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The impact of postural defect on respiratory impairment in collegiate students: A narrative review

Kishor Kunal

BPT Student, Department of Physiotherapy, Galgotias University, Greater Noida, India

Corresponding author email: mannusinghkk@gmail.com

Sakshi Arora

Assistant Professor, Department of Physiotherapy, Galgotias University, Greater Noida, India

Abstract---Collegiate children are in the stage where quite intense and rapid growth and alterations are occurring in their physical being, which is why it is of critical importance that postural defect, and their importance is introduced to them and changes are made to improve and elevate the current situation. Since collegiate students spend the majority of their time in stationary positions and minimal physically straining activities such as sitting in classes or library or gaming on chairs etc. Such dormancy and wrong posture lead to the rise of several issues & illnesses not only physical but also mental. Respiratory impairment is of quite severe and detrimental nature and ironically is least talked and referenced about. The author pointing and concludes through a thorough review of literature that establishes a crystal-clear connection and how postural defect has a derogatory defect on respiratory impairment. There is a severe need for a brief yet thorough education on the development of proper postural habits at the college level to avoid such impairment and spread much-required awareness.

Keywords---respiratory impairment, proper, poor body posture, deformities, physical exercise, collegiate.

Introduction

The human body goes through the most sudden and rapid changes physically during the adolescent year and this is when proper care and nourishment need to be maintained and encouraged. During this phase promptly and the necessity

can't be overstated. But this phase is burdened with not only stress and responsibility but also the carefree attitude of students towards their health and posture as they are way too focused either on their studies or distractions. But the conditions and environment provided to the student's body during these times have a major impact on the life of student's physical capabilities, especially in old age days, and hence awareness and inspiration to focus on this critical aspect of life need to be assessed clinically. A huge chunk of student's spare time these days is mostly devoted to activities that are generally not attributed to good physical posture such as sitting slouching for long durations watching television or working in offices for a long period without giving any thought to the structure and positioning of the body etc. Apart from these major activities even some of the minor facets of a student's lifestyle such as wearing a schoolbag on a single shoulder, standing with putting major weight on a single leg, etc., can contribute to a bad and defective postural habit(Pawaria et al., 2019).

Posture in its most basic nature means the position in which we hold our body while sitting, standing, or lying. Posture can be divided into two types –

- Dynamic Posture – is how you hold yourself when you are in motion like walking running bending, etc(Attwells et al., 2006).
- Static Posture is your structural position when you're standing sitting sleeping(Szeto et al., 2002).

Respiratory impairment occurs when an individual has trouble with proper breathing caused due to any sort of defect in their respiratory organs, this defect or injury could be caused due to several reasons, and the relevant reason in this topic is an improper posture which eventually gave rise to malfunctioned body structure(In Jung et al., n.d.).

Bad posture can have a detrimental effect not only on our respiratory system but spine structures, walking patterns, etc. as well which may eventually lead to several deformities like scoliosis, hypnosis, stoop, etc. These might seem superficial and more like body image issues but a deformity in the spine can have several impacts on the psyche and mentality of the individual and even the inferiority complex of one's body image Low level of postural correctness can even cause defects and injuries in the osteoarticular systems of the body(Mayank Mohan *, Upender Singh **, 2007).

All these ill effects and consequences and yet there is so little to no focus our attention on this aspect of medical sciences and which is why through this study I wish to identify and put into spotlight the impact of the postural defect on respiratory impairment in college-going student. Keeping the changing scenario and landscape in mind the awareness regarding a proper posture is the dire need of the hour because of the digitization and a hint of luxurious and relaxed lifestyle influenced in the student's day to day activities. A good posture is one of the simplest and fundamental ways to an exponentially healthy respiratory system, yet it's the most ignored and disregarded one, the objective of this study is to establish a direct correlation between good physical posture and a healthy respiratory system(Akulwar-Tajane*1 et al., 2020).

