



**“Federal Working Group on the Development of Posture and Exercise”
(Registered Association.) on the ergonomic design of pupils’ work places.
(Head: Dr. D. Breithecker)**

Ergonomics for children

We learn from children that moving is living.

Especially for young children, movement is necessary, not naughty. Activity benefits both the body and mind. Although this can be frustrating to teachers and parents, the non-stop acrobatics are actually healthy and vital for growth. What appears to be unnecessary or sometimes even dangerous mischief can actually increase blood flow and oxygen supply to developing organs, muscles and brains. Our philosophy is that furniture for children should ergonomically support the total learning environment, wiggles and all.

The downsides of sitting still.

Children today spend significantly more time sitting than they did 20 years ago and we know they are less active, which can present many drawbacks. Movement is beneficial, even while sitting. And in the interest of supporting the healthy development of children, we believe that more awareness is needed about the subject of posture.

Traditional furniture encourages children to sit up straight and still. We think this should be a thing of the past. Even the commonly held opinion that movement detracts from attention and concentration is no longer valid.

As you may recall, conventional chairs are fitted with a rigid seat that inclines backwards and merges into a seating hollow. The children’s bottom is held in this hollow, cramping the solar plexus. The resulting flat breathing as well as inadequate blood circulation causes the working of the organs to be restricted due to lack of oxygen.

The results can decrease attention and concentration:

1. The pelvis turns increasingly backwards and the back becomes rounded. In developing bodies, the bone structure can be permanently deformed.
2. The shoulder, neck and back muscles become tense.
3. The spinal cord is pressed from one side.
4. The stomach muscles slacken and the digestive organs become constricted.

While sitting, our bodies have to fight gravity. A rigid sitting posture is manageable for a limited time. However, an exclusively static posture can lead to mental and physical impairment due to poor oxygen supply. This causes what we call, “The School Headache.” The sitting discomfort is aggravated when a child has to work at a table or desk with a horizontal top. The child’s back is noticeably rounded and their head is bent back in order to attain the necessary spacing between the eyes and the project at hand.



Postural damage already originates in childhood.

The functionally degenerative process to the postural and locomotive system today presents a persistent health problem in all age groups. The troubled axial skeleton increasingly protests against the forced deprivation of exercise and increasing sitting strain with back complaints, some of them serious.

Even for children, particularly on reaching school age, this statically-passive posture has become typical. On the average, primary school children spend 10 hours per day sitting. The health consequences for them are, however, particularly fatal. Continuous sitting affects them at a time when their development and maturing is being influenced by significant growth changes.

In the future the sitting problem will be even more acute. The sitting strain which will result from the current demands for “teaching on the Internet” can only be imagined. In order to avoid that “teaching on the Internet” becomes synonymous with “children into the sick bed”, more attention must be paid to “seating quality”.

Experts all agree that the seating situation for our children is miserable! Most adults think that children have “rubber bones” and continually sitting “hunched-up” on school chairs which are too small for them does no harm. A fatal mistake. Particularly while maturing and during the differing development of biological functions between child and teenager as, for example, in the case of bones and particular the spine, static-passive sitting postures on/at non-ergonomic and particularly incorrectly-sized furniture have dramatic health consequences. The result is that more and more children complain of head and backache not to mention other psychomotoric conspicuousness which are indirectly caused by long periods of sitting still.

Children should sit in the first class!

Future health is based on prevention. Prevention starts in childhood. “Spinal training” starts in childhood, at the latest when an active playing child changes into a sitting one.

We researched the sitting habits of children and we’ve learned that there is no ideal long-term sitting position.

Good reasons not to sit still. A brief lesson in physiology.

Dynamic beats static, hands down.
Try this yourself.

Here’s a quick demonstration to illustrate our point. Stand up and stretch your right arm out, then raise it to a horizontal position. Hold your arm very still. After a short time, you will likely feel an urge to move your arm, or at least your fingers. This natural desire for movement helps ensure the necessary blood and oxygen supply to the arm.



If you don't give in to this intrinsic need, the blood circulation will become worse and inevitably, the deprived arm will drop down again, despite your most determined efforts to fight it.

It's important to note that the organs are dependent on a continuous blood supply. This can only be maintained by meeting the body's dynamic demands.

