

**MOVING – SUPPORTING – HOLDING  
SITTING. ERGONOMICS.**

**AND THE CHAIR THAT BRINGS THEM TOGETHER.**



***giroflex***



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# PREFACE

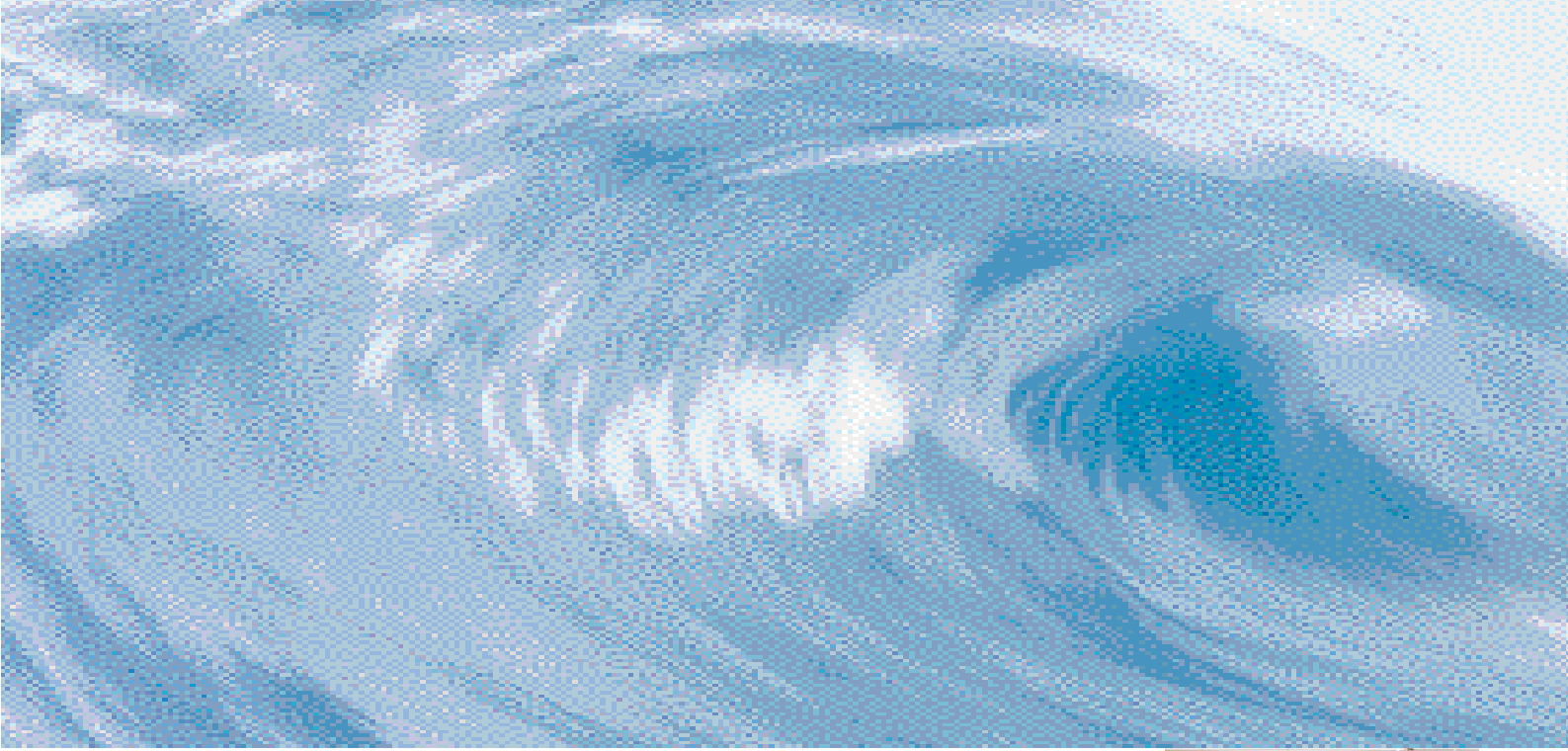
Sitting – it has always been one of the most basic occupations of human beings. Sitting – these days, however, it is no longer primarily a matter of taking our ease – while eating, conversing, relaxing – it is the position we assume for working. A new attribute of the information age is that more and more people are sitting longer and longer – and often badly. What's more, with a body which is actually designed specifically for movement.

Whether you are responsible as a decision-maker, intermediary or consultant for purchasing office chairs, or just take a personal interest in this subject as someone who spends long periods seated in the office or at home – this brochure has been written with you in mind. We want to offer you some insights. Into how our body, mind and spirit react to prolonged sitting. Into how, on the other hand, our intellectual and spiritual condition affects our sitting behaviour. Into what helps us maintain a healthy posture and good overall well-being. And into how the research and development staff at giroflex support you in this at your workplace with well-conceived ergonomic solutions.

Sitting – even that can involve movement. We believe that only active sitting, extensively adapted to human beings and their needs, can meet the demands of the future. Giroflex already started to specialize in manufacturing office chairs at the beginning of the nineteen-twenties, and has cooperated closely on their further development with specialists in ergonomics and occupational medicine up to the present day. Prof. Dr. Helmut Krueger, Head of the Institute of Hygiene and Occupational Physiology at the Swiss Federal Institute of Technology in Zurich, has also assisted in an advisory capacity in the production of this brochure.

The giroflex company has been operating on an international scale since 1938, and has since provided millions of ergonomic chairs for users who sit for prolonged periods on all five continents. Through this publication we hope to provide you, our readers, with an insight into the complex correlations of sitting – and that you will see ways in which you can beneficially organize your prolonged periods of sitting.

**Sincerely, giroflex**



# EVERYTHING IS MOVEMENT. HUMAN BEINGS TOO.



Human beings are mobile to the core. They are physically, spiritually and intellectually mobile. They move others and are moved. They move consciously and unconsciously. By moving they keep themselves mobile. Movement is their life. The secret is to keep movement in a flexible equilibrium: motion and countermotion.



*«Ergonomics is the science devoted to studying the behaviour and reactions of human beings under workload. Its objective is to adapt work to the potential and needs of human beings.»*

*Prof. Dr. Etienne Grandjean, Swiss Federal Institute of Technology in Zurich, ergonomics pioneer and giroflex consultant from 1962.*



## **MOVING CORRECTLY IS ALL-IMPORTANT. ESPECIALLY AT THE WORKPLACE.**

Ergonomics is like salt: you only notice it when it's missing. Scientists have concerned themselves systematically for only a few decades with finding out how the environment and working systems can be optimized wherever human beings are employed. Prof. Dr. Etienne Grandjean, a pioneer in the field of research into human beings and their working environment in the office, was scientific consultant to giroflex for decades from 1962. Together with him giroflex developed ergonomic standards for office chairs which have been adopted throughout the world.





