clients? What kind of 'professional' service are they receiving?

The aim of this series is to provide you with the 'why' necessary to make your exercise prescription much

more than a hit and miss process and plant your feet firmly on the road to professionalism. We start our journey with posture, the foundation from which our function, and ultimately all personal training, is built.

what is posture?

As far back as 1947, the American Academy of Orthopaedic Surgeons posture committee defined posture as: 'That state of muscular and skeletal balance which protects the supporting structures of the body against injury or progressive deformity, irrespective of the attitude in which these structures are working or resting. Under such conditions the muscles will function most efficiently...'¹

The key to the above statement is balance, for it is balance or its antagonist imbalance that appears to be one of the major influences in creating structural deformation resulting in pain.¹⁻⁴ Indeed there is much evidence to suggest that chronic imbalance can result in Postural Distortion Patterns that can proliferate the cumulative injury cycle.²⁻⁵ This appears to make sense, especially if the kinetic chain concept is applied to the equation.

The kinetic chain is best described as a movement system consisting of myofascial (muscular), articular (joints) and neural (motor) components with each being dependent on the others for optimum performance, both statically and dynamically.⁴ This movement system requires precision of movement based on the alignment and mechanics of each joint as well as how these joints are

recruited to create a movement pattern. In simple terms, the movement produced at any joint in the kinetic chain directly affects the joints above and below it, therefore dysfunction in any one of these systems may have direct and detrimental effect on the function of its neighbours.⁵ (figure 1)

Clearly then, there is much to concern ourselves with when prescribing exercise and stretching programmes to our clients, as every programming decision we make will affect the systems of the kinetic chain. This is obvious of course, but have you ever stopped to think of it in this way before? Suddenly understanding the 'why' becomes much more important doesn't it?

ideal imbalance

Firstly, we are all imbalanced to some degree, even if our posture is considered optimal. This is because there is actually an inbuilt ideal imbalance^{6,7} between the muscles crossing any joint e.g. knee extensors / flexors, plantar flexors / dorsiflexors. This is simply a reflection of the functional roles of these muscles and beyond the scope of this article.

The muscle imbalances we must concern ourselves with are those that create alignment distortions that affect structural function. These can be caused by but are not limited to:

postural stress

Living, as we do, under the force of gravity has created a structure, which seems to have placed the ideal imbalance in favour of our extensors; after all, structure determines function.⁷

Unfortunately, modern living creates a synthetic environment where sitting dominates our function and as a result affects our structure.

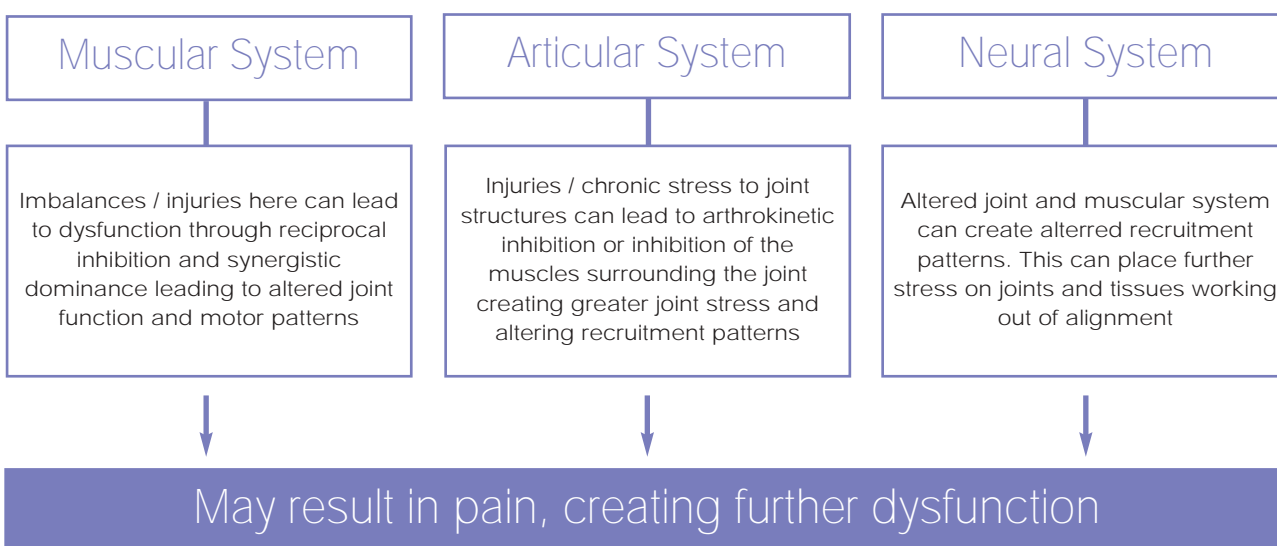
For simplicity, it is useful to think of postural stress in terms of 'training for posture'. Imagine 'training' 16 hours a day seven days a week for a specific event. You're probably going to get very good at it aren't you? Well, most people get very good at poor posture!

