



Exercises shown to not correct abnormal muscle activation patterns

Summary

Most movements require the co-ordinated contraction and relaxation of numerous muscles. The neurological control of this is known as a muscular activation pattern (MAP). Research summarised elsewhere in this guide describes how highly prevalent latent (pain free) myofascial trigger points (MTPs) alter MAPs producing dysfunctional movement and joint control. This increases stress on tissues, increasing wear and increasing the risk of injury and impingement syndromes. Treatment of MTPs was shown to normalise the MAPs.

Research published in the Journal *Manual Therapy* describes an abnormal MAP found in patients with neck pain. The authors believe that this would cause dysfunction which may increase adverse loading on sensitive cervical structures. Subjects with this abnormal pattern were each given one of two different six-week supervised exercise programs. Both exercise programs produced a reduction in pain, but neither changed or corrected the abnormal MAP.

The trial

Subjects

The subjects were 58 females with moderate neck pain of greater than 3 months duration. Exclusions were those with previous neck surgery or participation in a neck exercise program in the previous 12 months.

The exercise programs

Exercise programs were conducted over a six-week period. Participants received weekly supervision and instructions from an experienced physiotherapist. One regime was described as “endurance-strength training” while the other was described as “low load training of the cranio-cervical muscles”. Exercises were performed so as not to provoke neck pain.

What was measured

According to the authors, previous work had identified that patients with neck pain demonstrated a bilateral increase of sternocleidomastoid (SCM) muscle electromyography (EMG) amplitude, and a decreased ability to relax their neck muscles after the completion of a task. EMG readings were taken of the SCM muscles bilaterally. Pain and disability were also determined using a tool called the Neck Disability Index.

The results

- Both regimes resulted in a reduction of pain.
- Neither changed or normalised the abnormal SCM activation.

The pain hypothesis

It was suspected that the abnormal SCM activity was due to pain. The results showed a reduction of pain but the abnormal activity remained, negating that theory.

Did the exercises actually cause more problems?

The need for exercises as part of rehabilitation is well understood. However, let's look at what actually happened in this trial.

The initial situation

The subjects had chronic neck pain. The researchers identified abnormal neurological control of neck muscles which they suggested placed abnormal loads on sensitive cervical structures.

What they did

They had the subjects perform exercises for six weeks then found that the abnormal neurological control which placed abnormal loads on sensitive nerve structured remained. The exercises that were supposed to correct the problem did not do so. Further, the exercises were performed using the same abnormal function that causes abnormal loading on sensitive cervical structures. The exercises did not fix anything, and would have caused further damage.

A sensible approach

It needs to be recognised that most neurological control of these functions happens at a subconscious level, and that abnormal patterns are usually a result of something not working normally. In this practitioner guide we present two important such causes: trigger points and articular issues. It was shown that the treatment of trigger points actually corrected abnormal neurological control, while the combining articular manipulations aimed at correcting articular function greatly improved the results obtained by exercise. The clear message here is that one needs to address causes of dysfunction prior to implementing rehabilitation exercises.

Reference

Falla, D., Jull, G. and Hodges, P. (2008) Training the cervical muscles with prescribed motor tasks does not change muscle activation during a functional activity. Manual Therapy, 13 6: 507-512.

Further information

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