*«Ergonomics today – people can and should independently adapt their working systems to their specific, individual needs.»*

*Prof. Dr. Helmut Krueger, Swiss Federal Institute of Technology in Zurich, successor to Prof. Grandjean and current giroflex consultant.*



In our era of rapidly developing technologies and their impact on society and human beings, ergonomics is focusing increasingly on the comprehensive individual conception. Employees are increasingly being expected to assume personal responsibility – and in return they are claiming greater decision-making scope. What is called for nowadays are no longer simply standard, ergonomic office chairs, but rather consciously styled and designed workplaces which are as individual as their occupants in every respect. Modern ergonomics thus always includes taking a look at people as a whole and not only their physical aspects and needs.



Understood and applied in this way, ergonomics will always make a contribution towards

- preserving physical and mental/spiritual health
- increasing motivation
- enhancing creativity
- boosting productivity
- improving the enjoyment and quality of life
- people's personal success
- society's success

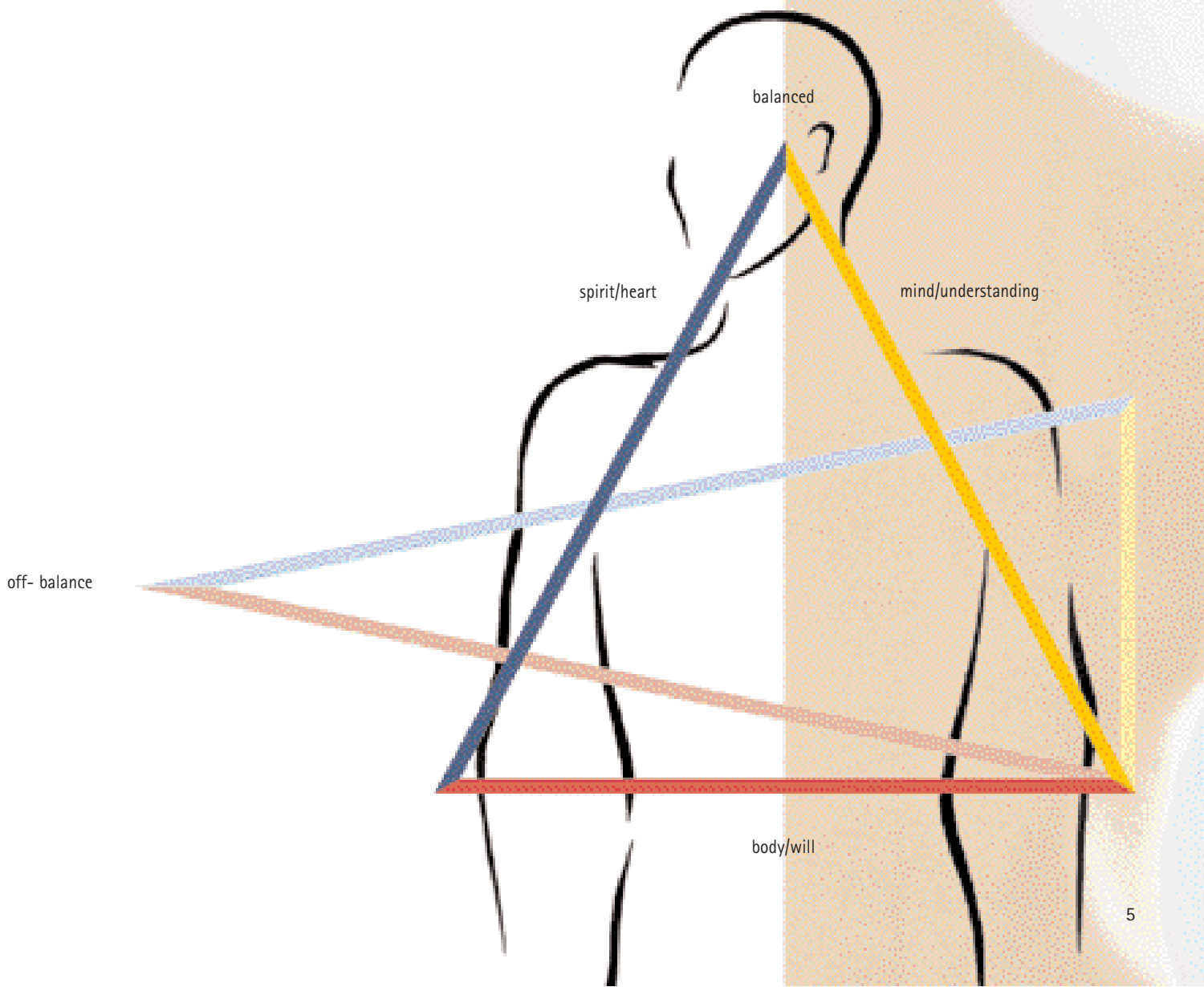


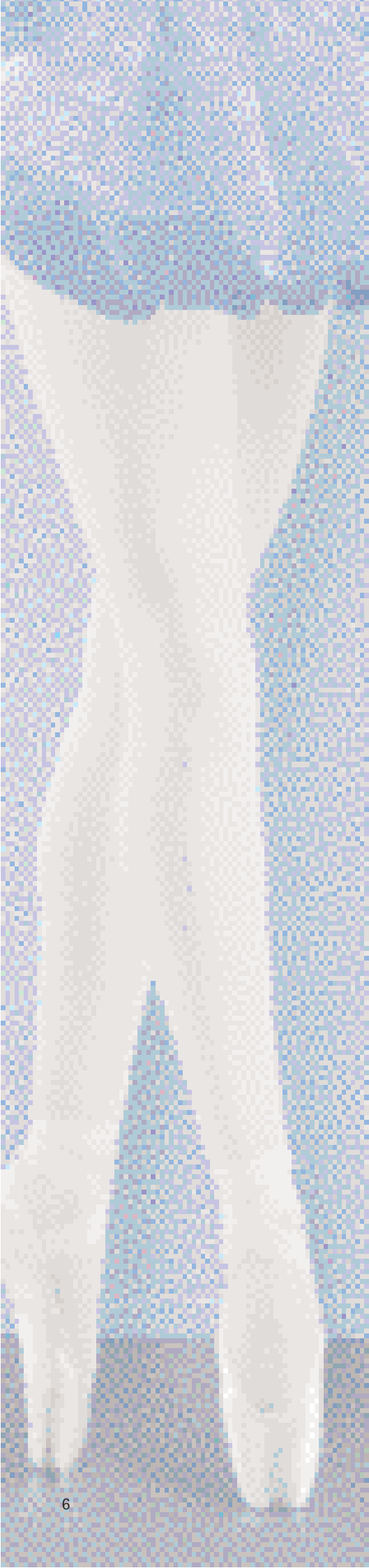
**Thinking and acting ergonomically** – creating a framework of conditions and systems in which all the participants can shape their working life individually and to their all-round satisfaction.