Many posture experts use Janda's 'short and tight' vs. 'long and weak' classification system⁸ as a way of simplifying the processes that create and result from postural distortion and often classify muscles as 'tonic' and 'phasic'. This oversimplification tends to ignore individual differences in terms of 'normal' posture as well as making assumptions based purely on static posture.

The table below should serve as a guide only, and should not be considered a definitive classification without corroboration of manual muscle tests, range of motion assessments and dynamic postural assessment. ▶

Figure 1

The Kinetic Chain



When a muscle becomes facilitated (short and tight) it increases in 'tone' and may decrease the neural drive to its antagonist. This is known as reciprocal inhibition⁸ and is a normal quality of the kinetic chain. It becomes a problem when muscles that are supposed to be turned off during a movement sequence remain switched on. This has the effect of creating a situation known as synergistic dominance, where synergists are forced to take on the role of a prime mover due to inhibition.⁹

pattern overload

Using our 'training for posture' analogy above, it becomes clear that any movement pattern repeated often enough has the potential to create strain upon the tissues creating that movement. This may create stress patterns in the joint structure itself, leading to arthrokinetic inhibition where the joint itself causes inhibition of the surrounding tissues or lead to synergistic dominance as an avoidance pattern.¹⁰

It is important that the stresses applied to our joints be changed regularly through changes in exercise, loads, planes and ranges as well as changes to postural alignment, if pattern overload is to be avoided.

painful or prolonged noxious stimuli

Injury to a joint creating swelling and / or pain may activate the type 4 joint receptors (nociceptors) that are receptive to these stimuli. These receptors are capable of creating arthrokinetic inhibition in order to protect the joint from further damage.¹⁰

lack of core stability

This has been indicated as a possible cause of postural distortion and pain.¹¹ We all train for mobility but how many of us train for stability? Just how much spinal flexion strength do we need in this vertically loaded body of ours? Probably not that much! Simply stabilising the platform that our spines work off seems to improve the function of most clients.

Other problems occur here when the tone / strength of Rectus Abdominis is greater than that of the Erector Spinae. Again, reciprocal inhibition and synergistic dominance have the opportunity to 'take root'.

Figure 2

Long and Weak	Short and Tight
Generally considered 'postural' muscles (all muscles are involved in posture) in so far as they tend to maintain stability	Considered 'mobilisers' as they 'switch on and off' in order to create gross movements
These muscles are prone to 'weakness' as a response to gravity or reciprocal inhibition of a hyper tonic antagonist	These muscles tend toward 'tightness' either through 'taking up slack' or through over development e.g. pecs, and may create inhibition in their antagonists
Rhomboids Middle and lower trapezius Triceps Supraspinatus Infraspinatus Thoracic Erectors Rectus Abdominis Vastus lateralis Vastus medialis Gluteus maximus Gluteus medius Gluteus Minimus Peroneals	Pectoralis major and minor Trapezius Levator scapulae Biceps Brachii Scalenes Subscapularis Quadratus Lumborum Hamstrings Iliopsoas Rectus femoris Adductors Piriformis Gastrocnemius Soleus

Posture is often the only clear indicator of the forces acting upon our bodies. More importantly, it illustrates our ability to cope with those forces. A clear understanding of why muscular imbalance and postural distortion occur is fundamental to every exercise that you will ever prescribe. With this knowledge it becomes easier to see how, when and where to apply exercises and stretches to your clients in order to bring about functional and aesthetic improvement. When, and only when, you can do this you will truly be applying 'personal' to your personal training.

In the next issue we look at postural types and how to assess them both statically and dynamically. **fp**

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