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Cervical Kyphosis: Understanding Its Impact on Postural Alignment and Movement

“The head constitutes 6% of the total body weight, which is linked to the cervical spine and all other joints through the kinematic chain by various muscles” (Singla D, Vequar Z). It is no wonder that kyphosis presents itself in individuals with poor postural alignment. The area of research I have chosen to explore is a condition called kyphosis, with particular emphasis on cervical kyphosis. This condition involves a spinal deformity that displays a curvature of 50 degrees or more. Throughout my dance training, I have received guidance from instructors on how to maintain healthy alignment in my neck. I possess the postural habit of allowing the back of my neck to curve forward. This creates a “humpback” appearance on the posterior side of my neck and is an area that holds a lot of tension when dancing. I chose to research cervical kyphosis to help understand its effects on individuals and how it relates to my body's postural alignment through dance. “Tech neck” is another term utilized to describe cervical kyphosis. It is characterized by your neck's posture when looking at a device at a low angle. I desire to learn more about this phenomenon and discover if this postural habit is heavily related to the use of small, handheld devices or due to other circumstances. Throughout this paper, I will demonstrate the information I have gained through this research process and how I will relate it to my practice. Kyphosis is important to understand when discussing postural alignment because, if corrected, it can assist in correcting neck and back pain.

Kyphosis is a spinal deformity that displays a curvature of 50 degrees or more either in the cervical or thoracic spine. The human spine naturally displays kyphosis in the thoracic spine, but excessive kyphosis in the cervical spine is typically caused by improper neck alignment. Lam mentions, “The biomechanics that influences the curvature lies in the shape of the vertebral body and intervertebral disc, with an anterior wedge increasing the angle of kyphosis” (Singla D, Vequar Z). Kyphosis is mainly affected by the vertebral discs and the way they are placed in the spine. There are three main types of kyphosis: Scheuermann kyphosis, postural kyphosis, and congenital deformities. Scheuermann kyphosis is the deformity of the thoracic spine that usually occurs before an individual reaches puberty. This disease is considered “developmental,” which means it transpires during a child’s growth. This type of kyphosis is seen more commonly in men than women and is usually caused by the wedging of the vertebral bodies. Instead of the vertebrae being stacked on top of each other in a rectangular shape, they are ossified in a more triangular shape, which causes the spine to curve forward more than normal (University of Maryland Medical Center). Postural kyphosis is another type of kyphosis and shows up most in female adolescents. The cause of postural kyphosis is improper postural alignment of the neck. Oftentimes, female adolescents are at risk for kyphosis because of the way they might stand (i.e., trying to make themselves shorter). Oftentimes, women will possess a concaved stance because they are insecure about their height and or lack confidence in themselves. An individual’s slouching posture can increase the forward curve of the cervical spine. This action stresses the “extensor muscles of the back and the posterior ligaments of the spine, thereby weakening it over time” (Singla D, Vequar Z). Congenital kyphosis is a more uncommon type of kyphosis as it is strongly associated with neurological complications. The two types of congenital kyphosis are failure of formation (type 1) and failure of segmentation (type 2). Failure of formation is caused

by one or more vertebral bodies failing to develop, which becomes more challenging as a person grows. In contrast, failure of segmentation is caused by two or more vertebral bodies failing to separate. Understanding these three types of kyphosis is important to recognize when looking at the various impacts that this condition has on individuals.

Kyphosis can be interpreted as more than a cosmetic deformity, however, a person living with kyphosis does experience pain in the affected area. A few of the common varieties of pain include back pain (ranging from mild to severe), fatigue, and increased forward posture of the head, which puts physical stress on the back of the neck and shoulders (Lam). Kyphosis is also said to be age-related and is usually attributed to underlying osteoporosis and vertebral fractures. Some of the causes of age-related kyphosis include lower bone mineral density, vertebral compression fractures, heritability, loss of endurance of spinal extensors, decreased flexibility of trunk extensors, etc. (Roghani, Tayebbeh et al). These areas of pain are all affected by the postural alignment in the cervical spine, centering on the copious muscles within the neck. When looking at kyphosis, one must understand the functional anatomy that contributes to this condition.

Kyphosis mainly occurs in the cervical spine, which includes seven vertebrae (C1-C7) and has a natural lordotic curve, which is an inward curve of the spine. This area of the spine is more movable than the thoracic or lumbar. This is because the vertebrae in the cervical spine assist the movement of the head and demand a greater range of motion than the thoracic or lumbar spine. Cervical kyphosis is a “protraction movement that is a result of the extension of the upper cervical spine and flexion of the lower cervical spine” (Singla D, Vequar Z). In this action, the base of the chin slides forward and sends the weight of the head anteriorly. There are two vertebrae at the top of the cervical spine, called the atlas (C1) and axis (C2). The axis is specifically designed for the rotation of the neck and is placed superior to the rest of the vertebral

body. The atlas is the first cervical vertebrae and “does not have a vertebral body but does have a thick forward (anterior) arch and a thick back (posterior) arch with two prominent sideways masses” (University of Maryland Medical Center). The atlas is placed on top of the second cervical vertebrae, called the axis. This vertebra is the “primary weight-bearing bone of the upper cervical region” and allows the neck to rotate on its axis (Kaiser). Both vertebrae are crucial to comprehend when researching kyphosis because they bear most of the head’s weight and facilitate the movement of the spine and different muscle groups.