# HUMAN BEINGS. MORE THAN JUST THE SUM OF ALL THEIR PARTS.

Human beings consist of mind, spirit and body. No mind – no thoughts. No spirit – no feelings. No body – no actions. Human beings have experiences at all three levels and retain them in their memory. Mental, spiritual and physical conditions are linked and influence each other. So when physical needs are involved the mind and spirit also always play their part.

In the psychological and philosophical fields this mutual association and interdependence is often illustrated by the triangular model:

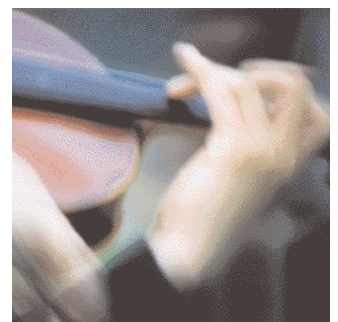
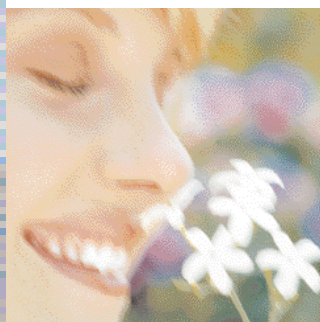




If these three aspects are in equilibrium, a person is «OK». If he is a «leaning triangle», i.e. if one aspect outweighs the others, the other aspects literally «go short». The mental, spiritual and physical conditions are subject to individual cycles. Harmony of body, mind and spirit is the process in motion of a living system.

It is important to keep reminding ourselves of the correlations between thinking, feeling and acting; the law of motivation or demotivation can be derived from this. Motivation arises from positive thinking, which generates positive feelings and a correspondingly strong ability to act. Demotivation arises from negative thinking, which gives rise to negative feelings and results in a diminished ability to act. Anyone wishing to act with human beings in mind must therefore always take into account and cultivate all three perspectives.

**Body, mind and spirit** – only if all three aspects exist and manifest themselves in the correct degree is a human being in balance, healthy and motivated.



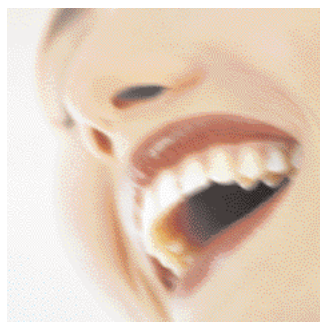
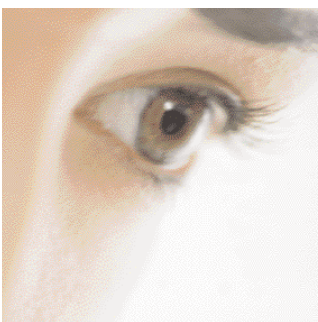
*«Body, mind and spirit are material and energy interwoven with each other. They are the person who comes to know himself in different ways.»*

# THE HUMAN BODY. MUCH MORE EXCITING THAN A MACHINE.

A violin virtuoso cannot give expression to his abilities with an instrument which is out of tune. On the other hand, it is exactly the same for the most sonorous Stradivarius if it is handled by an untalented person. Talent needs the instrument – as the spirit needs the body as its translator into the visible. The instrument needs the talent – as the body needs the spirit and the mind to furnish its senses.

Human beings are much more than biomechanical machines. Not only body, spirit and mind are in constant interaction. The functions which can be described physically also influence each other and react to each other. We can only express our knowledge and our abilities to the extent that our body allows it. Ensuring the dynamic equilibrium of all the systems in the human organism therefore means ensuring well-being and efficiency.

**Our body** – not a machine, but rather a living system featuring diverse, mutually linked influences.





## THE DYNAMICS OF SITTING ARE THREEFOLD: SUPPORTING, HOLDING, MOVING.

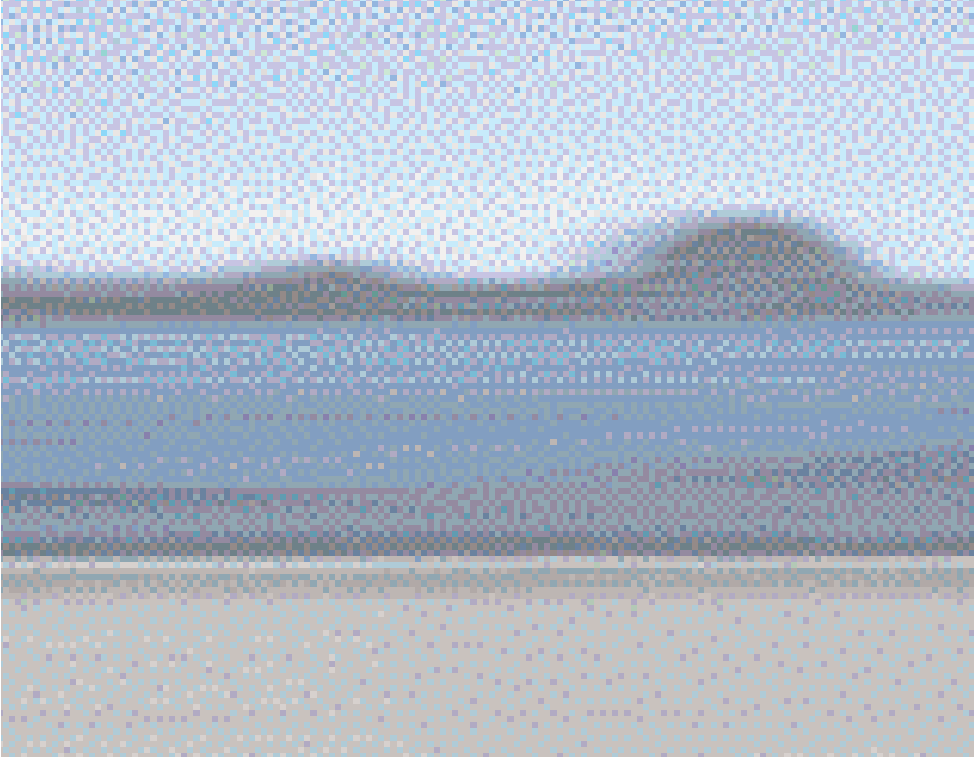
Human beings' upright posture has given them the freedom to employ their arms and hands for complex activities. The transition from moving on four legs to standing on two feet coincided with a total reorganization of the body's statics. An extremely ingenious, coordinated and dynamic supporting and holding system in conjunction with movement and countermovement now keeps us in balance. Sophisticated as this system is, it is prone to disorders.