Method

Search strategy- Articles from PubMed, Elsevier, and Medline that were published or made accessible on various websites between 2000 and 2021 were retrieved. Each search included phrases such as postoperative stiffness, body posture, respiratory impairment, physical treatment, and physiotherapy. We reviewed many pieces of research before selecting whether to include an article in our study. Reading choices - where applicable, the following keywords were included in articles: body posture, respiratory impairment, proper structure, formal review, clinical suggestion, book review, treatment remarks, case report, and original publications.

Human Posture and Its Violation

People's posture is influenced by a variety of elements, including their ability to withstand static stress, their neuromuscular development, the elastic qualities of their intervertebral discs, and the joints of the spine and pelvis. Straight back and head, unbent hips, completely lowered knees, an "unfolded" chest, slightly diverted shoulders, scapulae that are tightly fitted to the chest, and a clenched abdomen are all required for an ideal standing posture. Alternatively: Scoliosis in the frontal plane occurs when the axis of the spinal column shifts to the right or left(Shin et al., 2020). When thoracic kyphosis and lumbar lordosis grow, a round-bent back posture is produced. When thoracic kyphosis increases, a lordotic and an around-the-back posture are created. It is possible to achieve a flat posture by flattening one's physiological curves. Sagittal and frontal plane combined posture is characterized by an increase or decrease in physiological bends together with the lateral displacement of the spinal column at different levels. Scoliosis is the most common cause of anomalies in the frontal plane. This debilitating and fast progressive condition of the spinal column is characterized by vertical vertebral axis torsion(Carvalho et al., 2015). The curvature's form is determined by the C- and S-shapes (one bend either right or left) (except for the basic curvature, one or two less pronounced compensatory ones appear, directed in opposite directions). I, II, III, and IV degrees of scoliosis curvature are all characterized by the degree of curvature between 5 and 10 degrees, 11 to 30 degrees, and 90 or more degrees of curvature. There are generally three levels of scoliosis severity: mild to moderate, moderate to severe, and severe. Severe (more than 16 degrees) and fixed (less than 8 degrees) scoliosis are examples of the three types of scoliosis. Due to anatomical, physiological, and biomechanical changes, a person's locomotor apparatus alters as they age. When an elderly or senile person's posture is characterized by extremes in their neck, lumbar, and upper back lordosis, attention is drawn(Ciccarelli et al., 2014). Five common postures of the elderly have been identified: A variety of labels have been coined to characterize the form of the kyphosis, including inflexible, saddle-shaped, and flattened kyphosis. Scoliosis, kyphosis of the thorax, cervical and lumbar lordosis are more frequent in women than in men between the ages of 30 and 60. Kyphosis positions are becoming more common as people become older, whereas vertical postures are becoming less common(Gangopadhyay et al., 2010). An increase in vertebral dislocation and torsional severity with age is one of several structural and functional changes that occur in the spinal column throughout life. Torsion is an age-related disease that is directly connected to muscle

dysfunction, especially in the longest muscle. Torsion and lateral curvature of the spine work together to strengthen it. During the aging process, the spinal column's dystrophic-destructive processes increase the statics and dynamics of the elderly person (Ezzatvar et al., 2020). Conjugated muscle areas involved in posture formation fluctuate in tone when the static-dynamic stereotype is shifted. Because of the relaxation of the abdominal muscles, the lumbar, thoracic, and cervical lordosis all increase concerning the rest of the body (Muyor et al., 2012a). It is as a result of this that the head moves forward. To compensate for this forward and downward movement in position, an imaginary line is drawn from the anterior superior iliac bone to the posterior upper point of the ilium. A skew in the pelvis, as well as the length of the lower limbs, is a sign of musculoskeletal dysfunction, which results in poor posture. There may be an imbalance in lower limb length that causes osteoarthritis of the hip joints and a bent spine. It is thought that scoliosis is caused by an abnormal curvature of the spine due to the overuse of muscles that weaken with time. Lumbar spine bending may be caused by skeletal asymmetries in the lumbar area, the pelvis, or the lower extremities. It is possible that the spine and pelvis are not perfectly symmetrical. Many orthopedic operations are required when lower leg asymmetry becomes an issue. A person's posture may be classified as normal or impaired based on the status of their support and mobility bodies, which operate together as a system and thus need effective repair (Muyor et al., 2012b).

