

Repositioning for pressure ulcer prevention in the seated individual



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Repositioning is one of the important elements in the prevention of pressure ulcers (National Pressure Ulcer Advisory Panel (NPUAP) et al, 2014). However, repositioning seated persons who are at risk of pressure ulcers is often a challenge. A number of issues compound this challenge, such as whether the individual understands the importance of repositioning, whether he/she has sensation so they feel the urge to change position, whether the individual can change position alone and when changing position whether the individual chooses a position that alleviates pressure and shear sufficiently. Furthermore, from a carer's perspective, it is important to determine whether they are aware of the importance of position change and whether they understand which alternatives can be used to alleviate pressure and shear.

The duration of tissue loading, in combination with the amount that tissues are deformed, are the main causes of pressure ulcers (Linder-Ganz, 2006). When tissues are loaded, for example, in the gluteal area when seated, the tissues are deformed between the bony prominence (ischial tuberosity) and the seat.

Indeed, Stekelenburg (2007) identified that 2 hours of compressive loading leads to irreversible damage, whereas ischaemic loading results in reversible tissue damages. When using mattresses and cushions for pressure ulcer prevention, it is essential that they have appropriate immersion and envelopment, such that the deformation threshold for damage is not exceeded (Loerakker, 2010). Fundamentally, these devices should be able to minimise tissue deformation and mechanical stresses (Gefen, 2014). In other words, it is important to be enveloped by the cushioning material to decrease deformation forces (Gefen, 2014). A good cushion contributes to pressure ulcer prevention strategies, however, this will be only for a limited period of time and, as such, repositioning is also needed to prevent pressure ulcers (NPUAP et al, 2014).

Being seated over time is challenging, however, individuals with normal sensation and normal physics, sit in a dynamic way, in that they move and change position all the time (Reenalda, 2009). These movements are made for several reasons, one is to avoid discomfort,

which is a particular problem when seated on a poorly cushioned chair. In addition, when seated, muscles are used in a static way and when an individual changes position, other muscles will be used thereby avoiding discomfort and tiredness. Questions to be asked are, how do individuals with reduced sensation and reduced possibility actually change their position? Further, when changing position, does their new position actually avoid acquiring pressure ulcers? Finally, when in the new positioned are they stable, secure and comfortable?

Comfort, stability and security

Comfortable seating is often defined as being seated without using too much static muscle force. Being seated in a stable position is the ability to keep the centre of body mass within the base of support, again without the use of excess muscular activity (Pollock, 2000). Security is comfort and stability combined. Insecurity while seated is often experienced when stability is challenged, or when an individual becomes uncomfortable (van Etten, 2013). Changing position and re-establishing a stable and comfortable position is a challenge and when not done properly, may lead to an insecure feeling, which then leads to further movement often to a position that does not enhance tissue integrity.

Time and change of position

In a lying position, the (general) advice is to

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change position every 2–4 hours (NPUAP et al, 2014). These repositionings are often undertaken to move the individual to a totally different position, for example, from a 30° lateral position on the left side, to the same position on the right side. This completely offloads the previously weight bearing tissues and if maintained for 2–4 hours, this offloading will last for the duration.

In a seated position, however, a total repositioning is difficult to achieve since the main contact area is always the individual's ischial area. While seated, the general recommendation is to reposition twice per hour, for a couple of minutes, to allow blood supply to be restored and to reduce the magnitude and duration of cell deformation (Schofield et al, 2013). In addition, for seated individuals it is also recommended to reposition completely by adopting a lying position, or a standing position to achieve a total offloading of the buttocks. Some of the main pieces of advice given in the international guidelines (NPUAP et al, 2014) are:

- Reposition the individual in such a way that pressure is relieved or redistributed
- Establish pressure relief schedules that prescribe the frequency and duration of weight shifts.

Seated repositioning options

When seated, there are several options to reposition, such as: pushing up, leaning over to one side, leaning forward, reclining, tilting, tilting and reclining, standing and bed rest.

Pushing up

For many years, wheelchair users were taught to perform a push up while seated in a chair. A push up is achieved by pushing the body up with the arms to lift the bottom off the chair. The effect of this exercise has been discussed for many years. Coggrave et al (2003) measured tissue oxygenation in the seated position and when offloaded, and concluded that brief pressure lifts of 15–30 seconds are ineffective in raising transcutaneous oxygen tension (TcPO₂) to the unloaded level, for most individuals. Loerakker et al (2003) achieved a similar result using tissue deformation tests. In these tests, short regular intervals of offloading was compared to tissue being loaded constantly over several hours, results showed that the damage to tissue was identical.

An important point to consider is that push ups using the chair armrests give very high loads on the shoulder structures, which may lead to strain damage. For these reasons, push ups are not advised.

Leaning over

Leaning over may seem to be a good method to offload one side of the bottom (Jan et al, 2010). Using this method, there will be no load on the offloaded area and many people will be able to keep such a position for a considerable time. However, it is the total opposite for the side still in the chair. Understanding that pressure ulcers are caused by tissue deformation, the side of the buttocks remaining in the chair has an enormous increase in load (tissue deformation). A high level of tissue deformation can cause pressure ulcers within a very short time (Linder-Ganz, 2006). For this reason, leaning over is not advised.