Maintaining the same posture and the same movements over prolonged periods thus sends the body off balance or subjects it to stress. A tensed back, cramped muscles or twinges in the limbs are the consequence – and a poor basis for concentrated working and effective thinking. Movement arises from change. If you want to sit healthily and also be intellectually alert, you have to have repeated changes of position and movement – and be able to ensure this by means of a suitably equipped chair.

Sitting as an alternative to standing serves primarily to relieve the load on the system, e.g. the spinal column, the muscles and the circulation. However, the advantages and disadvantages cannot be clearly delineated; they depend mainly on

- the length of time you remain sitting
- your sitting posture (e.g. leaning forwards or backwards, active or passive)
- the degree of movement and changes of position while sitting
- changes between sitting, standing and walking
- the ergonomic quality of the chair

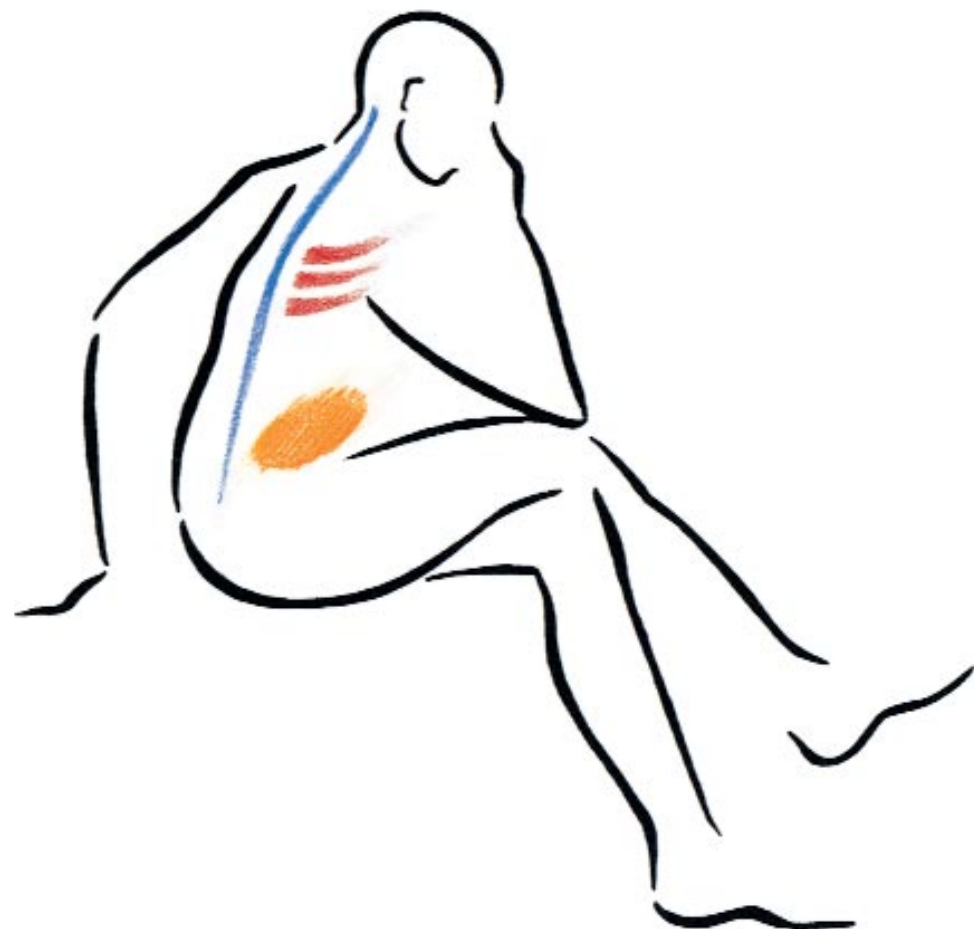
*«Sit dynamically, think dynamically.»  
Or: «Idleness breeds stagnation.»*



From a purely functional standpoint, the following organic systems in particular play a role in the context of sitting:

- the spinal column as a supporting system
- the abdominal cavity with the pelvis as a supporting system
- the muscles as the holding system

All three of these also need movement and changes of position to remain in working order.



**Healthy sitting** – movement and changes of position are the key actions for keeping the body's supporting and holding systems in balanced working order.

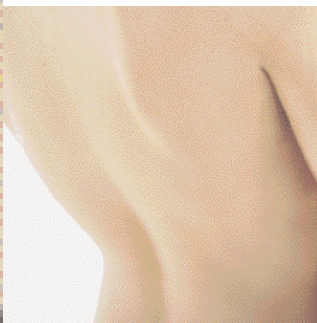


## Supporting system No. 1: the spinal column

An upright posture with minimum use of the muscles – the double S of the spinal column bears the burden. Adaptable intervertebral discs alternate with solid, articulated vertebrae to keep our spine as stable as it is flexible. In addition to this the spinal column also acts as

- a support for the back muscles, which are attached to the bony processes
- a duct for the spinal cord, which together with the brain is the centre of the nervous system
- the inlet and outlet for the nervous system

Keeping the spinal column healthy and in working order is therefore of vital importance for our physical mobility and also for our spiritual/mental condition.



## Supporting system No. 2: the abdominal cavity and the pelvis

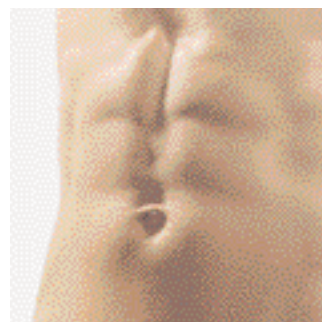
The abdominal cavity with the pelvis is the human organism's second supporting system besides the spinal column. Its load-bearing capacity depends primarily on the adequate working and movement of the muscles of the abdomen and the pelvic floor. If these are sufficiently strong they hold the internal organs – and thus relieve the load on the spinal column.

