

PRODUCT EVALUATION

THE TEMPUR MED REPLACEMENT
MATTRESS

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ABSTRACT

Pressure sores cost the NHS vast sums of money, with the estimated treatment costs being between £180 million and £321 million (Department of Health 1993). With approximately %10 of patients in hospital suffering from pressure sores (NHS Executive 1994), it is vital that equipment is used in a cost effective manner. There are a vast number of different pressure relieving and reducing devices available to nurses.

The article will give a brief description of pressure reduction and pressure relief, and give an evaluation of a new product, the Tempur-Med replacement mattress, outlining the differences between it and conventional pressure reducing mattress. Cost effectiveness issues will be considered, as will the lack of evidence to support the use of one pressure relieving device against another.

The choice of the correct type of equipment for a patient who is assessed to be 'at risk' of pressure sore development, or who has established pressure sores, can play a vital role in the overall recovery and healing of that patient when used alongside other strategies such as changes of position and appropriate wound management.

The terms 'pressure reducing' and 'pressure relieving' are often used and abused when considering which piece of equipment is most suited for a particular patients needs.

Pressure reducing implies that pressure is redistributed over a large area, leading to a reduction of pressure at the interface between the skin and the support surface. The act of returning a patient to bed after sitting in a chair is a type of pressure reduction (Fletcher 1997).

Pressure relief on the other hand implies that the source of the pressure is removed from an area of the body for a significant period of time (Fletcher 1997). An alternating pressure mattress can provide pressure relief.

When these two terms are fully understood it is possible to meet the needs of patient more fully, so that they have the most appropriate piece of equipment for their needs, and that is used in the most cost-effective manner.

PRESSURE REDUCING MATTRESS

This type of mattress aims to reduce the pressure exerted on the interface between the patients skin and the support surface. This is done by the use of a foam which is of a much higher density than that of the standard NHS mattress (with the mottled cover). This high density foam is able to provide a more supportive surface for the patient. A number of companies produce mattresses of this type used in the United Kingdom, each company adopting a differing manufacturing process for the foam. Several have a cut-foam construction which helps to allow air to be redistributed throughout the mattress and remove excess moisture from the skin. Some of these cut foam sections are smaller at the foot end which is said to provide better heel pressure reduction. Other mattresses do not have this cut foam effect but have various sections of high density foam glued together. It is however possible that the adhesive may deteriorate over a period of time and the sections become detached (Rithalia 1996). The cover of these mattresses also differs in that it is made of a 'breathable' vapour permeable material, which is also waterproof. This allows excess moisture to be taken away

from the skin through the cover, in the form of vapour, allowing air to circulate both within the mattress and around the patient. This cover also has a 2-way stretch which helps to prevent a 'hammock effect' by allowing the mattress to conform to the shape of the body. The cover may be removed for laundering purposes.

These mattresses require turning on a regular basis by a 'flip and rotate' method. The length of time between turns varies, but is usually either weekly or monthly dependant upon the company. A schedule is printed on the cover of the mattress as an aide memoir. The turning increases the longevity of the mattress as it allows areas of the foam which are subjected to the most pressure time to recover, as foam does not respond well to continuous compression.

Pressure reducing mattresses are suitable for use in patients who assessed to be 'at risk' and 'high risk' of pressure sore development i.e. Waterlow scores 10-20. Their price varies, but is in the range of £120 to £250 each.

PRESSURE RELIEVING MATTRESSES

These operate via an electric motor which pumps air into cells, which alternately inflate and deflate in a cyclical fashion, the cycle being dependant upon the particular mattress chosen, but usually ranging from 5-12 minutes on a 2 or 3 cell cycle. They can either be used on the existing base mattress (which should be a pressure reducing mattress) in the case of an alternating pressure overlay, or as a replacement for the base mattress. Overlays tend to be made of a single layer of cells, whereas replacements have 2 or 3 layers of cells. The cyclical operation of these pieces of equipment, whether overlay or replacements, relieves the tissue interface pressure at given intervals and helps to increase the flow of blood to the ischaemic tissues. They may or may not have vapour permeable waterproof covers.

THE TEMPUR-MED REPLACEMENT MATTRESS

This mattress has been widely used in the United States of America and the rest of Europe but has only recently been marketing in the United Kingdom on a large scale. The foam of the mattress uses technology which was originally developed by the North Atlantic Space Agency (NASA), for their space programme. They required a material which offered comfort at both heavy and light pressure loads during space flights. This visco-elastic, gel like high density foam is able to re-mould itself in 10 seconds following positional changes of the body. It is often referred to as low memory foam due to this rapid ability to re-mould. The foam is temperature sensitive, which means that it is able to mould to the contours of the body when the body's own heat is transferred through to the foam. At room temperature however it remains relatively firm. This moulding ability allows the foam to provide a high degree of pressure reduction. The foam does not promote the growth of bacteria due to its impregnation with an anti-bacterial agent.

