

## **A comparison of the principles of seating products.**

Christine Turner DipCOT, SROT  
Occupational therapist  
August 2005

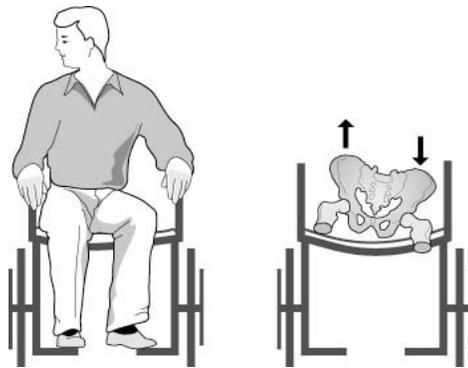
### **The Selection of Wheelchair Cushions**

There are 2 fundamental reasons to select a cushion for use in conjunction with a wheelchair:

1. To enhance a good sitting posture
2. To reduce the risk of skin breakdown

In reality the improvement in the achievement of No.1 will also impact on the achievement of No. 2

It is recommended that a wheelchair is ALWAYS used in conjunction with a cushion as the slung wheelchair canvas is never a good sitting base because it can neither support good posture or maximize redistribution of body weight and therefore reduce risk of skin breakdown.



### **How to Use This Guide**

This guide has been developed to give you information to assist you in making choices when selecting wheelchair cushions. It should always be born in mind that each situation

is unique to that individual wheelchair user and it is never possible to definitively predict the success of a product in addressing a client's needs.

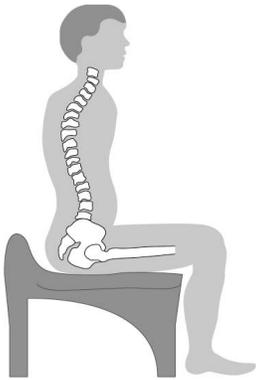
### **Key Components of Goals of Wheelchair Cushioning**

Appropriate cushion selection allows the wheelchair user to sit comfortably with a stable sitting base.

Good **POSTURE** ensures the attainment and maintenance of an upright and symmetrical position.

Maximum **FUNCTION** can be achieved with minimum energy expenditure.

Provision of effective **PRESSURE** relief to attain and maintain skin integrity.



'Good sitting position'

### **What is the purpose of a wheelchair cushion?**

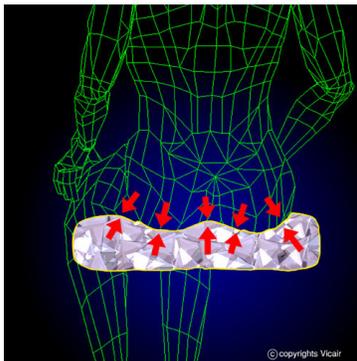
To reduce pressure

To reduce shear

To provide comfort and a stable base from which to work

To aid posture - posture influences functional ability and comfort

To reduce transmission shock



Sitting 'into' cushion enhances sitting stability and pressure re-distribution.

### **How is pressure and shear forces reduced?**

Increasing the area of support

Transferring weight beneath the sitting bones

Increase the number of areas of the body being supported both underneath and behind the sitting position.

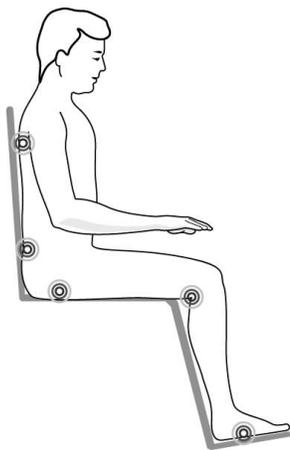
#### **In normal sitting**

75% of weight is over only 8% of body surface

19% feet

2% arms

4% back



Areas at risk of pressure sores when seated

### **Benefits of Wheelchair Cushioning**

It is important to understand what is seeking to be achieved when evaluating someone's seating position in their wheelchair and to be able to establish realistic and achievable goals.

An understanding of the benefits of postural positioning is of value to demonstrate what can be achieved with the application of good seating principles:

#### *Maximize function and comfort*

This is, for the wheelchair user, the primary focus when considering an appropriate wheelchair cushion. The use of equipment that is comfortable and can demonstrably improve function to the maximum achievable level is crucial.

*Minimize / Prevent development of deformities and pressure sores*

It has been shown that the good control of posture does impact on the development of deformities. Good support improves balance, upper extremity function and can impact on the progression and development of deformity.

Pressure sores occur as result of tissue damage because of an inadequate support surface for the sitting base. Maximum surface contact helps to re-distribute pressure and assists the reduction of tissue trauma.

*Improve self-esteem*

Given that it is human nature to feel that the way that we present ourselves to the world affects our perception of ourselves and the therefore how other people respond to us, it is understandable that self-esteem is a key consideration of good positioning. If a wheelchair user sits well then their body language will suggest that they are more self-confident and therefore they will indeed internalize that self- confidence.

*Improve heart / lung function*

Sitting well with the spine in a good mid-line and balanced alignment and the spinal contours facilitated and supported, allows the chest wall to expand and permit good lung capacity and functioning of the heart and cardio - vascular system.

*Increase visual / Perceptual and cognitive abilities*

A good sitting position allows increased freedom of movement of the head at the top of the spine thus facilitated an increased range of movement and subsequently improved field of vision. This will have consequent affect on perception of the world about them and the ability to interpret that information. As a consequence the learning processes and the ability to acquire knowledge will be impacted. This is of particular significance for wheelchair users who have had a stroke, head injury or other neurological condition that presents with cognitive difficulties.