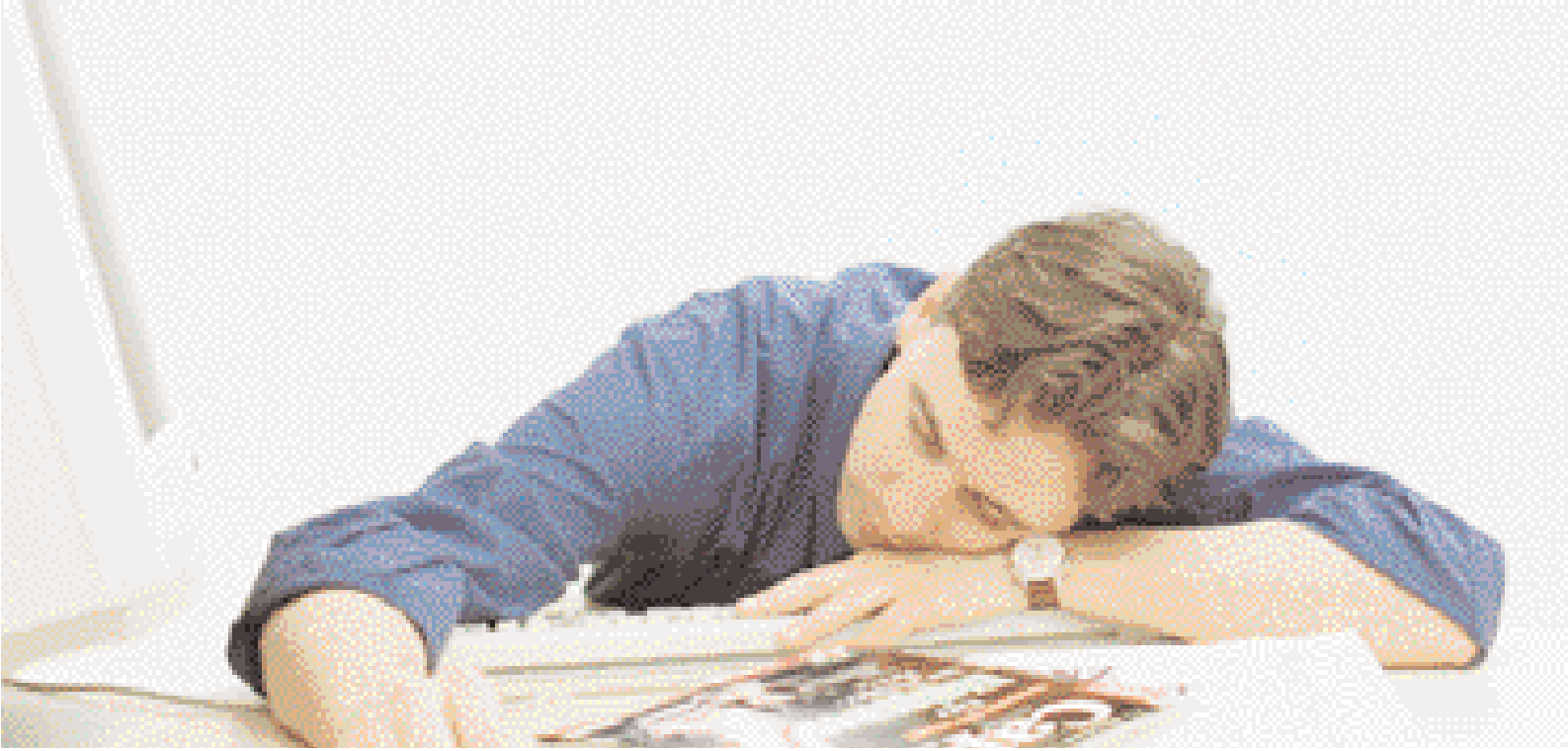
### Holding system: the muscular apparatus

Together with the spinal column, the body's entire muscular apparatus ensures an upright gait. Muscle fibres are activated by nerve impulses which – controlled by the brain – are generated in motor nerve cells in the spinal cord. If the same muscle fibres have to work for prolonged periods, they tire and generate only reduced strength. It is therefore important that large numbers of muscle fibres should be stimulated one after the other and be able to develop strength. This can only be achieved through corresponding awareness and the use of the entire body.

