
Select Medical - Independent Biomechanical Assessment of the ANSER battery powered seating system

Prof Jim Richards, Laurence Protheroe, Sian Parry

*Biomechanical Testing Facilities in the North West
University of Central Lancashire*

September 1st 2008

Summary

The ANSER battery powered seating system shows a reduction in seated pressures at the buttocks, with a choice of firmness available to the user. The variability in peak pressure throughout the cycle of the cushion indicate that the position of greatest pressure is continually moving so that no one area is subjected to constant high pressure. These findings are particularly relevant for the elderly or disabled persons with reduced mobility.

Aim

To investigate the effect the use of the ANSER battery powered seating system has on seating pressure during prolonged periods.

Objectives

- To investigate the effect of the pressure relief system on seating pressure during prolonged periods.
- To investigate whether the pressure system prevents pressure increase over a period of time.
- To investigate the peak pressures at different stages of the pressure cushions' cycle

Background

Prolonged periods of time in a seated position without movement can lead to the development of pressure sores on a person's legs or buttocks. People with spinal disability and the elderly are just two groups that are vulnerable to this.

Pressure relieving devices have been developed to relieve pressure on patients who remain seated for long periods of time, such as wheelchair users. The system consists of an inflatable pad which attaches to the seat, and a control unit which inflates the pad low, medium and high levels dependant on the patient's personal preference. At each of the levels the control unit works on a cycle which varies the level of inflation continuously which aims to relieve the pressure placed upon the patient. Such devices are also appearing in chairs for use in nursing homes.

Method

Two separate investigations were undertaken. The first focused on the capabilities of the inflatable system to manage pressure relief over a long period. The second investigated the pressures during the cycle of the inflatable pressure relief cushion.

Investigation one required participants to remain seated on the ANSER battery powered seating system in a wheelchair for 4 hours. A wheelchair is just one example of a seat that is likely to be used with the inflatable pressure relief cushion; however this was chosen due to the standardisation of this type of seat in comparison with other chairs available. The CONFORMat® System (Figure 1), which measures pressure on uneven surfaces, was placed on top of the pressure relief cushion. Pressure readings were taken every 30 minutes for the duration of the cushions' cycle time.

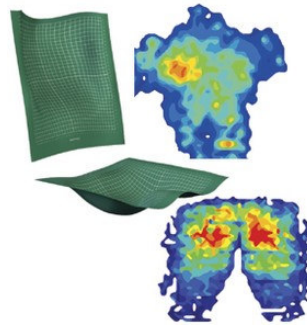


Figure 1 – The CONFORMat® pressure measurement system

Investigation two measured the pressure at the limits of the pressure relief cycle (fully inflated and fully deflated). A wooden seat was used for this test, representing a particularly hard surface. Pressure readings were taken for a short duration (10 seconds) at maximum and minimum inflation. A comparison of the three settings (soft, medium, firm) of the inflatable pressure relief cushion was made.

Results

The mean pressure throughout the 4 hour cycle was recorded as 14.6 KPa (109.5 mmHg) with a mean peak pressure of 25.8 KPa (193.5 mmHg). An example of the variation in pressure is shown below (Figure 2).

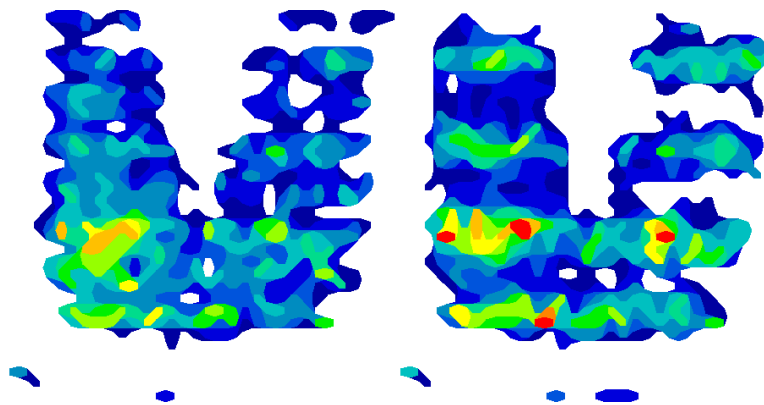


Figure 2 – Pictorial representation of variability of pressure throughout cycle

The ANSER battery powered seating system decreased the peak inflation pressures by around 50% compared to the wooden seat alone (Figure 3). Small differences between the three firmness settings were also found.

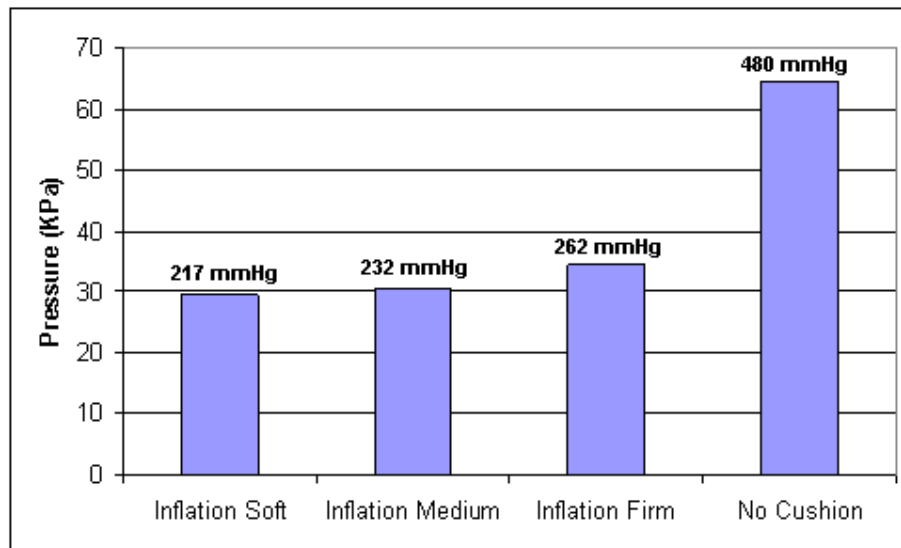


Figure 3 – Mean peak inflation pressures for each setting in comparison with seated pressure without the inflatable pressure relief cushion.

Discussion

The discrepancy between the peak and average pressures obtained highlights suggests that the ANSER battery powered seating system varies the pressure that the user endures to a large extent. While, the peak value of 25.8 KPa (193.5 mmHg) is in the range previously linked to the development of pressure sores (Brienza et al, 2001), the user is not subjected to these values continuously. This is supported by the pictorial display (Figure 2). Inspection of these still images highlights some variation in the amount of pressure at any given site (shown by colour) and the location of the highest pressures.

The ANSER battery powered seating system reduced pressure for the user when sitting on a wooden seat. This produced a reduction in pressure for the user of a minimum of 50% (Figure 3). The differences between the three levels of cushion hardness indicate that there is some variation in pressure for the user depending on the setting but even on the firm setting the values do not approach those of sitting on a seat alone.