*Improve eating / swallowing / and digestive function*

In the same way that heart and lung function is improved as a consequence of good positioning because the chest wall can expand and the abdominal cavity expand; digestive function throughout the digestive system from the mouth to the bowel is also improved.

*Normalize Muscle tone and reduce abnormal reflexive movement*

Abnormal reflexes or faults in these reflexes are evidenced in disorders of the nervous system. E.g. cerebral palsy, stroke, spinal cord lesion, head injury. Reflexes develop, change, disappear or become integrated as a part of childhood development in the able-bodied child and in babies are part of the process of developing motor function development.

When abnormal reflexes or muscle tone is evident it will affect the ability if the wheelchair user to maintain their postural position in the chair and will therefore impact on function.

*Promote sitting and therefore functional symmetry and balance*

A balanced body requires less energy to maintain its position, and enhances the users function. Less external support is needed and pressure is more evenly distributed. Stabilization reduces lateral collapse and improves upper extremity control. Without good stabilization the wheelchair user will have an increased tendency to slide forward out of the chair not only reducing function but also affecting weight distribution in the wheelchair.

*Promote proximal stability to maximize distal function*

By stabilizing the body at those points nearest to the body mass it impacts on functional ability of limbs distally from the body. By ensuring that the body is well stabilized and supported centrally with weight distribution equally balanced, function of the hands can be significantly improved.

**Choosing a cushion**

Evaluation of the suitability of a cushion it is important to recognize:

Degree of postural support required for an individual.

Degree of risk of tissue breakdown and what that level of risk may be.

The identified risk factors are wide and varied and whilst some people suffer tissue trauma principally as a result of pressure others may suffer as a consequence of shear or moisture induced maceration. Inevitably therefore there is no one cushion that is likely to be appropriate for all situations and products cannot be definitively categorized as 'high risk, medium risk, or low risk'. It is only possible to give a general indication of where products sit in terms of classification against risk factors.

Consider:

a) The wheelchair

Seat size (the correct size and type of cushion for an individual should be established first and the wheelchair to marry with that afterwards)

b) The user

Skin condition

Susceptibility to pain and pressure sores

Body stature

Weight - under / over / static / fluctuating

Immobility

Transfers

- Incontinence
- Posture
- Sitting balance and stability
- Sweating

c) User's lifestyle

- Frequency of use
- Need for regular review
- Level of activity
- Institutional use
- Employment
- Sport
- Environment
- Method of transfer
- Ease of maintenance (consider carer input, number and type of)

**Basic factors to consider when selecting a cushion**

- Effectiveness for individual user's needs.
- Ease of care
- Weight
- Appearance
- Storage
- Maintenance - where is it being used and who is caring for it?
- Ease of repairs / spares
- Guarantees

**Cushions Types**

Can be categorized by the material or range of materials that are used to fabricate the product. Additionally cushions may be planar, which affords the accommodation of growth, or anatomically contoured, thus following the shape of the body and distributing body weight. The greater the degree of contouring the greater is the pressure re-distribution properties of the product.

The majority of cushions are developed to be used in conjunction ONLY with the covers that are sold with them. Using an alternative cover may negatively impact the effectiveness of the product and indeed the safe use of the product. The use of vapour permeable and stretchable fabrics will have a significant improving effect on the pressure redistribution properties of the cushion. Using stretchable materials ensures that the user can 'immerse' more effectively into the cushion thus enhancing effective contouring.

There has been considerable expansion of range of cushions and other seating support that has become available offering variable advantages and disadvantages that can be considered relevant to client need:

<b>Material</b>		<b>Key Applications</b>	<b>Advantages</b>	<b>Disadvantage</b>
<b>Foams</b>				
	Polyurethane (PU)	<p>‘Quick memory’ foam that springs back to original shape after being compressed.</p> <p>Used for: Lower grade block foam cushions. As base layer with other types of foam, gel, fluid etc. thus enhancing effectiveness and life expectancy of product.</p>	<p>Cost effective. Can be readily and effectively sculpted and scored. Wide variety of density to address wide variety of need.</p>	<p>Insulating therefore raises surface skin temperature. Use of vapour permeable cover may help to minimize this. Low grade PU can deteriorate quickly thus losing effectiveness. Limited ability to conform to body shape.</p>
	Visco-elastic	<p>‘Slow memory’ foam which allows for envelopment/ immersion of body into cushion.</p> <p>Used for: Offering enhanced pressure re-distribution and sitting stability because of sitting ‘into’ rather than ‘on’ cushion.</p>	<p>Enhanced body conformity. Enhanced lifespan. Enhanced pressure re-distribution.</p>	<p>Heavier than PU. Insulating.(see above) Density of foam influences degree of ‘immersion’ (i.e. heavy user will ‘immerse’ more than lighter weight user.)</p>
<b>Fluid</b>		<p>More frequently may be oil based or water based. Almost always used in conjunction with other materials.</p>	<p>Effective pressure re-distribution. Good conductor of body heat. Generally stable.</p>	<p>Heavy (therefore usually used with other lighter materials) Needs to be held in ‘sac’ which may be liable to puncture.</p>
<b>Gel</b>		<p>Usually used in conjunction with other materials.</p>	<p>Enhanced body conformity. Good pressure re-distribution. Enhanced shock absorption.</p>	<p>Heavy. Takes on environmental temperature. When gel deteriorates loses</p>

			Usually good conductor of body heat. Provides good sitting stability.	effectiveness.
--	--	--	--	----------------