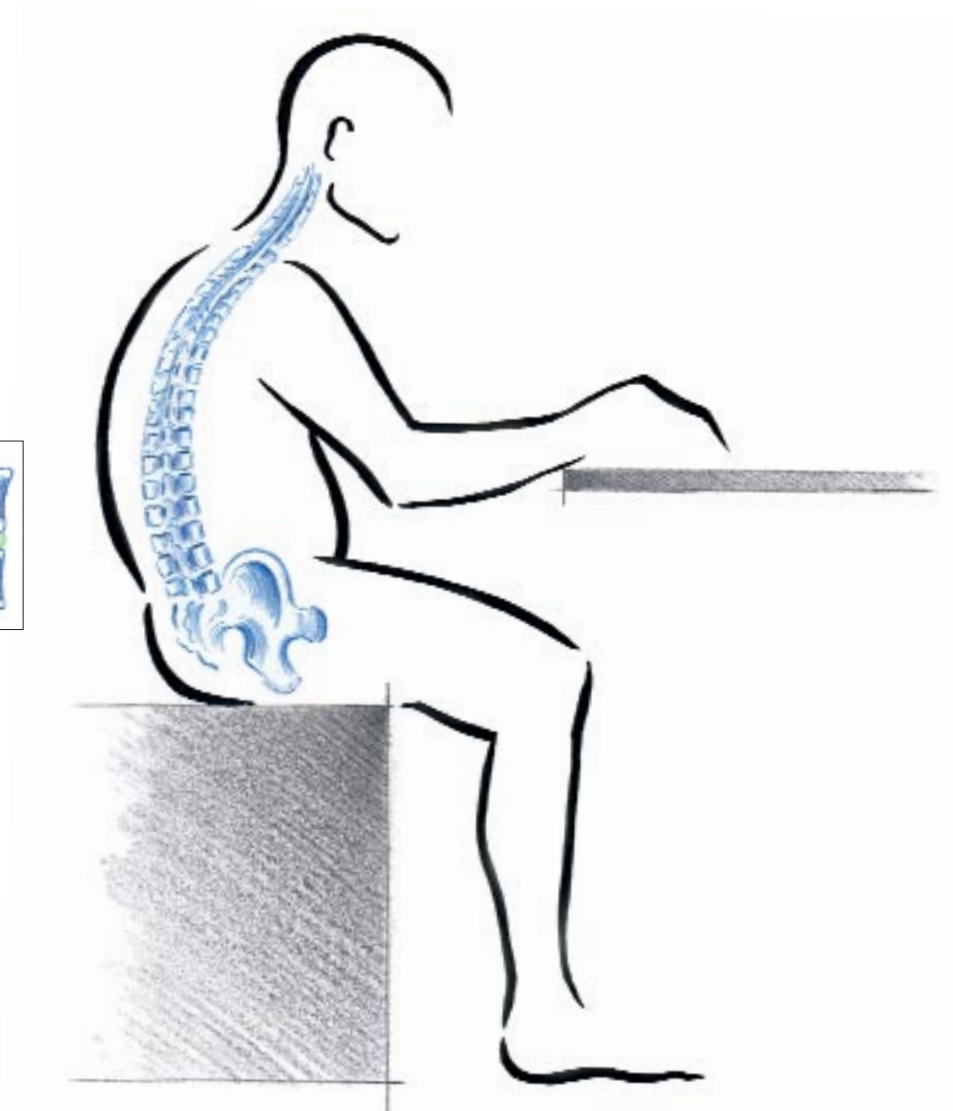


**Supporting, holding, moving** – one for all, all for one: spinal column, pelvis and muscular apparatus work together in a healthy, upright gait. The system as a whole only remains intact if all three «team members» are used and strengthened equally vigorously.





## **SITTING:** THE THINGS THAT CAN GET OFF BALANCE.



When we sit down, this primarily relieves the muscular apparatus in the trunk, the hips, the legs and the feet. That is a good thing. However, the other side of the coin is that the pelvis is also rotated, and this is transferred to the spinal column, which tends to produce round shoulders and increased strain on the intervertebral discs. Furthermore, the abdominal muscles are pressed forwards and cease to perform their holding function.

When you sit leaning forwards, pressure in the intervertebral discs is increased. Tissue fluid is pressed out. If this position becomes a permanent posture, painful changes can take place in the articular and intervertebral disc surfaces of the vertebrae, and a «sitter's belly» develops due to the slackening of the abdominal muscles.

The pressure in the intervertebral discs is eased in an upright sitting position. The return of the tissue fluid into the intervertebral discs is facilitated and thus also the supply of nutrients to the intervertebral discs. The abdominal muscles are better able to hold the abdominal organs over the pelvis.

However, there is no ideal permanent posture. The following drawbacks can be added to those mentioned above, especially in the case of a prolonged forward-leaning position with too little movement:

- The thorax may be constricted, thus adversely affecting breathing. However, an adequate supply of oxygen is vital for all body cells.
- The body's entire energy exchange and thus its general well-being can be adversely affected by constriction of the intestinal tract and consequent digestive problems.
- The flow of blood and lymphatic fluid can be adversely affected (i.e. impaired supply of nutrients and transmission of information to the organs, impaired discharge of foreign substances from the tissues, impaired resistance to infection).
- Tension and pain can occur in the back of the neck.
- Parts of the muscular apparatus can be under- or over-worked.

#### What needs to be done:

Counteract these effects – each time you sit down. By doing the following:

- Movement – movement – movement!
- Keep reminding yourself what happens while you're sitting down.
- Keep reminding yourself of your posture.
- Practise «mobile sitting», i.e. change your sitting position as often as possible (especially between leaning forwards and backwards).
- Switch between sitting and standing working positions.
- Use an office chair designed according to ergonomic and anatomical principles.

**Sitting** – You can counteract the unfavourable effects of sitting incorrectly and too long – with awareness, movement and the right office chair.



# THE ERGONOMIC CHAIR: SUPPORTING, HOLDING AND MOVING

An office chair which is intended to render the best possible service to human beings must conform to the organic aspects of supporting, holding and moving, and translate them into an appropriate mechanism. And since human beings are not a standard size, the aspect of individual adjustment is added to this.

## **Supporting system: the chair base**

The supporting function is performed by the seat and the base. Quality criteria here are:

- **Stability.** A five-arm base is essential. In the case of office chairs with an adjustable backrest, the five support points of the base must form a circle at least 20 percent larger than the maximum seat depth.
- **Robustness.** Material and structure must also be able to withstand heavy loads.
- **Pressure compensation.** A seat surface shaped for the human form and with a rounded front edge relieves pressure on the thighs.

## **Holding system: the rests**

Backrest and armrests are complementary in their holding properties. A backrest performs its functions best of all as follows:

- **Anatomically shaped.** Perfect support is provided by a backrest profile which replicates the anatomy of the spinal column and features a specially shaped area at lumbar height («lumbar pad»).
- **Correct rest height.** A low backrest is appropriate for varied activities or if the greatest possible freedom of movement is preferred. A high backrest extending to the shoulders is strongly recommended as essential for prolonged, seated activities which restrict scope for physical movement and easily result in unnaturally fixed positions (e.g. in front of a computer monitor). The back muscles can then relax and the load on the intervertebral discs in the lower spinal column region is relieved.

The armrests perform a further holding function. They relieve the load on the muscles in the shoulders and the back of the neck. However, they could restrict freedom of movement in the case of constantly changing activity.

# ORGANICALLY.

## Moving system: the backrest and the chair base

The backrest and the base are responsible for movement in and with the chair. The backrest must

- continuously follow the forward and backward movements of the back and at the same time hold, i.e. support it in any position – without any unpleasant sliding effect between the upper body and the backrest. A point-synchronized mechanism is a finely tuned system which ideally coordinates the movement of the chair with that of its occupant.
- be lockable in its angle of tilt if a prolonged period in one position is desired or appropriate (e.g. telephoning or working at a computer monitor while leaning backwards, or writing while leaning forwards).

The motion-optimized base must

- be swivel-mounted
- feature steerable safety castors, specifically for hard or soft floor coverings, for coordinated, safe movement with the chair as a whole.

The **ergonomic chair** supports, holds and moves its occupant by means of well-conceived features and intelligent mechanism.



