

## PRODUCT FOCUS

# Pressure ulcer prevention and treatment: the Transair range

David Gray

### Abstract

*The Transair range has been updated as a result of clinical and technical advances. The Transair 500 cushion system utilizes foam and air technology to minimize disturbance to the user. Clinical trials suggest that this cushion is of benefit in both the prevention and treatment of pressure ulcers. The Transair 1001 alternating pressure air overlay and the Transair 2002 mattress replacement have both been revised to provide improved performance and both have been subjected to clinical trials. The results of these trials suggest that both have a role in the prevention and treatment of pressure sores in the individual in the high/very high risk group. This article examines these innovations in the Transair mattress and seating systems.*

Pressure ulcer development is most common in elderly people and can involve many clinical and non-clinical factors (Bliss, 1993). While the exact pathophysiology of pressure ulcers may be unknown, it is clear that the reduction of pressure in individuals at high risk of ulcer development can reduce their incidence (Jay, 1995).

For almost 50 years alternating pressure air mattresses (APAMs) have been used for pressure ulcer prevention (McLeod, 1997). During the past 20 years there has been an increasing number of these products available commercially, so their use across the UK has become widespread (Winman and Clark, 1997). Yet despite the length of time they have been in use, and their increased availability, there is relatively little clinical data to support their efficacy (Benbow, 1996; Fletcher, 1997).

Young (1992) identified three types of data available to aid the selection of pressure-reducing equipment:

- Anecdotal
- Laboratory
- Clinical.

Well constructed clinical trials are considered by many to be the best way to evaluate pressure-reducing mattresses (Young, 1992; Cullum et al, 1995). Much of the data supporting APAMs is derived from the laboratory and considerable use has been made of

interface pressure measurements (Swain et al, 1992; Rithalia and Gonsalkorale, 1998). While these studies are of importance it should be remembered that no standard method of measuring pressure has been established, and therefore different research teams use different methods. This means that results cannot be compared (Clark, 1994).

It is important that APAMs are subjected to clinical trials before their launch to ensure that purchasers are equipped with the best available data. This article focuses on a range of alternating pressure air devices that have been clinically evaluated before their commercial launch.

### TRANSAIR 500

A key component of a pressure ulcer prevention programme is the provision of pressure-reducing cushions. Pressure-reducing cushions, in conjunction with the appropriate mattress, can lead to a reduction in pressure ulcer incidence (Gebhardt, 1987, 1998; Gray, 1992). Many patients, both in the community or hospital, spend long periods out of bed in a chair. It is not only the selection of the cushion that is important, but also the posture and the time spent out of bed (Gebhardt



**Figure 1. Complete mobility for the wheelchair user is assured with the new Transair 500 battery-powered seating system.**

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**Figure 2.** The Transair 1001 is an alternating pressure overlay, made up of a single layer of alternating air-filled cells, that is placed upon a foam mattress. It has both audio and visual alarm systems to sense pressure or power loss.

and Bliss, 1994; Collins, 1998). Karomed produces a large range of seat cushions that have been extensively covered in another article (Cooper, 1998). This section deals with one of the range, the Transair 500.

### *Product specification*

The Transair 500 is an alternating pressure air cushion (APAC) that makes use of foam air technology. Karomed suggests that the use of variable density foam within the air cells reduces the need for high pressure within the cells, which can make APACs feel uncomfortable. Because the air circulates around the foam the changes in air pressure are less noticeable to the user, resulting in increased stability. The cover is made from a vapour permeable, washable, multistretch fabric. Transair 500 is powered by a battery unit, and provides a minimum of 8 hours use, promoting mobility to the wheelchair user (Figure 1).

### *Clinical efficacy*

The Transair 500 was subjected to a multi-centred clinical evaluation during 1997/8 at three sites across the UK (Gray et al, 1998). Two of the sites were hospitals and the third was a community setting. Two groups were observed — group one had skin intact on

admission to the trial and group two had existing pressure ulcers.

