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By Rani Lueder, CPE

In recent years, there has been a growing interest in child ergonomics, particularly when it comes to children learning and playing with computers. Media articles suggest that children experience the same dangers as adults. After all, if computer work increases the risk of developing Cumulative Trauma Disorders (CTDs) among adults, wouldn't the same be true for children?

Yet if you look a bit closer, distinctions between children and

adults become more pronounced. If you ever get a chance, line up your old X-rays in chronological order. Your forty year-old spine will look quite different than it did one and two decades before. Children are growing and developing, not subject to the same degenerative processes that we older folks experience. Perhaps we should refer to ourselves as the "degenerates," and children as the "generates."

Children are also considerably less prone to incurring soft tissue

disorders such as Carpal Tunnel Syndrome (CTS) than adults. Child CTS cases are typically caused by forceful events such as playing softball, rather than using keyboards.

Differences between children and adults

1. *Children's bones are growing.* Children's bones are softer than adult bones. The relationship between a child's bones and muscles also changes over time; some bones grow

Just Little



Children

faster than others.

2. *Child bone growth occurs at the growth plates.* Growth plates define the length and shape of

mature bones. When growth is complete in

adolescence, growth plates close and are replaced by hard bone.

Growth plates are the weakest link in growing skeletons (weaker/softer than ligaments and

tendons), representing fifteen percent of childhood fractures. Damage to child joints usually occurs at the growth plates. Of particular importance, damage to growth plates can affect future bone growth.

Ligament and tendon injuries are fairly unusual in children with immature bone growth plates. Since ligaments are two to three times stronger than bones, bone fragment injuries are more likely than ligament injuries.

3. *Taller children are not necessarily less prone to injury than their shorter counterparts.* People often assume that taller children are better able to safely perform manual tasks such as heavy lifting. Yet children may be at greater risk following a growth spurt.

Bone growth in children requires “catch up.” For example, the long bones of seven-year-old girls on average reach eighty percent of their peak length—while the bone mineral content is only forty percent of the

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ultimate level. That is, their bones grow longer before they become stronger. Following a spurt of bone growth, children also need to learn posture and coordination; soft tissues need to develop to accommodate their new dimensions.

4. *Children's spines evolve and differ from adult spines.* Infants are born without a lumbar curve; their lumbar curves develop as they progress towards adolescence. Adolescence also accompanies hormonal changes that affect the distribution of muscle and fat—and correspondingly the external shape of our backsides.

One reason ergonomists make a fuss over the importance of movement among adults is that by the time we reach adolescence, we have lost our ability to actively “feed” our spines (intradiscal segments), and eliminate intradiscal waste. Thus, movement is essential in slowing the associated degenerative processes as it induces changes in pressure that cause passive transport of nutrients and waste products.

Movement is also critically important for adults because so many have to unlearn life experiences that lead them to develop unbalanced, passive and constrained sitting postures.

5. *Children's vision is malleable.*

Pay extra attention to children's monitor heights, which inevitably force them to maintain excessively high visual fields.

Children's vision is developing. Ankrum and Fostervold's overview of the research concludes that classroom schooling requiring extensive or intense near vision can contribute to the development of near-sightedness (myopia). There is reason to suspect that too-close viewing dis-



tances, especially at high viewing angles, may increase long-term visual dysfunctions as children mature into adulthood.

Helping children succeed

Despite these differences, pain can debilitate children as well as adults. Recent studies indicate that schoolchildren experience much higher degrees of discomfort and pain than had been commonly assumed. Some researchers suggest that children's neck and back pain rates compare with those of adults.

We want to encourage children to find ways to learn, and to see learning as a positive experience. How better than by alleviating them of discomfort and distractions caused by inappropriate learning environ-

ments?

Childhood is also a critical time to teach good work habits that can set children up for a lifetime of safe practices. As they grow and develop, they learn coping mechanisms for dealing with new environments that will continue to affect the risks they face as they develop, mature and age. It is always best to learn how to “do it right the first time” than then to relearn safe practices later in life.

Let's hear it for the “generates”.

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See ErgoTherapist Cindy Burt's companion article on children and handwriting, page 36 of this issue. And for more on these issues visit the child ergonomics section of Humanics' website at www.humanics-es.com/recc-child.htm

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