PS3

Technologies to Assess and Prevent Seating Acquired Pressure Ulcers

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Summary

Relevant studies addressing the prevention of pressure ulcers (PUs) focus on bed -bound individuals. Nonetheless, many subjects spend much of their waking day sitting in leisure chairs or wheelchairs. Accordingly the research focus in Southampton is to develop technologies for the prevention and early detection of seating acquired pressure ulcers (SAPU).

Aims and Objectives

The aim of this session is to discuss the use of technology for the prevention and management of pressure ulcers with particular reference to the seated posture. Existing technology will be critiqued and its impact in a clinical setting will be assessed. The session will also identify novel technologies and assess their potential in both the early detection of tissue damage and the evaluation of the effectiveness of support surfaces.

Background, Technique, Standards, Clinical Detail, Results and Testing

Pressure ulcers (PUs) are areas of localised damage to the skin and underlying soft tissue, resulting from prolonged mechanical loading involving pressure and/or shear and friction (EPUAP-NPUAP, 2009). Pressure ulcers are most likely to develop in individuals who are either seriously ill, neurologically compromised or who present with impaired mobility (Lindgren et al., 2004). A recent review of epidemiological studies reported a prevalence of pressure ulcers across European hospitals ranging from 8% to 23% (Vanderwee et al., 2007). In addition to the personal costs, the financial costs of treating PUs have recently been reported to be £1.4 - 2.1 billion annually in the UK (Bennett et al., 2004). Pressure ulcers are known to cause pain, and a reduction in quality of life with major physical, emotional and social implications (Spilsbury et al., 2007).

The use of technology for the prevention of pressure ulcers has grown considerably in the last 20 years. Technology has been used as a guide to reduce interface pressures between the body and the support surface, to monitor biomechanical and physiological factors associated with tissue health, and to evaluate preventative rehabilitation strategies. The parallel session will include a number of sections to highlight past, present and future applications of technologies in pressure ulcer prevention:

Aetiology of Pressure Ulcers

It is important to outline the current mechanisms associated with the aetiology of pressure ulcers and highlight areas which require further investigation. Accordingly, we will discuss the pathophysiological factors which can contribute to soft tissue damage, namely, ischemia, impaired lymphatic drainage, reperfusion injury and direct cell/tissue deformation. Many of these mechanisms can now be examined using techniques developed in other areas, including tissue engineering, biosensors and medical imaging.

Technologies (Physical Sensors and Biomarkers)

Technologies have been developed for the prevention of pressure ulcers and the monitoring of tissue viability/health. Such technologies will include; pressure mapping, transcutaneous blood gas monitoring, temperature and humidity sensors, accelerometers, sweat and other fluid biomarkers. We will provide a critique of their applications and the impact both within the laboratory and clinical settings.

Support Surfaces (Mattresses and cushions)

There has been considerable innovation in the last decade in the design of support surfaces for use in the bed and the chair. Technologies continue to strive towards preventing pressure ulcers by limiting the interface pressure between the body and the support surface and providing pressure relief/redistribution. We will discuss the level of evidence associated with these support devices and their clinical impact.

Technologies related to Patient Sub-Groups

The spinal cord injured (SCI) represents the main sub-population for which sitting-related pressure ulcer research has focused. As a consequence, we will evaluate this research and examine how the technologies have altered to the clinical management and individual behaviour of this subject group.

Leisure chairs

Leisure chairs have been rarely examined in the research literature investigating pressure ulcers. Accordingly we are investing much of our research effort in this area to address issues in both the hospital and community settings. We will discuss aspects of the research studies, such as developing test protocols and deriving robust parameters to assess risk, which are taking place in the new Clinical Academic Facility at the University of Southampton.

Discussion

This session is designed to provide an overview of useful technologies in the prevention of pressure ulcers and offer future tools to be used in the clinical setting to assess subjects in the seated posture. We will highlight how technologies have increased our knowledge to a limited extent, for example in the aetiology of pressure ulcers. Appropriate utilisation of technologies has already made a clinical impact, but more is needed to reduce the prevalence/incidence of pressure ulcers, a condition that so adversely affects both patients and their carers. The goal of our parallel session will be to stimulate thought and opinions as to where technology can go next and what could make a significant impact on patients, carers, and clinicians. We welcome the opportunity in the session to answer questions relating to technology and we will look for debate regarding how technologies can be used in the future.

References

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