Twenty subjects were recruited to group one, with a mean age of 80 years and a mean Waterlow score of 20. Each subject spent between 3 and 6 hours on the cushions per day, and three of the subjects developed superficial ulceration (Torrance grade 2). A standardized question and visual rating scale was used to ascertain comfort perceptions. A majority of 17 (85%) responded favourably, two (10%) described the cushion as uncomfortable, and one (5%) subject was unable to respond.

In group two, i.e. those with established pressure ulcers, six subjects were recruited, with a mean age of 80 years and high Waterlow scores (a mean of 21). All had sores graded 2–4 on the Torrance scale. Each subject spent long periods on the cushions — two spent 3–5 hours per day and the other four spent 6 hours per day; none of the sores were observed to deteriorate. One subject (17%) reported the cushion to be very comfortable, four (67%) comfortable and one (17%) uncomfortable.

### *Conclusion*

The Transair 500 is an innovative product that attempts to address the issues of patient comfort and security. It has undergone clinical studies that suggest it would be an effective component of a pressure ulcer prevention and treatment plan.

### **TRANSAIR 1001**

The Transair 1001 (Figure 2) is an alternating pressure overlay, made up of a single layer of alternating air-filled cells, that is placed upon a foam mattress. The airflow within the cells is controlled by a pump that alters the pressure slowly, causing minimum disruption to the user while still ensuring that the pressure is alternated. A primary requirement in the redesign was to further reduce the interface pressures between the mattress and the patient. Adjustments to the alternating cycles and pressures used within the system were tested using the Oxford Pressure Monitor, and a study of the outcomes obtained indicated that the objective was achieved. (Karomed will publish these results shortly.) These measurements were carried out under laboratory conditions by the same research team who looked at the Transair 2000 and 2002, thus the results can be compared.

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The material used in the construction of the mattress has also been altered and the cells are now softer to aid user comfort. Pressure and power levels are constantly monitored and in the event of any failure within the system, visual and audible alarms are triggered. Audible alarms are included as is a cardiopulmonary resuscitation function.

### *Clinical efficacy*

This product was included in a recently completed clinical trial along with the Transair 2002. Details of this will be discussed below.

### **TRANSAIR 2002**

The Transair 2002 (*Figure 3*) is a mattress replacement system with a three-cell alternating action. Building upon the benefits of the Transair 2000, significant patient and carer benefits have been achieved. Changes include a liquid crystal display that informs the user of the operational status of the system, and improved ergonomics, making it easy to understand and use. Adjustments to the alternating cycle, including inflation and deflation timing, have led to improved interface pressure measurements — 17% lowering of pressure levels and 23% extension of the period of pressure reduction when compared with the existing model (2000). These data were obtained by the same research team who have been involved in the development of the 2000, so the methods and equipment have been standardized allowing the comparisons to be made. (Karomed will publish the results of these investigations shortly.)

Like Transair 1001, a softer material is used for construction of the internal cells and this, combined with a looser top cover, ensures a better and more even spread of the patient weight across the mattress.

The air cells do not fully deflate as identified by Rithalia and Gonsalkorale (1998). This ensures that the movement of air between the cells is less noticeable to the patient, while still providing clinically acceptable results (this will be discussed later).

The Transair 2002 includes a static mode. If the static mode is left unchanged for 45 minutes the system automatically returns to active mode, thus ensuring that no accidental tissue damage occurs. The new pump system incorporates the latest microelectronics, which means that the system is under constant interrogation and where pressures fall

unacceptably or electrical power is disconnected, audio and visual alarms are triggered.

