

Invacare® | **Potential risk factors in seating**



Did you know...? The body is not designed for sitting, therefore, specially designed support surfaces such as seat cushions and back supports may be required to prevent postural collapse, orthopaedic deformity and skin breakdown.

This fact sheet will help identify potential risk factors that may negatively impact an individual's seated posture and skin. Invacare's **Matrix** seating range has been specifically designed to address and prevent such issues arising. The goal is to promote optimal, long term solutions by creating and maintaining healthy seated postures, function, and comfort.

Extrinsic risk factors

When seated, the pelvis is the primary structure supporting the individual's body. The Ischial Tuberosities (IT's) and sacrum are normally the first bony prominences to come into contact with the seat surface even though neither body part is anatomically adapted for sitting. With the ever present influence of gravity, pressure, shear and friction, the IT and sacral regions are at risk of skin breakdown.

An individual's skin and tissue health are affected by other extrinsic risk factors such as temperature and moisture (also known as microclimate) that can build up between the individual and the seat surface, affecting the integrity of the skin.

In order to understand the influence of these external factors, let's take a closer look at each extrinsic risk factor in turn.



Knowledge bank

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SEATING SERIES

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Impact of gravity when seated



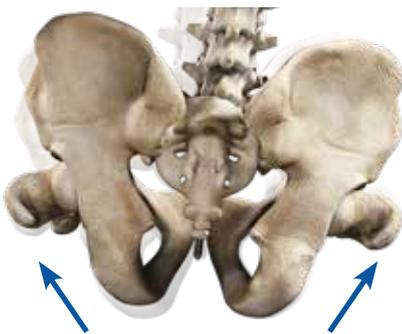
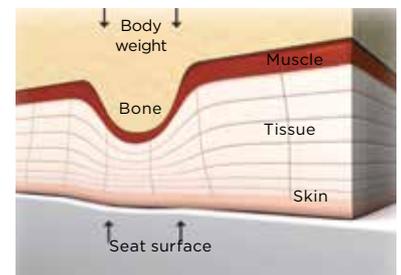
The downward pull of gravity on an individual in the seated position, combined with muscular decline due to aging, injury, or medical conditions, can lead to postural distortion or collapse. This restricts blood flow along with the delivery of oxygen and nutrients to the tissues, compromising cardiac function, respiration and digestion.

Imbalances in muscular tone or postural collapse can also affect the position of the pelvis, which can lead to excessive weight bearing over areas prone to or at higher risk of skin breakdown.

Functional postural support aids can optimize weight bearing and internal organ function, which is vital for the delivery of oxygen to the tissues for optimal skin and tissue health.

Impact of pressure when seated

Pressure is a vertical force that occurs when sitting. It compresses the skin and tissue between the supporting surface, and the bony parts of the body causing occlusion (closing) of the blood capillaries. This restricts delivery of oxygen and other vital nutrients to the tissues, which can lead to tissue cell death and result in skin breakdown.



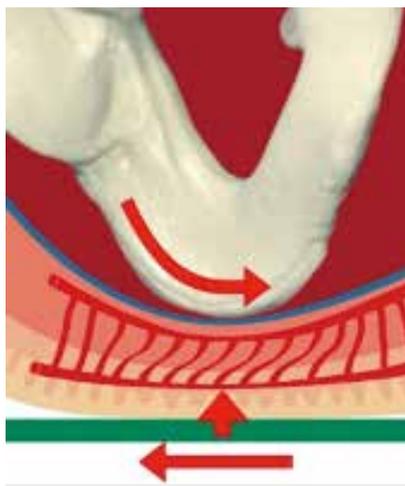
Pressure Redistribution

Transfer forces from IT's to hip joints and thighs

Pressure is calculated by force (weight) divided by area: $P=F/A$.

The greater the support area, the lower the pressure. An individual's weight (force) is always present so the clinician's goal is to minimise peak pressure build up under bony prominences. When seated, peak pressure can be reduced by increasing surface contact area and/or redistributing forces from bony prominences (IT/sacral areas) to areas that can withstand higher forces, such as the hips and thighs.

Impact of shear when seated



Shear forces are parallel forces, sometimes described as stretching forces, caused by the effects of gravity. Static shear occurs when the pelvis has migrated down within the seat surface and is often associated with a posteriorly tilted position. Dynamic shear can occur during short range reciprocal movements, such as leaning, reaching and wheelchair propulsion. In these cases, movement of the skeleton against the inner layers of the skin and tissue creates excessive strain, causing the upper layers of the skin to be pulled away from the deeper layers. This is the reason tissue damage is often greater internally than externally. Sacral skin breakdown is often related to shear issues.

Impact of friction when seated

Friction is the resistance that arises when one surface rubs against another. The rubbing of a material against the skin can cause abrasions to the superficial layers of the skin or even a blister. Skin damage due to friction may occur during transfers or other movement across the seat surface.

Impact of microclimate (temperature and moisture) when seated

Heat and moisture levels may increase over the seat surface when an individual is seated for extended periods of time. Higher temperatures can lead to the build-up of moisture, and when moisture is trapped against the skin for prolonged periods of time, the skin can turn white and become softer and more vulnerable to breakdown. This is known as maceration. Sweating and incontinence affect skin texture making it more vulnerable to the potentially damaging effects of shear and friction.

It is believed that a 1°C increase in body temperature can increase metabolic demand by up to 10%. In other words, the body is required to work harder in cases where a decrease in oxygen supply and other vital nutrients may already be present, thus accelerating skin breakdown.



Intrinsic Factors

In addition to external factors there are many intrinsic factors from within the body that can also affect skin health. Specialised wheelchair support surfaces help address the external factors described above to promote healthy postural positions and optimise internal organ function, but users and prescribers must be aware of the many other conditions that affect skin health, including:

- Reduced mobility or immobility
- Sensory impairment
- Ageing process
- Vascular disease
- Acute illness
- Altered levels of consciousness
- Malnutrition & dehydration
- Cognitive or psychological issues
- Smoking or alcohol use

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