

Beware of the Sitting Trap in Learning and Schooling

“Ergo-dynamic” concepts are decisive.

By Dr. D. Breithecker

Numerous studies on preventive measures against physiological problems in offices have long since demonstrated the importance of ergonomic furniture, changes in posture and physical activity at the workplace. These foster motivation and satisfaction with the work environment, and improve well-being and the quality of life while providing conditions to maintain the health of the employees. Ergonomic furniture ultimately ensures increased performance and productivity.

Many countries have established regulations about the work environment. Preventive measures with regards to working conditions for children would make even greater sense. It is more taxing for children to sit still than for adults. The static posture causes long-term problems in children who require more exercise to build their physical health than adults need for its maintenance.

Western civilizations include teaching how to sit still in their schools’ “hidden curriculum”. Most teachers seem to associate learning with quiet, disciplined sitting. “They are making concentration and cognitive attention dependent on physical inertness” — The students’ need for physical relaxation, signaled by fidgeting etc, is suppressed. “Movement is not desirable because it disturbs the class” — Many adults still think the “ideal” student sits in class receptively, attentively and motorically passive.

Life is movement, even when we are sitting

Fig. 1: If a body is permanently inactive, brain activity is reduced.

From their first year in elementary school on, children are exposed to sedentary strain under adverse ergonomic conditions. The most dangerous form of sitting, however,



is sitting still and for long periods of time.

School-children want to be really “good” at school. If they want to stay awake and focused they have to be able to move even when seated. Their temporary fidgety or restlessness is just another expression of this need. And the result is that this mental and physical “survival strategy” will only earn them the premature and wholly inappropriate label ADD or AD/HD.

Don’t worry about students which are rocking on their chairs. They’re just carrying out their physical and mental survival. The commonly held opinion that movement detracts from attention and concentration is no longer valid. Movement is an anthropological need and a basic behaviour for adolescents to support a well balanced physical, mental and emotional development. The highly sensitive and changing organism of adolescents requires a lot of physical activity to supply growing organs, muscles and brain with blood, oxygen and nutrients.

Today, people of all ages suffer from an ever increasing lack of exercise and a sedentary lifestyle. Therefore these anthropological principles should no longer be stymied by static-passive ergonomic standards but incorporated in “ergo-dynamic” solutions which encourage dynamic and productive sitting as well as temporary standing and active learning.

Learning and Schooling – “ergo-dynamic” solutions are decisive

Fig. 2: Learning, health and well-being. “Ergodynamic” concepts are decisive.

We do not have to underline that grown ups need height adjustable furniture. This is an absolutely basic requirement. But productive workplace conditions also demand productive and physiologically body behaviours. This is especially important for adolescents who depend upon their need to move (changes in posture) because of



their developmental physiological prerequisites.

Only a continual rhythmic change between passivity and activity, strain and relief, tension and relaxation will lead to conditions which ensure a balanced physical, emotional and mental state. The physiological load shift is automatically executed even while lying down and sleeping. This shift is significantly more important in a physiologically adverse position such as sitting. Therefore active-dynamic sitting is an important part of an "ergo-dynamic" and healthy work station in school.

Active-dynamic sitting is enabled by a swivel chair featuring a mobile construction where the seat is flexible towards the back, the front and towards the side. The seat will follow any movement while encouraging a change in posture. This promotes the natural impulse to move continually and effectively.

The best sitting posture is always the next one

Active-dynamic sitting always includes active leg movement. Foot and leg movements are physiologically important for two reasons. Not only do they activate they improve the blood circulation, but they also have a direct impact on the position of the pelvis. The activity is determined by the seat's mobility, if, for example, the body teeters, rolls around or swivels on the chair. Consider the problems passengers have in cramped seats on long flights. Any intermittent movement of the legs has an effect on the position and dynamics of the pelvis.

With the pelvis, the position of the sacrum and its base - on which the bottom disk and therefore the entire spine rests - changes as well. This means that every change in the pelvic position results in a corresponding activity of the spinal column.

Active-dynamic sitting saves strength!

Fig. 3: Dynamic sitting affects body, mind and soul

As long as this active-dynamic balance exists, there is a natural strain and relief on the muscles, sinews, ligaments, disks and



vertebrae involved in sitting. Moreover, a frequent load shift supports the demand for a muscle controlled sitting ("sitting up") because - in contrast to passive sitting in a comfortable chair - the muscular endurance improves. As the posture changes, there is always one group of muscle fibers at work to maintain the posture while others can relax. The result is a symmetric muscle strain with a coordinated agonistic and antagonistic muscle balance. This continual muscle activity not only builds the muscles of the spine, it also supports its economical supply.

Productive, dynamic sitting also supports diffusion in the disks because they are no longer partially exposed to permanent pressure, but the pressure is distributed over their entire surface. Frequent posture changes can be considered a "diffusion pump".

Many of the sitting variations adopted by the students in active-dynamic sitting, sitting astride on the chair, sitting back on the chair or slouching are important relief postures. These targeted measures temporarily relieve the spine. They are partly based upon the physical fact that the torso's center of gravity does not have to keep up a posture if resting on a large supporting surface. Any enlargement of this surface helps to relieve the body.

Movement doesn't only come from the head; movement also supports the head

The positive effects of active-dynamic sitting on neurophysiologic parameters should not be underestimated. Static-passive sitting, however, has a long-term negative effect on a student's ability to concentrate. After all, it is not only the muscles of a child which cannot take constant physical strain; a child's mind can't either. For children between the age of seven and nine, time passes three times slower than for adults.

As we know there are a number of regulating systems in the human organism which are associated with posture and physical activity. The most important one is the neural and neuromuscular system. Traditional static-passive sitting and a lack of physical activity during lessons leaves the neuromuscular system unchallenged. This has a negative impact upon the entire organism and leads to successive physical and mental degeneration. The necessary neurophysiologic impulses are provided by a varied range of physical activities during prolonged

periods of sitting, because the control circuits control the reflexes and keep up motor activity.

A child's healthy brain will signal its need for a dynamic load shifts unconsciously by rocking or fidgeting on conventional chairs. Neuro-scientific findings confirm the hypotheses that physical activity and related psychological-emotional control processes are essential for cognitive performance. A common proverb says: "The mind forms the body". But what about the body forming the mind? There have been studies confirming that physical activity alone and its sensory effects develop, maintain and strengthen synapses in the brain (Hollmann et al. 2005; Spitzer 2002).

An "ergo-dynamic solution" following the slogan "As much static as necessary, as much movement as possible" is an important component of an "active school. This makes learning more varied and thus more interesting. Students' eagerness to learn and their learning performance can be provably increased (see results of a study www.haltungundbewegung.de – Look for "Ergonomics for Children").

And such basic conditions will also motivate and relieve teachers.

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More information on "Ergonomics for Children", go to
www.haltungundbewegung.de