

Promoting Healthy Seating Through Movement and Natural Spine Alignment

A Consolidation and Review of the Science Behind the balans® Concept



We were born to move, not to sit still. While ergonomists agree that no single chair or seating solution is the optimal ergonomic chair for everyone, most will agree that “movement” through a variety of proper

postures is essential to healthy sitting. More over, the concept of an open body angle between the hips and lower torso is most favorable. Our balans® seating pioneered these concepts with the introduction of the Variable balans® in 1979.

Introduction

The Variable balans® – the chair that started a revolution. Designed by Peter Opsvik and introduced in 1979, the Variable balans® is The Original Kneeling Chair™. This landmark design inspired a whole new concept of alternative and active seating; based on movement, open body angles and natural spine alignment.

Inspired by some earlier observations of Dr. Aage Mandal and noting that traditional chair design failed to take the human body into account, Opsvik, working with Dr. Hans Christian Mengshoel; and designers Oddvin Rykken and Svein Gusrud developed an entirely new type of chair.

Opsvik observed that traditional chairs were not created with the human body in mind. He further realized that modern man was becoming a more sedentary creature – the workplace as well as leisure activities were dominated by sitting. The body, however is not fundamentally designed for long term sitting, thus a proliferation of back problems exist throughout the workplace today. The balans® concept was created to address that.

As balans® gained popularity in the early 1980's, imitators appeared in the marketplace. These designs however often varied in their biomechanics and most failed to understand the underlying principles of the concept. Indeed not all "kneeling chairs" are alike, despite their name. There have been numerous studies conducted on both genuine balans® designs and generic kneeling chairs. For balans®, some have been inconclusive, most favorable, and none unfavorable. One shortcoming of this research is that it can tend to aggregate all kneeling chairs together in the same category and thus has led to some misconceptions about the original kneeling chair concept.

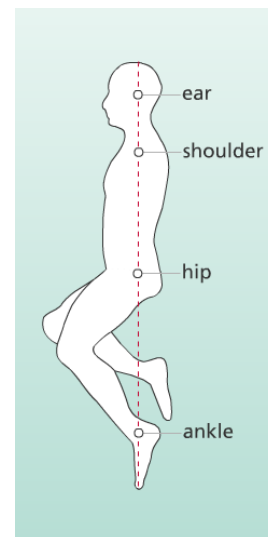
This white paper seeks to separate fact from fiction and presents an objective summary of research and science. It is aimed at educating and informing the reader about the benefits and issues surrounding the genuine balans® concept.

The Facts

The balans® seating concept was developed in response to a growing recognition of the limitations

of conventional seating. Its design concept is characterized by an open thigh-torso angle and lower leg support that flex (bend) the knees.

Although often referred to as a "kneeling chair" or a "knee-supported chair", the actual locus of lower leg support on the balans® seat is below the knees and at the shin to reduce potential loading at the knees. Balans® chairs are designed with the aim of encouraging neutral postures and facilitating postural changes. Although early versions of the chair provided limited adjustability, subsequent generations now incorporate a range of features to include seat depth, height depth adjustability, swivel, back and frontal (chest) support and rocking.



We have long known that long-term sitting in conventional postures increases the risk of developing chronic musculoskeletal disorders, particularly involving the neck, shoulders and low and upper back. In recent decades, the rates of spinal disorders have continued to increase in the general population. These injuries have become increasingly severe and expensive, affecting our discomfort, health quality of life and effectiveness at work.

Most people will develop severe back disorders during their lives, and once sustained, these tend to recur and worsen.

Movement Matters

We Were Born to MOVE, not sit still. A typical office employee who is sitting in a chair for hours on end is

bound to end up with aches and pains – the human body is not meant to sit still all day.

Movement is very important, but it is not the only thing that workers should take into account when they assess possible task chairs. Posture is also vital. Movement through poor postural positions can be extremely detrimental. By utilizing a chair that promotes movement through a range of proper postures, workers will inevitably complete their day with fewer aches and pains. Moreover, the open body angle characterized by balans® reduces constriction on blood vessels and nerves. Studies have demonstrated that continuous and subconscious movement while seated improves cognitive function and allows the sitter to work more attentively, improving productivity.

