

Our Children, who is designing for them...a lesson for children, parents and teachers!

Schools will be starting soon and we need to think about keeping our kids safe, no matter what their ages.

In the United States, there has been an ongoing argument between business, labor and the federal government over the application of the science of Ergonomics. OSHA is looking to establish a third column for Musculoskeletal Disorders (MSDs) on the 300 logs. These workplaces are everything from foundries, through vehicle manufacturing and assembly to healthcare facilities of all types, to aerospace manufacturing, to chemicals, foods; every type of job excluding construction, agriculture and maritime.

So what does this have to do with children you might ask? Well, children are humans and their need for good ergonomics for their school workstations, equipment and recreational toys and equipment is not well publicized. Low back pain has been estimated at nearly 70% for adult workers in industrialized countries (Anderson, 1991). Now statistics are beginning to surface for children with back pain. Approximately 23% of elementary school children complain of backache and that percentage rises to about 33% among the secondary school population (Mierau, 1984, cited in Marshall, Harrington, and Steele, 1995). In Europe, studies found that as many as 60% of schoolchildren experience back problems by the ages of 15 or 16. A study in the U.S. of 500 teenagers found that 56% of the males and 30% of the females suffered from degeneration of the spine found by E-ray evidence. This is just about back pain, what about the other injuries or potential for injuries called musculoskeletal disorders. Ergonomists recognize back pain, hand/wrist, elbows, neck, shoulders, knees, feet and eyes as areas of the body at risk for ergonomic type injuries.

The term “musculoskeletal” refers to all parts of the body, muscles, bones, tendons, ligaments, nerves, and blood supply. The musculoskeletal injuries happen over time and are referred to as cumulative in nature and there is not one incident that can be referred to as the reason behind the injury. What are the symptoms? Pain, discomfort, burning, reduced mobility, loss of strength, numbness or tingling. What are the risk factors that create this type of ergonomic injury potential? Poor postures, too much force, leaning or pushing against a hard or sharp surface, repeatedly using the same body part without rest, and certain environmental issues such as glare on a monitor, climate conditions such as too cold or too hot.

Let's first define the word Ergonomics. It is of Greek derivation meaning Ergo means work and nomos means laws however the applied meaning is “fitting the task to the person” which translates to assuring children have the correct height, reach, size, strength, and understanding of the risk factors as they relate to the use of the equipment they interact with everyday.

So what types of equipment do children regularly interact with that might produce the risk factors? Their workstations or desks at school, their backpacks, their interactive computer games such as the Wii, Game Boy, DSS, and now younger kids have cell

phones and are texting. Now we have to consider playground equipment and other outdoor recreational equipment such as swing sets, helmets and scooters. These items come in basically one size and since when will one size fit everyone? Young children especially are at risk based on their growth spurts and other developmental changes.

First, let's address the ergonomic issues at school. With the prevalence of violence in the facilities, administrators are calling for the removal of lockers that were used as storage for children as they went through their school day. Some of the items that might be included are books, gym "stuff", and lunches. Removing the lockers mean the children must assume the burden of carrying all of their "worldly needs" throughout the day on their backs. The London based National Back Pain Association found that 80% of 11 and 12 year olds were wearing the backpacks incorrectly and that some were hauling as much as 60% of their own body weight (The Washington Post, September, 1999). Now as we educate ourselves to the backpack issue, what are some of the questions we as parents and educators should be asking. One question might be will the excess weight of the backpack create curvature of the spine (scoliosis) in growing children? What about the shoulders and the neck, are they also affected? What is the maximum weight a child should carry and for how long? Should we be outfitting our children with bags that hang to the side of the body like a messenger bag? Is the excess weight creating instability for the children while wearing the backpack? What is a good backpack design?

There are answers to these risk factors that are cost effective and easily understood. Let me share a few with you. Here are some tips for computer users.

- Teach the children the meaning of "neutral" posture for all of their body joints through graphics that they are able to understand, such as the good, the bad and the ugly
- Teach educators and parents the proper workstation configurations
- Children should keep their wrists level with their forearms while computing
- Upper arms should be close to the body so children are not reaching
- Angles formed by shoulders, hips and knees is maintained at more than 90 degrees
- Angles formed by hips, knees and feet is maintained at more than 90 degrees
- While using the mouse, children should be instructed to move with their entire arm not just their wrist.
- Remind children to take regular breaks away from computing to allow rest and recovery of their bodies.
- Adjustability of all workstations is a necessity
- Children cannot play computer games all evening and on weekends. Their bodies need time to rest and recover. Limit the time children spend with hand held devices such as 'Gameboys' and joy sticks and large commercial game room Equipment.

Here are some tips for backpacking.

The basic backpack design is incorrect because it requires its wearer to use 10% more energy. With the backpack the entire load is placed on the back creating force and instability on the part of the child. The weight creates the back to want to fall backward which forces other body parts to react adversely. However, when worn properly with proper weight distribution, the backpacks are easier on the body than those that are carried on one shoulder such as the messenger bag.*

No one should carry more than 25 lbs.

Person's Weight in Pounds	Maximum Backpack Weight in Pounds
60	5
60-75	10
100	15
125	18
150	20
200	25

Recommended limits set by the American Physical Therapy Assn., American Academy of Orthopedic Surgeons, and the American Chiropractic Assn.

In conclusion, we need to:

Educate teachers and parents so they can identify and address the risk factors.

Educate teachers and parents about the proper postures, too much repetition and need for rest breaks.

Pay attention to the weights of the backpacks our children are carrying on their developing spines.

The answers exist in **EDUCATION and AWARENESS**. The more people understand about ergonomics, the healthier and safer our children will be.