Preventive maintenance of infringements of a posture

Maintaining proper posture to avoid injury and identifying the root causes of poor posture. These postural defects must be spotted and corrected as soon as possible, with physical culture taking a key role in the process. To target a particular part, organ, or functional system with precision, simulators have become more common in preventative physical culture and rehabilitation. Simulators provide a distinct benefit in that they enable you to alter the speed, intensity, and amplitude of movements by putting your body through a variety of exercises. Strength and endurance, joint health, and the removal of hyperdynamic effects are all aided by this exercise (Aytar et al., 2020). Different muscles and joints are targeted by the simulated workouts. Simulators help in the development of basic joint movements and muscle strength. Advances in sports and leisure as well as the evolution of sports-accessory and pharmaceutical technologies are substantially influencing today's health care practices. In addition to helping individuals improve their posture, athletic gymnastics is a popular kind of physical culture. As a consequence, regular, measured physical exercise is the best defense against improper posture. A person's musculoskeletal system is safeguarded through correct usage throughout his or her lifetime (Menz et al., 2003).

Correction of Posture Disorders

When designing a class schedule, everything must follow a set of rules: the conditional optimum of physical state; testing; selection of strategy for employment, technique, and exercises. In any event, the physical preparation process addresses four issues: repair, preservation, development, and maintenance of the degree of readiness that has been attained. Rehabilitative,

general physical fitness training, training, and preserving sports lifespan are all examples of motor routines (Menz et al., 2007). Pressure on the concave side of the spine is initially offset by the flexibility of the intervertebral discs when a person with poor posture engages in physical activity. Compression of the concave vertebrae occurs as a result of long-term physical stress. To repair a bad posture, one must first correct the pelvic inclination angle, then correct any abnormalities in the spine's physiological curve, then address any abnormalities in the chest, abdomen, scapula, or head shape. They are a sort of exercise that focuses on the stretching of muscles, the relaxation of muscles, coordination of movements, and corrective and respiratory. In comparison to similar exercises without objects, the weight of the object, the improvement in the level of the moving body segment, the increase in inertial forces arising during the swinging and pendulum movements, the complexity of the requirements for coordinating movements, etc., enhance the impact of these exercises. There is a rise in the therapeutic impact of exercise owing to a more precise dose of the load or an increase in stretching effect or muscular tension when using special shells, equipment, and simulations, respectively. In other words, the power simulators represent mechanical work for a specific set of muscles that has a distinct or local effect. Progressive and congenital types of spinal disease with signs of pain are exceptions to this general rule. Special physical exercises account for the majority of resources allocated to the development and maintenance of healthy posture (Madadi-Shad et al., 2020). It is important to credit the following activities for helping to rectify the curvature arc:

1. Spinal-correction exercises with an asymmetrical approach. A concave arc of curvature results in mild stretching of muscles and ligaments, while a convex arc results in targeted strengthening of weak muscles. These exercises are designed to develop the muscles of the trunk on one side alone (Sutherland, 2002).
2. Based on the minimum biomechanical effects of specific workouts on the curvature of the spine, symmetric activities are used. Because the spine has deformed, the symmetrically placed muscles of the trunk are physiologically out of balance, and these workouts correct that imbalance. Every routine workout should have greater functional loads for weak trunk muscles (for example, on a convex arc of curvature) so that they train harder than stronger muscles (Sutherland, 2002).
3. Corrective and preventative activities for treating and avoiding spinal abnormalities.