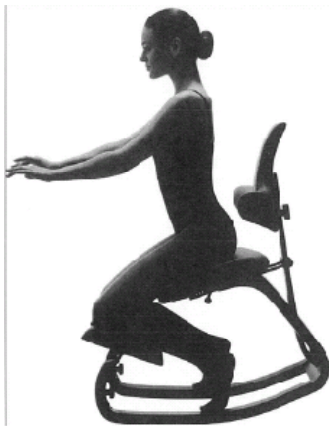


Figure 4. The Thatseit Balans design enables users to promote circulation and reduce leg swelling by activating the venous pumping action of the legs, such as by rocking with one leg on the floor and the other leg on the shin support.

Stranden (2000) describes how the use of the three venous pumping systems synchronize to aid circulation to the heart and prevent edema.

No other chair on the market can combine the key factors of movement and good posture the way the balans® chair can.

Just Two Hours A Day Sitting in a balans® Helps

A worker who spends their workday in a balans® chair is actually healthier than one who does not. Why? A balans® chair keeps the spine aligned in the most natural and neutral position and encourages movement as well. Using a balans® chair maintains

musculoskeletal health and burns calories while working. For those who may be resistant to the idea of replacing their conventional chair entirely, it has been shown that musculoskeletal health benefits can be derived from simply using a balans chair® for as little as 2 hours a day as a secondary chair. Periodically switching from a conventional chair to a balans® and back may in fact be the easiest way become introduced to this alternative way of healthy sitting.

Keep Your Knees, Please

There is a common misconception that the “kneeling” position of a balans® chair imparts unnecessary load on the knees and thus can be harmful to the knee joints. This is not true. The appearance of kneeling is actually a visual miscue. When sitting in a balans® over 90% of the body weight is borne by the seat, with the remaining portion distributed over both shins. The principle function of the “shin rest” aspect of the chair is to keep the user from slipping forward, due to the open body angle. In no event do the knees bear weight. A number of generic kneeling chairs in the marketplace today fail to understand this key principle, thus a proliferation of kneeling chairs that exist in name only. Such designs are more reflective of conventional seating with the appearance of a kneeling design.

If a balans® chair is designed and used properly it can be better for the knees than a conventional chair. This is due to movement the balans® chair facilitates. Rather than locking the knees into a single, static position, users of a balans® chair will shift effortlessly into different positions, encouraging blood flow and muscle use even during jobs that require hours of sitting.

Proper use of a balans® chair involves periodic flexing of each leg. The design of the chair is not meant to “lock” one into a bent knee position for hours on end. The shin supports are principally meant to keep one from shifting forward, it is possible, even preferable to use the chair with one leg extended and one leg on a shin rest. This position affords the sitter the greatest degree of control over their movement.

This simple but critical point has been the leading cause of the misconception that the chair is “bad for the knees”. Further, studies have shown that the bent knee position can also have a positive “leverage” effect on spinal posture.

EMGs and the balans® Chair

Some EMG studies designed to measure spinal load in a variety of static postures have been applied to balans® chairs. Observations that balans® produced higher EMG levels of intradiscal pressure have led some to conclude that sitting in this fashion is detrimental to the musculoskeletal health of the spine. Where these studies fail is in their design; to measure loads during static postures, being misapplied to movement, thus leading to improper conclusions. It has not been demonstrated that temporary higher levels of intradiscal pressures are detrimental. If that were the case, rigorous exercise, in its many forms would all need to be similarly characterized as detrimental.

What is more the matter is avoiding excessive muscle loads that exceed the sitter’s ability to recover from them. In short, EMG is not the most effective way to measure all sitting, and a most particularly ineffective way to measure sitting that encourages movement. In reality, the fact that balans® chairs promote movement is a positive aspect of the chairs, not a negative one.

For a more comprehensive understanding of these topics, please refer to our white paper:

<http://www.newdesignsforcomfort.com/downloads/balansreview.pdf>