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Functional rehabilitation

Dr Graeme' comments

As practitioners we are continually dealing with dysfunctional musculoskeletal systems. Typically dysfunction develops and is perpetuated by changes to functional elements, such as a shortening of muscles and connective tissues, articular issues, and muscles unable to contract normally. It is important to note that the central nervous system continually monitors all these functions, and will alter neurological control to compensate. Dysfunction causes abnormal stress on elements such as joints, muscles and connective tissues, which over time this leads to injury or pain syndromes.

When simple therapies or medication are used the abnormal functional elements remain, as does the dysfunction along with the associated abnormal stresses. When exercises alone are used the body will perform all the movements involved in the same dysfunctional manner.

Clearly, if one is to properly rehabilitate any injury or pain syndrome one needs to correct the dysfunction, but how do you correct it? If you try and use some form of corrective exercise the central nervous system controls movements to compensate for any abnormalities, so movements will not be normal. On the other hand, if the abnormal functional elements are removed the central nervous system will have no need to compensate. Simply, you correct the abnormal functional elements and let the central nervous system do what it is designed to do.

In the USA's National Academy of Sports Medicine's publication NASM's Essentials of Corrective Exercise Training (1) they describe addressing the following issues as part of a correctional exercise plan.

1. *Inhibitory techniques to relax hypertonic muscles*
2. *Lengthening techniques for contracted muscles*
3. *Activation and integration techniques*

My colleagues will probably be able to think of a few more things that need to be addressed, but it does illustrate some of the considerations and the process needed. This is a complex area so the purpose of this article is to illustrate some of the issues, then provide some advice on overcoming one key issue that usually proves to be a major stumbling block.

Basic neurological control

Normal function

In a large company a CEO will provide directions, then a team of middle managers work out the best way to do it. Your nervous system works like this. Your equivalent of the middle management is the Central Nervous System (CNS). It is like a massive super computer which takes your directions, monitors feedback from sensors throughout your body, then sends out instructions. If you consciously decide to walk forward your CNS will work out how to do this. You don't need to think about things like when to tighten your quadriceps or what angle you ankle joint should be. Instead, subconsciously your CNS monitors everything from your balance through to the stress on your joints and tension in your muscles. It sends instruction to your muscles to control your movement so it is is the most efficient, while minimising stress and damage.

Why function becomes abnormal

If part of your body becomes abnormal your CNS will detect this, and make changes to the control in compensation. An obvious example would be if you injured your ankle. Your CNS would detect this and cause you to limp. Limping is a less efficient way to walk and would abnormally stress other parts of your body, but your CNS will be monitoring all of these and making the best overall solution it can. What happens when your ankle heals? Your CNS detects this and automatically adjusts your walking back to normal.

The consequences of abnormal functional

If you walk with a limp for a long period of time you may develop back develop back problems or issues with the other leg. This will be fairly obvious. However, there are a host of other issues that cause abnormal function that are a lot less obvious, but very harmful just the same. This is known as dysfunction (abnormal or impaired function). It creates extra stress on tissues and results in the uncoordinated movement of joints. This predisposes to injury and can result in rapid degeneration. Dysfunction is a key issue in most musculoskeletal injuries and pain syndromes.

Some causes of dysfunction

There are many causes of dysfunction. We must stress here that it can be a complex issue, and their detection requires an examination by a properly qualified professional. In this article we will discuss two very common causes: articular dysfunction and myofascial trigger points.

Articular dysfunction

Articular dysfunction is extremely common. Simply speaking, it is where joints (in particular articular surfaces) cannot move freely through their normal ranges of movement. This restricts movement, causes abnormal stress upon the joint, and of course the CNS will make compensations which may be detrimental to other parts of the body. Their detection and correction requires specialised knowledge and training.

When functional correction is attempted without addressing articular dysfunction it cannot be successful. The CNS will continue to perform movements in the compensatory manner. Abnormal stress upon tissues and articular surfaces will continue, which can only be detrimental. This is illustrated by a two trials that compared the treatment of shoulder impingement syndrome with exercises alone vs combining exercise with using techniques such as joint manipulations to correct articular dysfunction. Exercises alone only produced moderate symptomatic relief, whereas when articular dysfunction was addressed and the joints able to move more normally the need for compensation was removed the results were much better (2,3)

(Myofascial) Trigger Points

The second major cause of dysfunction is trigger points. There are several reasons for this.

Alteration of muscle function

Trigger points are sections of muscle in continual contraction. Because of this the whole muscle becomes hypertonic, while blood flow is reduced resulting in a depletion of oxygen and a build up of waste products. Clearly, the muscle will be tight and not able to work normally so, the CNS will need to compensate. As an example, in an investigation of shoulder abduction researchers found that when trigger points were present in shoulder muscles the CNS altered the timing and "firing order" of the various muscles that control shoulder movement (4). When the researchers treated the trigger points and re-tested the neurological control had gone back to normal. Several other researchers have found similar alterations of muscle recruitment patterns due to the presence of trigger points, stressing that this causes poor control of movement and an increased possibility of damage (5–7)

Trigger points can be asymptomatic, and are highly prevalent

Because trigger points are caused by the things we do every day and are initially asymptomatic they are highly prevalent, even in asymptomatic people (8–15). Further, even in their asymptomatic state trigger points can badly affect function (11,16) .

Treatment of trigger points commonly just (temporarily) reverts them back to their asymptomatic state

As discussed in our article *Trigger Point Treatment: deactivation or elimination* most treatments for trigger points do not eliminate them, rather just revert them back to their asymptomatic state where they are (temporarily) not causing pain, but still cause all the functional issues.