Introducing the latest educational improvement technique.
Desks and chairs working together to support dynamic movement.

To achieve maximum results, an ergonomic children's work area should:

- Adapt to the height of the child.
- Conform to the child's autonomous need for movement.
- Accommodate the various activities

The human body, especially those of growing children, requires a steady flow of blood and the oxygen and nutrients that it brings. Movement is fundamental to this process, which is why a static body posture should not be maintained over a long period of time.

A common example of this natural requirement for movement is the regular change of supporting leg when standing. The body unconsciously shifts weight from left to right as needed. And so it is with sitting. The body needs a desk and chair system that enables freedom of movement.

An optimal working position is achieved when the table or desk is not only adjustable in height, but is also equipped with a 16- to 20-inch inclinable working surface. The writing and reading surface is then comfortably positioned for the viewer and the upper part of the body and the head can be held upright.

**Correct posture is a matter of adjustment.
Furniture should suit the children – not the other way around.**

The correct adjustment of school furniture is done in two steps.

First, the chair should be selected so that the front edge of the seat is the height of the bottom of the student's kneecap. The angle between the thigh and the trunk should be slightly more than 90° to ensure that the hip joint is above the knee joint. Both feet should be in contact with the floor. To utilize the full depth of the seat, the front edge of the seat should not press against the lower leg. When a student leans back, the backrest should provide support just below the shoulder blades.

Next, the table/desk height should be adjusted while the student is sitting in the proper chair. First, have the student sit at the side of the table and let his/her arms hang down freely at the side of the body. The arms should then be raised until they are at 90° to the body. The tips of the elbows should be two to three centimetres below the table top/front edge of the table.

Make sure that the top of the table can be steplessly inclined to enable the child to bring the desk towards them when working. Different tasks require different inclination angles.



The body was created for movement – to enable life to pulsate.

Chairs should be designed to encourage movement rather than restrict it. Ergonomic chairs for children are equipped with a flexible seating surface that follows every change of body position and invites continuous motion. Simultaneously, the swivel mechanism of the chairs ensures easy turning in both directions. This encourages the natural impulsive movements of sitting children.

Several physiological benefits are achieved:

- Spinal vibrations are changed regularly.
- Spinal discs are continuously supplied with nutrients.
- Complex back muscles are stimulated.
- More than 100 joints in the spine are able to move freely.
- Blood circulation and oxygen supplies are optimized.
- The brain metabolism is supported, encouraging concentration.

Sitting and working. Sitting and relaxing. Different activities require different seat inclinations.

Just shifting the body weight changes the inclination of the seating surface towards the front or back. This enables moving easily from a restful position, which relaxes the back, to a physiological working position.

Sitting, as well as dynamic sitting, demands that the muscles, sinews and ligaments hold the body in place. A relaxing place for the trunk can only be found when the backrest is reclined. This relaxing position offers the spinal discs, muscles and ligaments a chance to recover.

Working demands a certain orientation to the table or desk. The forward movement of the upper part of the body is assisted by a seating surface, which is also inclined forward. This ensures that the pelvis is slightly lifted, which in turn, enables the back to be kept upright more easily. Students should be encouraged to use the backrest for support at all times.

Movement not only comes from the head - movement is also good for the head

Ergonomically designed furniture can offer significant benefits and contribute to students' learning success.

We encourage productive sitting. Movement keeps the mind and body fit.

In particular, the development of the neuronal functions and the associated learning, memory formation and intellectual capability profit from the urge of nursery and primary schoolchildren to move which thanks to nature also shows itself when sitting.

The greatest motivation for synaptic switching and the production of factors which sustain nerve cells is movement in complex form. This includes walking, climbing, balancing as well as tilting or stretching on a chair. These activities stimulate areas of the brain in a complex manner. This results in neurotropic (cell protecting) factors being produced which guarantee the switching and retention of neurotropic structures, i.e. they stimulate further synapsidial growth as well as initial growth of nerve fibres and nerve metabolism. The resulting differential neurotropic switching circuits also form the basis for the cognitive ability of the



individual. According to the latest investigations, an improvement of the short-term memory (working memory) and learning ability can be thus achieved.

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