# MODERN SYSTEM: INDIVIDUAL ADJUSTMENT.

We should all sit in a manner which is anatomically appropriate for us. Facilities for adjustment are important for

- correct support for critical parts of the body
- floor contact for the feet
- load-relieving angles of arms and legs
- preventing pressure (e.g. on the thighs)

So-called workplace sharing (e.g. in call centres) makes the facilities for adjustment especially important, since in this case several people alternately use the same workplace and thus also the same chair.

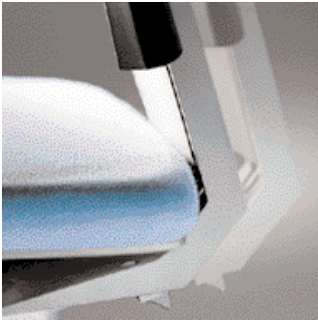




You should insist on these facilities for individual adjustment and check them carefully:

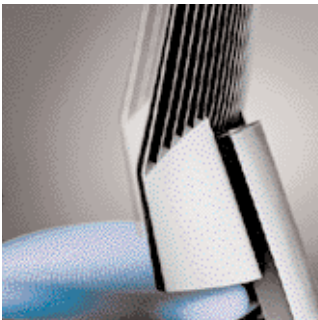
- **Seat height**

This must permit comfortable support of the feet even when seated leaning backwards, without pressure being exerted on the thighs.



- **Seat depth**

This compensates extreme differences in the buttocks and leg length of the occupants. If the seat depth is too small, there is a feeling of slipping off the chair. The legs then have to assume part of the holding function of the pelvis and the spinal column. If the seat depth is too large, the tendency is to use only the front part of the seat. This results in pressure on the thighs and the freedom of movement of the pelvis and the thorax is restricted and the load on the back is insufficiently relieved.



- **Backrest height**

The critical point of contact is where the lower lumbar vertebrae encounter the lumbar pad, in order to counteract any sinking of the pelvis and thus increased load on the spinal column and muscles. It must be possible to adapt accordingly to different back dimensions by adjusting the height of the entire backrest or adjusting the lumbar pad within the backrest.

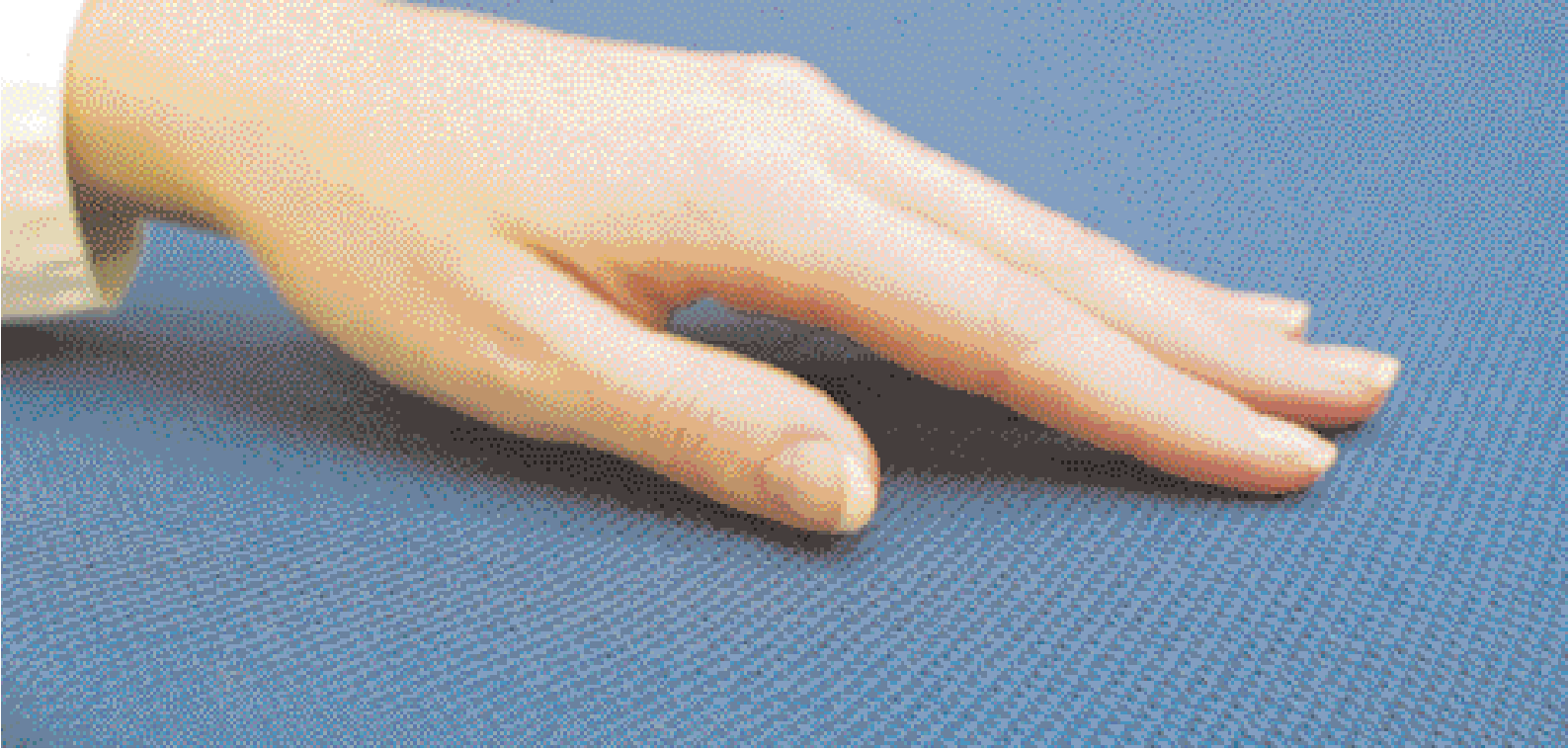


- **Armrests**

For people who use armrests a lot a height adjustment is useful for holding the arms in the best possible position (90-degree angle between upper and lower arm). If the armrest is too low this causes «drooping shoulders», if the armrest is too high the result is raised shoulders and tension in the back of the neck. An armrest which is adjustable in height, width and depth has many advantages. Above all it permits both support and relaxation as well as maximum freedom of movement and sitting options.

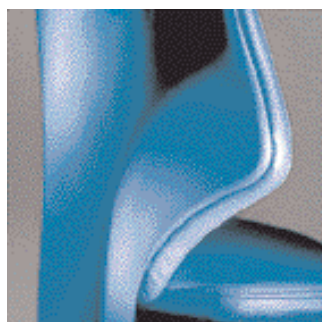
To enable the chair adjustment facilities to be utilized to the full they must be easy to understand and use. This requires suitable instructions on each chair.