The muscle groups involved with cervical kyphosis are the sternocleidomastoid, trapezius, erector spinae, levator scapulae, deep cervical flexors, and suboccipital muscles, which all assist with stabilizing the spine, flexion, and extension of the neck (Singla D, Vequar Z). The three muscles that display the most prominence in cervical kyphosis are the deep cervical flexors, erector spinae, and suboccipital muscles. The deep cervical flexors are a group of muscles located anteriorly in the neck that include the longus colli, longus capitis, rectus capitis, and longus cervicis (Physiopedia). These are the muscles that weaken over time when an individual displays poor posture in the upper cervical spine. Furthermore, these muscles need to be strengthened and fired over time to help prevent cervical kyphosis. The erector spinae are a group of muscles that includes the iliocostalis, longissimus, and spinal muscles. One of its main functions is spinal stabilization, but it also functions in flexion and extension of the vertebral column (Kaiser). The last muscle group that this paper will discuss is the suboccipital muscles. These muscles are located deepest in the upper cervical spine and include the following: the rectus capitis posterior major, rectus capitis posterior minor, obliquus capitis superior, and obliquus capitis inferior muscles. For its function, the suboccipital muscles are considered “joint stabilizers of the upper cervical spine” as opposed to functioning in head and neck movement

(Sung). The cervical spine vertebrae also contain intervertebral discs that provide cushion to the vertebral bodies, allow for flexibility of the spine, and absorb the shock from any impact on the spine. These intervertebral discs and vertebral bodies protect the spinal cord, and when these elements are shifted, they can compromise the nerve tissue. When this occurs, an individual may experience pain in the neck as well as headaches. The overarching goal of working these muscle groups is to restore the normal range of lordosis in the neck to prevent any further issues with the postural alignment (Scoliosis Reduction Center). In addition to strengthening these muscle groups, there are also other treatment options available to an individual when correcting cervical kyphosis.

There are two treatment options for individuals experiencing cervical kyphosis: non-surgical and surgical treatment. First, there are various exercises one can complete to help strengthen the muscles in the cervical spine. Non-surgical options can adhere to any variation/level of cervical kyphosis, but they work best to treat milder cases. The exercises utilized to help treat cervical kyphosis are geared towards strengthening the deep cervical flexors, erector spinae, and suboccipital muscles. These exercises may require equipment such as a TheraBand or a foam roller to create a pivot point on the neck when completing these exercises (Ogura, Yoji et al). These surgical options may include an anterior or posterior approach when correcting spinal deformity. Specific surgical options that may be available to a person with cervical kyphosis include “anterior cervical discectomy and fusion (ACDF), anterior cervical corpectomy and fusion (ACCF), anterior osteotomy (ATO), Smith-Petersen osteotomy (SPO), PSO, or any combination of these techniques” (Ogura, Yoji et al). All these approaches have the common goal of correcting the deformity of the spine and assisting in correcting spinal stabilization. These surgical options may include an anterior or posterior approach when

correcting spinal deformity. Most commonly, the anterior approach is preferred to assist in restoring a natural lordosis to the cervical spine. However, there are times when a posterior approach although it is less common when fixing cervical kyphosis. There are also times when a surgeon will utilize both an anterior and posterior approach (Gadia). Both treatment options, surgical and non-surgical, assist in correcting these spinal deformities and helping patients maintain a healthy alignment in the cervical spine.

As a person who struggles with cervical kyphosis, some somatic techniques that I have used are image techniques derived from Professor Erin Kouwe's classes. While taking movement classes, I often have trouble maintaining proper alignment in my cervical spine. This was especially prominent during ballet class last semester, which Professor Kouwe taught. When they noticed this habit of mine, they reminded me of this image of two disks. These disks represent my head and neck, and how I can allow my head to glide backward to readjust my alignment. This image is utilized in contrast to pushing or forcing my head back to reach a healthy alignment. This image helps me immensely with finding more space in my head and neck while preventing these parts of my body from collapsing on each other.

The knowledge I gained about kyphosis has greatly impacted my postural alignment and movement. I have started implementing kyphosis-correcting exercises weekly to maintain a healthy position of my cervical spine. In doing these exercises, I have noticed an immense impact on my postural alignment, which has served me in my movement classes. These exercises have allowed me to create space within my neck and release this unnecessary tension. Additionally, I have been able to utilize the image of the two disks to correct this postural habit in class. I hope to bring public awareness to kyphosis because many people may not realize they have this condition. Nowadays, individuals refer to kyphosis as "tech neck" due to the straining

of the neck muscles from looking down at cell phones. Through this research, I anticipate that others with kyphosis may learn about what steps they can take to preserve a healthy spinal alignment, such as exercises or surgery if needed. With this information, I plan to continue strengthening the muscles located in my neck to enhance their stability and prevent excessive anterior displacement. What was once a postural habit of mine is now a condition that I have much more knowledge of and can correct on demand.

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