Poor posture may be remedied with breathing exercises, according to many individuals. Breathing coordination and muscular strength are improved, as is chest and diaphragm mobility, thanks to these workouts for the respiratory system. In addition, they assist to prevent and treat chest wall problems (for example, exercises performed in the original position lying sideways on a platen, laid under the convex part of the chest, - pulling the arm to the side up). Over time, the system adjusts more quickly if the load remains stable. Sticking with the same set of strength training exercises for a long time, just modifying the weight and the number of techniques is the ideal strategy for long-term success. Tiny adaptive changes in the execution become habitual when the same complex is used repeatedly. It is recommended that you replace these compounds every six

to eight weeks. Well-designed physical activities may strengthen the musculoskeletal system while also improving posture(Lloyd Laubach, 2013).

Review of literature

We've all heard our parents tell us to stand up straight or chastise us for slouching, and although such remarks may irritate us, they aren't incorrect. As simple as sitting or lifting a heavy item might be, your body's stress-resistance capabilities are built on the structural foundation of your posture. As a result, muscles are forced to work harder than they need to which results in exhaustion, lethargy, and decreased efficiency. Students in today's society can sit on chairs, benches, or even seats for lengthy periods, which allows them to sit in a slouched position.

It is expected that 2020 research by Sakshi Shah and Dr. Poonam H. Patil, which included 35 teens and was published in India's Indian Journal of Medical Sciences, would examine the effects of posture correction and low-intensity workouts on the respiratory systems of adolescents. The six-minute walk test for respiratory function, a flexible ruler to identify spinal postural defects, and a peak flow meter to quantify lung function were utilized for pre-and post-assessment. They concluded that "posture correction and workouts aid improve respiratory functions in teenagers significantly" using all of the tests and data collected throughout the research. Running, jumping jacks, planks, and other moderate-intensity exercises were used in the trial for a minimum of five weeks a day. The individuals were also given instructions on how to maintain good posture throughout the day.

Authors: William R. Taylor & Ors. Carolin Bontrup An investigation on the link between sitting habits and low-back pain among sedentary office employees was published in the journal Spine. 64 contact center office workers were studied over 400 hours using textile pressure mats, according to research published in Applied Ergonomics, Volume 81, No. 11, November 2019. The goal was to find a link between a sedentary lifestyle, eating habits, and low back pain. 75 percent of the people who participated in the study reported experiencing some degree of back discomfort at some point in their lives. This is solid proof since it shows a clear and unmistakable link between the two. Morris and Patricia Grieve In addition to Keith Larson, Krissann Mueller-Klaus Carol According to Oatis' research, there is a link between certain postural irregularities and the occurrence of discomfort. Physical Therapy volume 72, Number 6 in 1992 found a clear link between the existence of any postural deformities and the occurrence of pain after conducting a study of 88 subjects. There was, however, a much bigger episode of pain and a more severe postural abnormality in the individual.

Park, Kim, and Or conducted cross-sectional research based on the sixth Korea National Health and Nutrition Examination Survey (KNHANES 6). Because there was a lot of data to support the idea that desk and table time was directly linked to LBP, but the grading of it wasn't well studied. The Korea National Health and Nutrition Examination Survey (KNHANES), which was conducted in 2014 and 2015, was used as a data sample, according to the study. Chronic LBP was defined in a national health survey in Korea as self-reported LBP lasting more

than 30 days. Because the findings were so important, the sitting time was divided into sections. Using logistic regression analysis, it was shown that, when compared to other individuals who engaged in high levels of physical activity, the time spent sitting at a table had a positive correlation with low back pain.

Roland Zemp, Michael Fliesser, William R Taylor & Ors., also Workers' occupational sitting behavior and back pain were examined in pilot research published in the journal "Occupational Sitting Behavior and Back Pain - A Pilot Study." New Sitting Categorization Technology (SIT-CAT) has been developed by the authors based on this research, which allows for more accurate categorization of sitting postures. In this research, 20 officials were chosen at random, and it was observed that those who sat for long periods were more likely to report back discomfort.

