



Exercise: A Risky Business

Exercise is not a substitute for Exercise Rehabilitation

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Overwhelming evidence exists for the use of exercise in the rehabilitation of many musculoskeletal and chronic pain conditions. The form that the exercise should take is less obvious. Exercise, using gym based protocols of quantity, are inappropriate where retraining of correct movement patterns is required. Twelve key elements of rehabilitative exercise are provided to give clinicians insight into appropriate quality-based exercise rehabilitation programs for their clients.

As a clinician, evidence based practice can be difficult to implement as many of the interventions available to the clinician lack evidence. One notable exception is exercise. Every international guideline on musculoskeletal pathology and chronic pain shows strong evidence for exercise. Exercise is indicated in conditions such as low back pain, neck pain, shoulder pain, knee pain, neuropathic pain and chronic regional pain syndrome, to name a few.

Previously the sole domain of physiotherapists, the evidence supporting rehabilitative exercise is creating significant interest and subsequently there has been a flood of practitioners moving into the field. Exercise physiologists, sports scientists, gym instructors, personal trainers, myotherapists, Pilates instructors, occupational therapists and even chiropractors are jumping on the exercise bandwagon. Outside of and within each field there are many different kinds of exercises being used,

such as Pilates, Feldenkrais, Alexander Technique, Yoga and Tai Chi. Moulding traditional psychophysical therapies and eastern philosophies into contemporary exercise rehabilitation formats and proclaiming them as the next great solution seems to be an increasing trend.

Choosing which form of exercise is best for patients can be very difficult, particularly as the global term

“exercise” referred to in the guidelines offers very little help. The exercise referred to in the literature is an amorphous title

that would be unacceptable in other fields. Questions that remain unanswered include,

- should the exercise be aerobic or anaerobic?
- should the patient enjoy the exercise?
- should the exercise focus primarily on strength, stability or flexibility?
- should the exercise be overly focused on the core or not, and

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- which specific exercises are best for which pathology and which patient?

Of course the most appropriate exercise program depends upon the individual needs of the client and their environment, and as such there is not one method that is the best for everyone.

Exercise in the Gymnasium

Since the advent of Swedish Gymnastics in the middle of the 19th century gymnasium attendance has become the mainstay of the average person seeking fitness, but it is not the most appropriate form for exercise rehabilitation. Exercise in the gymnasium primarily focuses on the body as a machine and is quantity-based, where the mantra is often “more weight, more reps, more speed!” In rehabilitation, the patient needs to learn to move well again. . The entire neuro-musculoskeletal system must be considered. Learning to move well requires re-training the brain, as much as the body. Where the gymnasium often focuses on single body parts, the patient must re-learn to use their injured part and to re-integrate it into their whole neuro-musculoskeletal system, and their daily environment.

Exercise Rehabilitation

Exercise Rehabilitation is an entirely different field, quite separate to exercise. The strategies used in gymnasiums for those that are symptom free may be ineffective and potentially dangerous to the patient in pain. Research being lead by Australian physiotherapy researchers including Professors Paul Hodges, Lorimer Mosely and Peter O’Sullivan, and their many co-contributors is

starting to shine some light on the key elements of rehabilitative exercise and how it differs from purely physical exercise. Twelve of these key elements are explored below.

1. Pain

Pain is a priority to the brain, so much so that a perceived threat produces pain ahead of an actual threat to the body. Pain inhibits coordinated muscle function (and subsequently effects how we move), and if continually present can produce an excitation in the brain and spinal cord that amplifies and exaggerates the pain response. In chronic pain sufferers the brain gets so used to running the pain sequence that it cannot stop doing it. People in pain need to know their exercise won’t increase their injury so that they can

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move freely. Experiencing free movement without pain allows the pain sufferer to be

receptive to learning new movement patterns and to lay down new neuronal pathways.

2. Correct and monitor posture

Maintaining optimal posture in relation to gravity facilitates correct joint positioning, deep postural muscle activation and correct movement patterns. Good posture is not the upright military position associated with the 1950’s but a state of relaxed readiness from where the body can move with ease. Rarely is the body in a stationary position however, so posture is not about rigidity, rather it is about dynamic control and positioning.

3. Focus on the sensory input

Sensory feedback is vital in all training to produce awareness and change. Vision is neither the best nor the most reliable sensory feedback system in a

person's body. Proprioceptive (knowing where you are in space) retraining has been shown to be the most important factor in improving neuromotor control and quality movement. Proprioception requires concentration, alertness and awareness. Providing verbal and manual cueing strategies facilitates correct motor patterning and gentle resistance and vibration can allow patients to feel what is happening to them. Psychological research into mindfulness is showing the importance of noticing what is occurring in the present moment and can be used to advantage to learn new motor patterns.