**Individual adjustment** makes an office chair into an ideal personal equipment for its user – especially if different employees use the same chair.



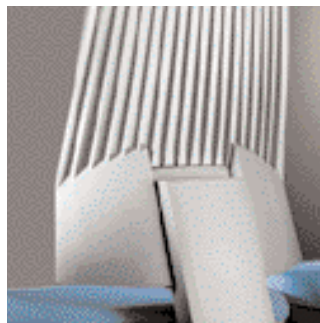
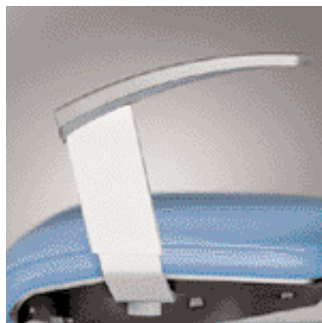
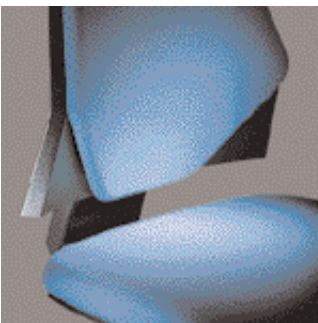
## **ERGONOMICS MEANS FEELING GOOD. THE SURFACE ALSO COUNTS.**

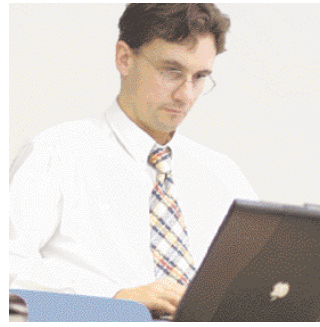
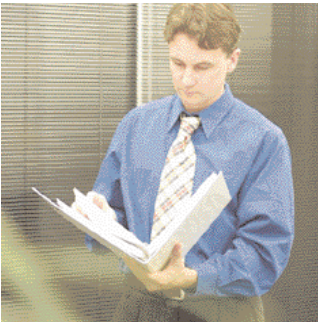
When you're sitting you are also always in close contact with the material of the chair. That is why pleasant upholstery and covering materials are also an ergonomic criterion. They should detract as little as possible from the function of the skin (especially the regulation of the body's moisture content and temperature). This aspect should, of course, already be taken into consideration in the choice of clothing.



# ERGONOMICS MEANS LOOKING GOOD. WHAT PLEASES THE EYE ALSO UPLIFTS THE SPIRIT.

Everything we look at leaves an impression on us. Positive or negative – it makes a perceptible difference. Chairs are not merely functional objects, their shapes and colours also make them an aesthetic and tangible factor in the working environment.





# THE RIGHT INVESTMENT: THE COST/BENEFIT FACTOR.

An ergonomic chair is much more than a necessary purchase. It is an investment in the

- health
- quality of life
- motivation
- creativity
- success of personnel and the company

The calculation is simple:

- The majority of all lost working time is due to illness and disorders related directly or indirectly to prolonged sitting.
- Illness and disorders are more than faulty bodily functions. They also weigh heavily on the spirits and thus also on motivation, creativity, productivity and general quality of life.
- The service life of a good quality chair is several times that of a computer.
- Projected, for example, over 10 years, personnel costs account for a large slice of the total in relation to buildings, fittings and office operating expenses.
- A company which invests in ergonomic and generally motivating equipment for its personnel will earn recognition also in the form of enhanced performance.

**The ergonomic chair** – a sum that adds up. Fewer lost working hours and demotivation, more enthusiasm for work and productivity on the part of personnel makes a more than favourable impression on results.



## TIME FOR A RETHINK: INFLUENCING POSTURE – WITH ATTITUDE.

Not all back problems have to be caused by prolonged sitting or an unergonomic chair. In the fields of psychology and psychosomatic medicine the spinal column is regarded as a symbol of inner stability and inner flexibility, as a flexible life support system. There are many references to these relationships in the language we use:

- we refer to positive or negative attitudes.
- someone is unsteady or stable.
- someone who is sad hangs their head and their shoulders droop.
- something moves us or leaves us cold.
- some people have broad shoulders and can bear heavy loads, others soon collapse under the weight of worries.
- people who don't let go of old ideas can prove to be «stiff-necked».
- the words «motive» and «motivation» have to do with movement.

People who keep checking their inner attitudes and asking themselves whether they have «taken on» too much, are under too much stress or are insufficiently «flexible» to follow the flow of life, and then change their attitudes accordingly could give their backs a better time of it in the long run, despite prolonged sitting.

**Having backbone** – not just a matter of externals, but also of inner attitudes to ourselves and the world!



*«Genuine responsibility only exists where there are real answers.»*



## **THE BEST POSSIBLE WORKING ENVIRONMENT: EXERCISING PERSONAL RESPONSIBILITY.**

Even the most ergonomic chair can only ever provide support, and no guarantee for preventing physical disorders arising from prolonged sitting. Final responsibility rests ultimately with the user. This involves:

- knowing one's own body well enough and respecting it as a miracle of nature
- knowing the risks of prolonged sitting
- knowing and utilizing the facilities of the ergonomic chair
- moving repeatedly
- changing positions between sitting and standing
- paying attention to a suitable diet
- paying attention to one's digestion
- paying attention to regular, deep breathing
- paying attention to suitable clothing
- repeatedly making oneself conscious of one's own posture
- being aware of one's inner attitude with respect to one's flexibility and ability to withstand stress



## THE ERGONOMIC OFFICE. MORE THAN AN ERGONOMIC CHAIR.

Ergonomics as we understand it is all-embracing and places human beings at centre stage. In order to close the beneficial circle around everything, of course, your ergonomic workplace needs even more elements – beyond sitting:

- all the furnishings (especially the desk or working surface at your height - accessibility)
- the monitor with keyboard
- the light and the lighting
- the colours
- the sounds
- the room climate
- the electromagnetic fields
- the interpersonal working atmosphere
- the content of the work

Supporting, holding, moving – it's never too late to tackle the ergonomic planning of your working environment!

# IT TAKES DAILY PRACTICE TO SIT HEALTHILY.

The ergonomic chair is the basis for well-being and productivity at the workplace. Occasional breathing and body exercises are beneficial to one's overall constitution and ensure that prolonged sitting does not become a problem.



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