

SJR6

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I have been a practicing physical therapist for 47 years, including research and teaching, with a focus on back health and injury prevention, which are based on habits of healthy posture and movement.

Back health in the school environment has been a focus of mine for over 15 years. I have been a member of Healthy Kids Learn Better Coalition starting in 2005. I have advised school districts on school chair purchases for back health of students and have done extensive research on the backpack problem.

I appreciate the opportunity to address this epidemic affecting our children. My goal is to provide our legislators with information to reach effective solutions to this problem.

Problem

Back pain, strain, postural distortion, long term effects of school backpack use, including the increased risk of back disability in adulthood

This Legislation

I applaud this issue being before you. Since the 1970's children have been using backpacks to carry their school books and have suffered the consequences.

Since backpacks are off-axis loads, posture immediately has to adjust, because the center of gravity has changed. If the off-axis load is increased, postural distortion is increased. This combination of loading in increasingly poor posture for prolonged periods every day is the recipe for pain and injury. If backpacks continue to be used for school, it is crucial to reduce the weight a child should carry in his/her backpack. This is important to reduce the problem, **but is not a solution.**

The main strategies that have addressed the problem for over 40 years, weight carried and method of wearing the backpack, have been largely ineffective. Statistics of pain and injury from backpack use have increased. According to the Journal of the American Medical Association Pediatrics, low back pain among school-aged children is also increasing. This affects school attendance, general physical activity, and creates an increased risk for low back pain in adulthood, the greatest medical cost to industry and workforce productivity, let alone quality of life.

The strategies have been ineffective because they only address the weight carried in

backpacks and the manner in which the bag is worn and adjusted. This bill again addresses predominantly the weight of the load carried, not the postural distortion caused by the design of the bag itself. It does however encourage use of “ergonomic backpacks”, which begins to address effective solutions. However, ‘ergonomic’ is not well understood or defined in reference to backpacks, which in themselves do not display ergonomics.

It is misleading to address weight carried as the chief culprit in this problem. That would lead the public to believe that our children should carry no weight at all, when in fact weight is crucial during the growth period for building bone density for a lifetime.

The chief culprit is postural distortion caused by a carrying system that loads the body behind its vertical axis, the common backpack, which also requires frequent unhealthy movement patterns in order to handle the load. These two factors—poor posture, and poor handling movements—are injurious, especially with heavy loads. Therefore we should not load typical school backpacks heavily. If the moderate load is transferred to a loading system that aligns with the body’s vertical axis, postural tone is enhanced and pain is relieved or greatly reduced with the same load.

Looking to effective solutions, we need to examine the bag itself, provide carrying systems that load the body with good posture, and allow the user access to contents in a healthy way. There are bags available that do just that. It is also possible to create one’s own system when the principles are clearly understood.

We are in fact training **something** with everything we carry on a daily basis. We can make the choice to train good strong posture and awareness of healthy movement habits in our children with such everyday activities, rather than train patterns of pain and disability.

Solution

- 1) Thoroughly analyze the cause of the problems being addressed. Is the weight the culprit? or is weight an essential element for healthy bone development? Should any weight be carried with poor posture?
- 2) Educate the public about the physics and developmental physiology related to how the body is meant to carry loads and why it is important for lifelong health.
- 3) Apply knowledge of physics related to reducing the force of the load upon the spine. The further the load from the axis, the more the force is multiplied on the spine. Eliminate the torque by loading on the vertical axis.
- 4) Teach body skills of good posture, good body mechanics with everyday activity, and especially when lifting and carrying loads.

- 5) Always load the body with good posture, using an axial loading system for carrying school supplies that does not distort posture with increased loading.

Other Related Public Health Issues

There are two other significant public health issues directly related to this discussion: osteoporosis, and deaths from opioite misuse.

Osteoporosis is a pediatric disease that usually manifests itself later in life. Prevention of the disease can only happen during the growth period, the period when weight-bearing activity is crucial for bone density for a lifetime. Carrying weight is important and beneficial, not harmful, as long as it is done moderately and axially, with good posture.

The Opioite Epidemic is predominantly the result of misuse of pain medication, most often prescribed for back pain. Back pain often begins in childhood, usually related to backpack use which causes postural distortion and poor movement habits, with heavy weight added on. Students that move their load from their backpack to a bilateral axially-loading system, are relieved of their pain and experience improved posture, the foundation of spinal health. They also have access to items without bending and twisting with the load.

This Legislation could be a significant factor in addressing all of these problems, if worded thoroughly for effectiveness.

Textbooks when carried in methods described, would then increase their value in education from not only their academic subject but also Physical Education for the most important lifelong movement skills of all, good posture and healthy movement in everyday activity, while increasing postural strength—the basis of healthy bones, pain-free bodies, and positive outlook throughout life.

CONCLUSION

Knowledge is available to effectively solve this problem. I would like to be a resource for you and the Department of Education in creative ways to implement the knowledge effectively and simply. Back health demands that loads be carried with good posture and handled with good body mechanics.

Please make the following addition to SJR6 *in italics* to read:

Page 2, line 12 (b) Schools should encourage the use of ergonomic backpacks with individualized compartments to properly distribute the weight of books and equipment, and *which load the body on the vertical spinal axis with no postural distortion.*

Submitted herewith:

Our Kids, Backpacks, and the Back Epidemic. M von Foerster, Orthopedic Practice Vol. 15:3:03

What is an Ergonomic Backpack? Marilyn Miller von Foerster MA, PT

Influence of Physical Activity on Bone Strength in Children and Adolescents: A Systematic Review and Narrative Synthesis. Abstract: Vina PS Tan et al. Journal of Bone and Mineral Research, Vol29, No. 10, October 2014

Load Distribution and Postural Changes in Young Adults When Wearing a Traditional Backpack Versus the BackTpack. Kimberly D. Dahl, et al. Gait & Posture 2016;45:90-96, <http://dx.doi.org/10.1016/j.gaitpost.2016.01.012>