Practical advice

We need to recognise that dysfunction is an issue with all musculoskeletal conditions, and that correction is impossible unless the elements causing dysfunction are addressed. The correction of function using exercises alone usually cannot work. We need to follow the principle of correcting these elements, as discussed in National Academy of Sports Medicine's publication NASM's Essentials of Corrective Exercise Training, but also deal with the causes of dysfunction they have not mentioned.

Trigger points are the biggest challenge

Of these causes, trigger points and other chronic myofascial changes create the biggest challenge. This is because, as discussed in our article *Trigger Point Treatment: deactivation or elimination* although treatment often relieves pain the trigger point will remain in it's asymptomatic state. Pain (temporarily) goes, but dysfunction remains. The use of supplementary self massage using our massagers was recommended as a practical, economical way for patients or clients to totally eliminate trigger points, allowing normal function.

References

1. *Clark MA, Lucett SC. NASM Essentials of Corrective Exercise Training. Lippincott Williams & Wilkins; 2011.*
2. *Bang MD, Deyle GD. Comparison of supervised exercise with and without manual physical therapy for patients with shoulder impingement syndrome. J Orthop Sports Phys Ther. 2000;*
3. *Yemul SR. Sunita R Yemul COMPARISON OF SUPERVISED EXERCISE WITH AND WITHOUT MANUAL PHYSICAL THERAPY FOR PATIENTS WITH SHOULDER IMPINGEMENT SYNDROME. J Cur Res Rev [Internet]. 2013;05(05):5. Available from: https://pdfs.semanticscholar.org/58be/5f3ab071d954be4023e27183421c71ecb83f.pdf*

4. *Lucas KR, Rich PA, Polus BI. the Effects of Latent Myofascial Trigger Points on Muscle Activation Patterns During Scapular Plane Elevation. Jclb [Internet]. 2007;25(8):765–70. Available from: http://dx.doi.org/10.1016/j.clinbiomech.2010.05.006*
5. *Zuil-Escobar JC, Martínez-Cepa CB, Martín-Urrialde JA, Gómez-Conesa A, Shin C, Oh H, et al. Muscles Recruitment Pattern in People with and Without Active Upper Trapezius Myofascial Trigger Points in the Standing Posture. J Phys Ther Sci [Internet]. 2018;13(1):1–9. Available from: http://dx.doi.org/10.1016/j.pmrj.2016.03.004*
6. *Florencio LL, Ferracini GN, Chaves TC, Palacios-Ceña M, Ordás-Bandera C, Speciali JG, et al. Active Trigger Points in the Cervical Musculature Determine the Altered Activation of Superficial Neck and Extensor Muscles in Women with Migraine. Clin J Pain. 2017;33(3):238–45.*
7. *Bohlooli N, Ahmadi A, Maroufi N, Sarrafzadeh J, Jaberzadeh S. Differential activation of scapular muscles, during arm elevation, with and without trigger points. J Bodyw Mov Ther [Internet]. 2016;20(1):26–34. Available from: http://dx.doi.org/10.1016/j.jbmt.2015.02.004*
8. *Chiarotto A, Clijsen R, Fernandez-de-las-Penas C, Barbero M. The prevalence of myofascial trigger points in spinal disorders: a systematic review and meta-analysis. Physiotherapy. 2015;*
9. *Kaya Mutlu E, Birinci T, Dizdar G, Ozdincler AR. Latent Trigger Points: What Are the Underlying Predictors? Arch Phys Med Rehabil. 2016;*
10. *Zuil-Escobar JC, Martínez-Cepa CB, Martín-Urrialde JA, Gómez-Conesa A. The Prevalence of Latent Trigger Points in Lower Limb Muscles in Asymptomatic Subjects. PM R. 2016;8(11):1055–64.*
11. *Celik D, Mutlu EK. Clinical implication of latent myofascial trigger point topical collection on myofascial pain. Curr Pain Headache Rep. 2013;17(8).*
12. *Fernández-De-Las-Peñas C, Gröbli C, Ortega-Santiago R, Fischer CS, Boesch D, Froidevaux P, et al. Referred pain from myofascial trigger points in head, neck, shoulder, and arm muscles reproduces pain symptoms in blue-collar (Manual) and white-collar (Office) workers. Clin J Pain. 2012;28(6):511–8.*
13. *Fuentes-Márquez P, Carmen Valenza M, Cabrera-Martos I, Ríos-Sanchez A, Ocon-Hernández O. Trigger points, pressure pain hyperalgesia, and mechanosensitivity of neural tissue in women with chronic pelvic pain. Pain Med (United States). 2019;20(1):5–13.*
14. *Roach S, Sorenson E, Headley B, Juan JGS. Prevalence of Myofascial Trigger Points in the Hip in Patellofemoral Pain. Arch Phys Med Rehabil [Internet]. 2013;94(3):522–6. Available from: http://dx.doi.org/10.1016/j.apmr.2012.10.022*
15. *Castaldo M, Ge HY, Chiarotto A, Villafane JH, Arendt-Nielsen L. Myofascial trigger points in patients with whiplash-associated disorders and mechanical neck pain. Pain Med (United States). 2014;15(5):842–9.*
16. *Celik D, Yeldan P. The relationship between latent trigger point and muscle strength in healthy subjects: A double-blind study. J Back Musculoskelet Rehabil. 2011;24(4):251–6.*

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