Leaning forward

Leaning forward is a good method of reducing the load on the bottom, when performed in a secure, stable and comfortable way. Leaning forward can be achieved by leaning with the elbows on the knees, on a table, or supported by the back of another chair. When positioned in a comfortable, stable and secure forward lean, many individuals can keep this position for prolonged periods of time. Further, pressure imaging shows a good offloading of the buttocks when using this method of offloading (Rappl et al, 2010). However, it should be noted that for some patients, leaning forward may be difficult to achieve, for example, for those with arthritis or following hip replacements, or those who are very overweight. Thus, careful assessment of the individual is important to ensure that they are able to achieve the repositioning plan.

Reclining

Reclining the backrest of the chair has been used to increase comfort for the seated individual for many years. Zemp et al (2019) showed that recline of the backrest alone significantly reduces the interface pressure. This happens, possibly due to the change in angle of the hip joint, reducing the prominence of the ischial tuberosities and, thus, making these less visible on a pressure imaging system. However, reclining will cause the individual to slide down in the seat (Hobson et al, 1992). When sliding down on the buttocks, friction between the seat surface, the clothing, and the skin will cause the different tissue layers to shear. These shear forces will add to the already existing shear forces arising because the individual is seated and, therefore, will increase the risk of pressure ulcers. These frictional forces when reclining, combined with moisture may lead to friction skin injuries as described by Berke (2015). Backrest reclining as

a standalone pressure ulcer prevention strategy is not advised.

Tilting

Seat tilting is a good option to reposition a seated individual. Wheelchair seat tilting was developed in Europe in the late 1980s as a comfort measure and seat tilts in manual wheelchairs are normally between 15–25°. In the US, tilting was always seen as a pressure ulcer preventive measure and, thus, seat tilts often exceed 40°. This is because seat tilts of over 30° give a much better reduction of load on the buttocks and increases blood flow (Zemp et al 2019). However, when tilting to this degree, two side effects occur: there is a much larger demand for good effective pressure distribution on the backrest of the chair and the user will have problems joining into daily activities, mostly only being able to look at the ceiling.

Fundamentally, to have a proper reduction of load on the buttocks the tilt should exceed 30°. However, Zemp et al (2019) showed that although regular smaller changes in tilt can be effective in reducing interface pressure, these small changes will have no effect in changing blood flow. Therefore, the longer the individual stays in this tilted position, the better the restoration of perfusion to the tissues and the greater the reduction in tissue deformation (Zemp et al, 2019). At its essence, the individual should undertake tilting to at least 30° for at least 5 minutes, twice per hour.

Tilting and reclining

Significant changes on the load of the buttocks begins when the seat tilt exceeds 15° (Aissaoui et al, 2001). Zemp et al (2019) showed that the most significant reduction of load happened with the seat tilt over 35°, combined with a 30° recline. When tilting and reclining a person it is important to tilt the seat first and recline the backrest afterwards. This reduces the tendency for the individual to slide out of the chair. When returning back to upright seating, the backrest should be reclined first followed by tilting the seat up to a normal seat angle. It should be noted that the combination of extreme tilt and recline makes most if the activities of daily living impossible.

Standing

Standing is a very good way to offload the buttocks, as the bottom will be totally without loading. However, to achieve this demands that the individual can stand, and also can stand in a stable, secure and comfortable way. If it

is established that the individual can stand, adequate support measurements should be taken, using the help of a carer, a stable support like a table, or standing supports, such as bars or a raiser. While raising up and standing, the individual should feel stable, secure and comfortable.

Other standing alternatives are the use of manual and power wheelchairs with standing options. While these chairs are used as seating and mobility aids, they also have a standing option, with the seat raised until the individual stands upright. Walter et al (1999) showed that individuals with spinal cord injuries who stood for 30 minutes, or more, per day reported fewer pressure ulcers than those who stood for less than 30 minutes per day. Further, there are additional medical advantages associated with standing, such as improvements in lung function, bone density, and gastrointestinal functioning (Dicianno et al, 2013). Additionally, there will be an improvement in health-related quality of life, since communication is easier as the individual is standing at the same level as other people.

Lying

Transferring to a lying position is another good method to totally offload the bottom, but for many it is also a challenging activity. In many nursing homes, for example, transferring individuals from chair to bed is seen as work intensive, compared to having the individual seated in a tilt and recline chair and just tilting the patient to a resting position. However, it should be remembered that a tilted position is not as effective in offloading when compared to a 30° side lying position. For individuals seated in a chair who can only be tilted a few degrees, or cannot be tilted all, and with limited possibilities to use any of the other repositioning alternatives described above, transferring to a couch or bed might be a better alternative for the purpose of offloading.

Motivation

A big challenge is in keeping the individual (and carers) motivated to continue with repositioning, even though they do not always see any immediate direct results of this continuously repeated activity. Indeed, the reward — having no pressure ulcer — is often quite abstract for many people. Therefore, establishing the individual's knowledge of, and attitudes and behaviours towards pressure ulcer prevention is an important step, in order to enhance motivation and commitment with the prevention strategies (Shanley, 2017).

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