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ROLE OF DNS (DYNAMIC NEUROMUSCULAR EXERCISES) ON CHRONIC NECK PAIN: A HYPOTHESIS

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ABSTRACT

Chronic neck pain is one of the major problems faced by people worldwide and there is various method to cure them, Concept of DNS work upon the scientific principles of kinesiological and biomechanical development by improving neurophysiological aspects of the movements. It is necessary for activation of deep neck flexors which is not achieved purely by isometrics strengthening and other stabilization and strengthening exercises programs. On the contrary, the stability of the nucleus is achieved through the precise coordination of these muscles and the central nervous system and regulation of intra-abdominal pressure. Therefore, DNS exercise play a key role in the treatment of patients with chronic neck pain.

KEYWORDS: *DNS, Neck*

INTRODUCTION

Chronic cervical spinal pain by the International Association for the Study of Pain (IASP) defines as pain perceived anywhere within the posterior region of the cervical spine, from the superior nuchal line to the first primary thoracic spinous process. This is often according to patients' notions of neck pain. Pain in the front of the cervical spine is typically described as pain within the throat and not as neck pain. Bogduk and Mc Guirkalso suggest that neck pain could also be subdivided into upper cervical spinal pain and lower cervical spinal pain, above or below an imaginary transverse line through C4. In upper cervical segments, pain can be referred to the head, whereas in lower cervical segments, pain can be referred to the scapular region, anterior chest walls, shoulder, or upper limb. Suboccipital pain can also be defined as the pain located between the superior nuchal line and the C2 vertebra, an area that appears to be the source of cervicogenic headaches. Therein, the division of neck pain into the suboccipital region and upper and lower cervical pain could be important for clinicians and researchers in recognizing the area of the source of pain and trying to work out the possible causes.[1]

Neck pain is among the most common pain problem with a reported prevalence ranging from 22% to 30%. It is usually accompanied by a substantial effect on daily life that results in the extensive use of healthcare services. In order to improve a patient's functional status and quality of life, it is important to understand which structures are capable of producing pain. a common type of neck pain is that which is induced by nonspecific musculoskeletal disorders. such diseases may occur repeatedly leading to a vicious circle of chronic pain. Various structures in the neck and close-by

districts might be the wellsprings of nonspecific neck pain, for example, muscle joint structures, ligaments, intervertebral plates, and neural structures.[2]

Over the past decade, numerous studies have shown an association between reduction in the strength and endurance capacity of the cervical muscles and neck pain. It has been found that certain muscles in the cervical spine tend to weaken due to neck pain: the most common of them being the deep and anterior cervical flexors. Thus in order to gain muscle strength, flexibility, intensity, and endurance, to restore injured tissues, and to contribute to the ability to sustain normal life activities, a proper exercises program needs to be adapted. To manage neck pain various exercises program depends upon the intensity, duration, frequency, and mode of exercise pattern. Previous studies have shown that isometric exercises program can contribute significantly to reducing neck pain on the other hand neck stabilization exercises can help to limit pain, maximize function, and preventing further injury.[2] Despite this popular treatment there is a lack of a well-designed set of exercises that may work on the cervical spine (deep neck flexors) along with helping in the stabilization of the whole spine.

All stabilizers must work together to provide a good movement pattern for any skill performance or any functional activity. When one muscle or a part of the muscle is inefficient or weak then another muscles groups in the kinetic chain may be activated to compensate for instability or movement. A careful analysis and rehabilitation is required to evaluate muscle imbalance which may further lead to fixed optimal motor program in the central nervous system, with poor performance and chronic pain. Therefore, strategies for corrective stabilization should be incorporated as the basic principle of any training program. [3]

Lee suggested that stability isn't about the ‘quantity of motion and therefore the ‘quality of the end feel’, but about the control of systems that allow the load to be transferred and movements to be smooth and effortless.3 Core stability is thus an important component in maximizing efficient function.

This function is usually taken over by a kinetic chain through coordinated and sequential activation of the various body segments, which forces the distal segment to enter the best position at the best time and at the best speed to perform the required tasks because the core is responsible for kinetic chain, balance and coordination.[4]

Punjabi describes the spinal stabilization system as a three-way interaction between the central nervous system (neurons), active (muscle), and passive (skeletal, joint) systems. Spine stability is dependent upon the dynamic muscles coordination of various antagonist and synergist for precise control of excessive joint motion while allowing the necessary torques for desired multi-joint movement.[5-8]

A manual rehabilitation method of dynamic neuromuscular stabilization is based on scientific principles of developmenal biomechanics which is used to optimize the movement system. A Czech physiotherapist, Professor Pavel Kolar, PT and Ph.D., DNS developer, influenced by Karel Levit, Vladimir Janda, Vaclav Vojta, and Frantisek Vele from Prague Tuina Medical College.

DNS has quickly gained attention and popularity in enhancing sports performance and rehabilitation, not only can recover from musculoskeletal injuries, but also prevent injuries. The purpose of this clinical review is to discuss the background of dynamic neuromuscular stabilization (DNS) and signify its use in rehabilitation, recovery from overuse injuries, and improvised sports and leisure.

A new method of intrinsic locomotor system stabilization and a new manual approach to activate the "Integrated Stabilizing System" DNS help achieve exciting levels of improved function. DNS isn't just a technique, but it is a strategy designed to better understand the neurophysiological principles of locomotor system function. It includes both a knowledge and theoretical base and assessment, treatment, and exercise, and lifetime strategy.

The DNS concept usually operates according to the kinesiological principles and the neurophysiological aspects of the musculoskeletal system.

The integrated spinal system is made up of:

- Multifidus (Short intersegment spinal muscles)
- The deep neck flexors
- The diaphragm
- The abdominal wall
- The pelvic floor

As in the feed-forward mechanism the muscles are automatically activated before the expected movement to create a stable foundation, actions begin with the stability of the various parts of the body to ensure balance, efficiency, and safety for the elements involved.

There is the automatic activation of stabilizing muscles during any movement. All stabilizing muscles act as one functional unit. Ensuring stabilization of the spine and torso during any phasic movement.

As suggested by Kohler, the dynamic neuromuscular stabilization (DNS) approach is based on a careful assessment of the quality stabilization and recovery of the movement of ISSS with special functional exercises based on developmental kinesiological positions of healthy children. These exercises not only activate the optimal patterns necessary for stabilization(support)in the closed kinetic chain, but also in dynamic movements in the open kinetic chain, which occur during reaching, throwing, stepping forward, or kicking.[8]

Intra-abdominal pressure (IAP) is one of the parameters that affect the stiffness and mechanics of the spine. It is generally believed that increasing IAP can stabilize the 8-9 spine, but the 9-11 spine can relieve the spine during static and dynamic lifting. The second parameter which also contributes to spinal stability is ISSS (integrated spinal stabilizing system).

ISSS is comprised of balanced coactivation between the deep neck cervical spinal flexors and extensors, upper thoracic area, and the balance between the diaphragm, pelvic floor, all abdominal muscles, and thoracic and lumbar extensors.

These internal stabilizing muscles of the spine coordinate with the IAP to ensure rigidity, thereby ensuring the dynamic stability of the spine. The stability of the posture of the anterior lumbar pelvis.

This further strengthens the argument that dynamic neuromuscular stabilization is necessary for activation of deep neck flexors which is not achieved purely by isometrics strengthening and other stabilization and strengthening exercises programs; instead, core stability is achieved through the precise coordination of these muscles and the central nervous

system.[7] So experimental studies are needed to be done to find out whether DNS will be affected in treating the patients with chronic neck pain or not.

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