As with other pressure reducing and pressure relieving mattresses, it has a vapour permeable cover, which is both waterproof and has a 2-way stretch to help prevent a hammocking effect. The cover can be cleansed with soap and water or standard hospital disinfectants or in cases of severe soiling can be machine washed at 95 degrees. A range of other cleansing materials may be used such as phenols and alcohol preparations. Lotions containing iodine will not damage the structure of the mattress. The cover extends over the zipper which prevents infiltration of fluid into the foam through the teeth of the zip should spillage down the side of

the mattress occur. The base of the cover has a hard wearing, rubberized material which provides protection to the foam, and helps to prevent the user from flipping and rotating the mattress, which is unnecessary as the foam does not deteriorate with constant compression, so needs no recovery time. This makes periodic flipping and rotating unnecessary.

A unique 8 year Guarantee is given with the mattress, which covers defects in the physical properties of the material.

Although this mattress retails at around £480 each, this needs to be seen against its advantages;

Provision of even pressure re-distribution

As the foam moulds itself to all body contours, it ensures that there is not only pressure re-distribution, but also a high level of patient comfort.

Minimisation of friction and shear

These have been identified as major contributory factors in pressure sore development. The mattress will help to prevent this due to its moulding ability.

No maintenance

As there is no motor, it is totally maintenance free. This renders service contracts unnecessary (which can cost in the region of £150 per year mattress).

No electricity costs

With some alternating pressure mattresses the running costs can amount to £50 per year. This sum of money can be quite significant if used in a patients own home.

8 year guarantee

No other pressure reducing mattresses has such a guarantee.

Reduced risk of cross infection

As there is no need for periodic flipping and rotating, there is less risk of disturbance into the air of dust and other airborne materials. The foam is also impregnated with an anti-bacterial agent.

As well as being available as a replacement mattress, the TEMPUR material is also available as an overlay, to place on top of a reasonable quality mattress, a cushion, so that continuity may be maintained in patients who sit out of bed for periods of time and for those patients undergoing operative procedures, a theatre version of the mattress is available, which can be made to any size specification.

CLINICAL EFFICACY

TEMPUR advise that this mattress for use for those patients in the medium to high risk category of pressure sore risk. Over the last 5 years, many case studies have been written, which available in a booklet produced by the company. The studies were conducted in a number of clinical areas such as Intensive Therapy and Continuing Care Units, most of them coming from America and Scandinavia. They outline the use of this mattress in the care of patients who are at risk of pressure sore development, or who have established sores of up to grade 3 in severity. All of these case studies have shown that those patients at risk of pressure sore development did not develop pressure sores, even when they had a number of risk factors and their positions could not be changed. The patients with grade 3 pressure sores all showed a substantial amount of healing when nursed on the system, even when they had been nursed on other, more sophisticated bed systems with no improvement. My own experience in the use of this mattress has seen a dramatic improvement in grade 3 sacral pressure damage of a patient with a bi-lateral amputation of the lower limbs. Patients views on the mattress were also sought in the studies, the overwhelming opinion of the patients being very positive towards it.

In a more controlled situation, a series of interface pressure readings were taken using computer imaging. This showed that all of the pressures exerted were below that of 32 mmHg, which is often quoted as being the capillary closing pressure, following the work of (Landis 1930). In reality however, the pressure needed to occlude circulation to an area are probably much lower than this, particularly in poorly, compromised patients (Collier1995). Another study, again using computer imaging, compared the interface pressures of the TEMPUR mattress with 4 other mattresses, using readings taken continuously for a duration of 30 minutes and found that it provided the lowest constant pressure readings. It is rather unfortunate that none of the other mattresses were classified as pressure reducing. Comparison with other equipment could however be the subject of future work.

Although the measuring of interface pressures has its limitations (Fletcher 1996), it can provide us with useful quantitative data on the efficacy of products and is a technique that has been used for some time to compare different support systems (Clark and Andrews 1992)

CONCLUSION

Although case studies and personal experiences provide useful information on the efficacy of a product, they do not take the place of independent, well-designed Randomised Controlled Trials, which are needed to compare the cost effectiveness of different types of pressure relieving devices (NHS Centre for Reviews and Dissemination, 1995).

Through the case studies however, the TEMPUR mattress has been shown to be effective both in the prevention of pressure sores in vulnerable patients, as well as the treatment of patients with established pressure damage of up to grade 3 in severity.

I feel that this mattress is a useful addition to the arsenal of pressure reducing products.

Please note: Since the evaluation TEMPUR has brought out a new mattress recommended for medium/high risk patients.

6 year Guarantee

Cost: £190-£285 (depending on quantity purchased)

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