Researchers Patricia Griegel Morris, Keith Larson, and Krissann Mueller-Klaus found that the majority of the subjects in their 1992 study "Incident of common postural abnormalities in the cervical shoulder and thoracic regions and their association with pain with 2 age groups of normal and standard subjects" suffered from any stage of postural abnormality in TCS region, with the vast majority of individuals in the moderate bracket. Many of the participants in the aforementioned study had postural abnormalities in the cervical, shoulder, and upper back areas. This finding may be partly attributed to a lack of awareness of one's posture. Sang-in Jung's study from the SPTS Journal of 2016 reported that observational data on CVA, scapular index, and pulmonary function tests for a total of 50 participants indicated significant differences and was published.

It was first published in February 2012 under the title "Biochemical impacts on head posture and breathing motions of the chest." A study authored by Karolina Wglarz, Karol Piotrowski, and Elbieta Szczygie concluded that while the sagittal plane position of the head was not conclusive and affirmed by the dialing of the chest, in the relaxed position significantly, meaning that the forward head posture causes limited movement of lower ribs both in the sagittal, frontal and transverse planes, which is consistent with the findings.

Discussion

Several research has found that students with better body posture either that is sitting, standing or even sleeping are more focused and motivated, these postures doesn't only effect in long term but also in short term in the form of physical pain as well as mental health sitting is the major time spent while studying either in classroom bedroom or café hence sitting comfortably with proper support is important the proper posture avoid neck, shoulder, back pain as well as maintains the energy level which leads to fewer breaks in studying and excellent performance in learning the comfortable and correct sitting during lecture keeps student focused on the lecturer much longer, hence the sitting of lecture halls must be designed keeping in mind that students has to sit here for long period sitting upright with proper backrest not only keeps mind active but also improves breathing and oxygen intake after classroom or lecture halls study table is the most important place where spent time studying where ever this study table might be at home in bedroom hostel or at coffee shop, it is cardinal to have a

sitting with proper back rest which promotes proper body posture, National health service (NHS) advises that poor posture triggers headaches and migraines that is the result of slouched posture during sitting with effects the neck muscles when a student sits in improper posture hi/her muscle works extra which leads to the less energy for studying and hence taking more breaks and insufficient progress in learning sitting in slouched positions might lead to improper digestion of food and hence stomach problems. Proper body posture not only enhances physical and mental health but psychologically boosts your confidence levels the way you talk, and the way you give a presentation or interact with other people is enhanced due to your boosted self-confidence.

So, what amounts to a good posture?

For there to be good posture in a teenage student, basically all 32 vertebrae of the human's spinal cord must appear in a straight line when looked upon from the front. While looking from sideways three curves must appear on the neck, shoulder, and bottom of the back. Humans don't have these curves in the spine since the child's birth a newborn infant has just one curve in its spinal cord, other curves start manifesting at the ages of 12-18 months. These curves in a person's spinal cord essentially absorb excess stress from activities like jumping or walking.

Easy steps to enhance your body posture

Modify the environment you spend in bad postures such as setting up your TV or computer so that its screen is straight to your eye level, sleeping on your side with neck support, and a pillow for leg support helps as well. Wearing shoes with low or no heels in the base and good arch supports using headsets for phone calls are just a few simple changes that could be made for drastically better posture. Anything from a baby to a schoolbag shouldn't be left hanging while being carried and must be kept closely attached to the body symmetrically and regular exercise.

Conclusion

Because of the reasons discussed above which include but are not limited to the heavy desk-bound daily routine, collegiate students are a distinct likelihood of attracting respiratory defects. Since the scientific discourse being researched and studied till now accumulating into nothing of concrete evidence stating a clear connection between sedentary lifestyle, postural defect, and respiratory impairment all the recent research and studies provided above in standardized situations and circumstances to study if postural defect and respiratory impairment are genuinely linked and proportionate to each other. Establishes a situational regular occurrence of postural defect among collegiate students with respiratory impairment and pain-related disability. Enough emphasis cannot be given to the relationship between posture and breathing and attaining optimal posture on the body. If either breathing or posture is in disorder its directly proportionate to each other and causes a vicious cycle of exacerbating symptoms (like anxiety, tightness in the chest, chest pain, difficulty breathing, shallowness of breath, hyperventilation, etc.) until proper awareness and education are spread about this and the pattern is broken.

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