4. Don't brace

Bracing (of the abdominals and spinal muscles) is a useful strategy for heavy or unpredictable tasks, but prolonged bracing is a faulty stabilising strategy for normal, daily activities. Many people in pain become stuck with bracing and have lost the ability to use their muscles more wisely. The rigidity of continued stabilising compresses the joints, impairs normal movement and circulation and never allows the muscles to switch off.

5. Breathe normally

The diaphragm forms the roof of the core muscle group and is an essential element in motor control of the trunk. Holding the breath, even a small amount, negatively effects proper respiration and spinal stabilising strategies. Breath holding contributes to bracing and can place overwhelming pressure on the pelvic floor leading to a range of further issues.

Relaxed diaphragmatic breathing needs to be practiced during exercise so that it

becomes a normal part of daily movement.

6. Use closed chain exercises

Closed chain exercises occur when the foot or hand is in contact with the ground and the body moves upon the foot or hand. In contrast, open chain exercises occur when the hand or foot moves against resistance in space, eg bicep curl. Closed chain exercises are more functional, replicating everyday activities like standing and walking. Closed chain exercises (via sensory input) also facilitate the joint stabilising muscles and optimal neuromuscular movement patterns, thereby reducing the potential for shear forces across joints.

7. Pre-activate target muscle groups

Learning to isolate and pre-activate target the deep, stabilising muscles prior to initiating movement ensures their full participation during future movements. Through quality practice, conscious control of the target muscles eventually shifts to unconscious control and the correct muscles begin to work automatically.

8. High quality better than high repetitions

As stated previously exercise rehabilitation is as much about training the brain as it is the muscles. Fewer, higher quality, repetitions increases the chance of correct motor patterns being produced and integrated. Multiple repetitions without awareness can increase the likelihood of fatigue and poor motor pattern production.

9. Controlled movement, not jerky

Slow, controlled movement ensures that the joints deep, supporting muscles

Exercise rehabilitation requires learning and so the focus must be on the quality of movement rather than the quantity of movement.

are facilitated and have full opportunity to control correct joint position throughout the movement. Many musculoskeletal problems occur due to imbalance caused by hypertrophied superficial, movement muscles. Controlled movement ensures correct balance in muscle development. It is easy to move fast by using inertia and momentum. Slow, controlled movement is much more difficult to produce. Letting the body learn how best to respond to and to work with gravity is best done slowly and mindfully.

10. Progress slowly

Even minimal overloading can overwhelm the injured patient causing them to brace (a strategy of which they may be completely unaware). Overloading too early increases the likelihood of tissue damage, pain, faulty movement patterns and subsequently, dissatisfaction and compliance issues.

The body's tissues take time to adapt to new stresses, as does the brain to lay down new patterns. Pushing too fast can overwhelm the system and reinforce poor movement patterns.

11. Vary the exercises

Activities of daily living are never constant. Sudden forces, unexpected circumstances and variability always occur. People need to be able to cope with change and need training in a variety of positions and situations. Movement needs to progress to incorporate whole body movements, different speeds and functional movements that replicate their normal daily activities.

12. Exercise regularly

All research on brain plasticity shows that long periods of regular training is required to strengthen preferred neuronal pathways. Likewise, regular

training is also required to maintain strength and fitness levels, particularly in the sedentary Western world. Movement is essential for good tissue health.

Conclusion

Exercise rehabilitation requires retraining of movement patterns and strategies, so the focus must be on the quality of movement rather than the quantity of movement. Some of the principles of exercise training, such as the overload principle, can be utilised in exercise rehabilitation. But where a patient needs to relearn correct movement patterns, focussing on quantity-based exercises has the potential to aggravate and exacerbate.

Professional supervision is vital during exercise rehabilitation to ensure that the above parameters are being applied and monitored. An adequately small ratio of practitioner to patients is required to provide accuracy, feedback, reassurance and progression. Finding appropriately trained exercise professionals is central to ensuring clients receive optimal outcomes.

In the short term the cost of such supervision may seem onerous, but in the long term the investment leads to safe and durable return to normal life (and movement) for the patient.

This paper was produced by the staff of Riseley Physiotherapy Pty Ltd. The paper may be forwarded but may not be altered without permission.

The paper is intended to stimulate discussion. We welcome comments and feedback.

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