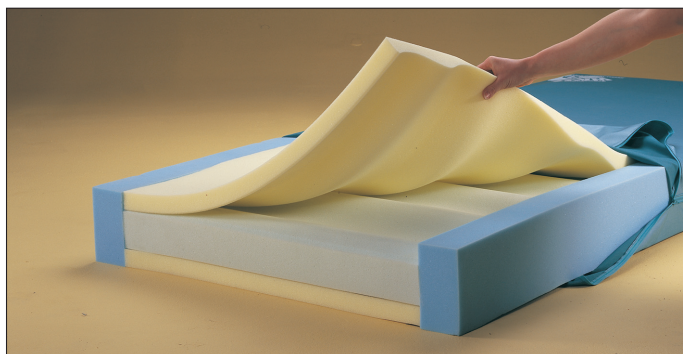
The product also features a sitting mode that is used where heavy patients are left sitting in the upright position for long periods. The sitting mode provides additional support under the area of greatest pressure, i.e. the sacral/buttock area.

### *Clinical efficacy*

While the Transair 2000 mattress was previously evaluated (Skipper, 1992; Benbow, 1996), until now the clinical data available



**Figure 3.** The Transair 2002 is a mattress replacement system with a three-cell alternating action. It is ergonomically designed for ease of operation and meets the needs of patients who are at very high risk of pressure sores.



**Figure 4.** The clinically proven, high-specification foam mattress such as the Transfoam Wave should be central to any pressure sore prevention and management strategy.

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### KEY POINTS

- Karomed has upgraded and improved its Transair mattress and seating systems which have been trialled pre-launch.
- Transair 500 cushions utilize foam air technology that, by reducing movement during air circulation, provides less disturbance and discomfort to the user.
- Transair 500 cushions use a battery pack that provides a minimum of 8 hours of power, promoting mobility to the wheelchair user.
- The Transair mattress range has been revised to produce the Transair 1001, an alternating pressure air overlay, and the Transair 2002 mattress replacement system.
- Clinical trials indicate that both are of benefit in the prevention and treatment of pressure ulcers in the high/very high risk category.

were limited. A recently completed stratified clinical trial was carried out in a variety of clinical settings, including a stroke unit, a care of the elderly unit and an orthopaedic unit (Gray and Timmons, 1999). Admissions to the research wards were screened and those who met the study entry criteria were considered for inclusion in the trial following the provision of consent.

The entry criteria were:

- Skin intact on admission with no existing skin conditions
- Waterlow score of 15 or above
- Not terminally ill
- Expected to stay in hospital for at least 5 days
- Aged 65 years or over
- Weight no greater than 128 kg.

Subjects were allocated either a Transair 1001 or a 2002 depending on their weight — those weighing 64 kg or less were allocated a 1001, and those weighing between 64.5 kg and 128 kg or more were allocated a 2002. Both products are made of a single layer of air cells, with the 2002 being approximately twice the depth of the 1001. Laboratory data suggested that the 1001 would tolerate 100 kg of weight before it bottomed out onto the supporting mattress. Given this fact it was hypothesized that very high risk patients who weighed considerably less than 100 kg could be safely nursed on the 1001. Clinical results have borne this hypothesis out, and despite two similar groups of high/very high risk subjects, where weight was the only significant difference, similar pressure ulcer rates were observed.

During the trial a pressure ulcer incidence rate of 2% was observed in the two groups. This fact cannot be solely attributed to the mattresses, as pressure ulcer prevention is a complex process that involves education, organizational strategies and staff attitudes. However, these results do suggest that the 2002 and 1001 are useful adjuncts to a pressure ulcer prevention and treatment programme. (A full paper detailing this trial is in development and a submission will be made to present the data at the 1999 European Pressure Ulcer Advisory Panel meeting in Amsterdam in Autumn 1999.)

### CONCLUSION

Alterations to the already successful Transair range have been clinically evaluated before launch. This is a new approach and should go

some way to meeting the needs of purchasers, who have previously complained about a lack of clinical data to support new products (Young, 1992; Hill, 1995; Fletcher, 1997). It should be remembered that pressure-reducing equipment on its own is not enough to prevent pressure ulcers. Attention must be paid to the provision of high specification foam mattresses (Figure 4), education, staff attitudes and audit as part of an effective pressure ulcer prevention and treatment strategy. **BJN**

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