

Non-invasive assessment of tissue viability for early detection of pressure ulcers

Date: February 13th, 2008

Time: 5:15 pm (approx. 45 minutes)

Location: ETL E2-002, University Of Alberta

Presented by: Dr. Martin Ferguson-Pell, Professor & Dean – Faculty of Rehabilitation Medicine, University of Alberta



Speaker Biography:

Dr Martin Ferguson-Pell has recently been appointed Dean of the Faculty of Rehabilitation Medicine at the University of Alberta, which is the only free standing faculty of rehabilitation medicine in Canada.

After graduating with a PhD in biomedical engineering Dr Ferguson-Pell was appointed lecturer at the University of Strathclyde in Glasgow. In 1982 he relocated to New York and founded and directed the Centre for Rehabilitation Technology at Helen Hayes Hospital. He was also Associate Professor in Clinical Bioengineering in Rehabilitation at Columbia University and held an adjunct appointment in biomedical engineering at Rensselaer Polytechnic Institute. In 1995 Dr Ferguson-Pell was offered the founding appointment to the ASPIRE Professorial Chair in Neuromuscular Restoration and Rehabilitation at University College London. During this time he was also appointed Director of Research and Development at the Royal National Orthopaedic Hospital, a Board level position. Dr. Ferguson-Pell's background is in Biomedical Engineering and he is a registered Clinical Scientist. He has extensive experience working in clinical-academic settings developing engineering solutions to overcome barriers experienced by people with physical disabilities. He employs traditional scientific methods, engineering design as well as qualitative methods to provide a balanced approach to the development and translation of research that directly influences the independence of people with physical disabilities.

Abstract:

Recent studies of patients receiving acute inpatient care throughout Europe and North America indicate a prevalence of pressure ulcers between 15 and 25%. Studies of patients in long term care and in the community indicate comparable or higher pressure ulcer prevalence. The cost to healthcare systems in extended length of stay alone is staggering, but other costs, such as the demoralization of staff and the impact on patients and their families are incalculable. There is a need for instruments that can provide information about the physiological response of tissues, measuring quantities that are closely linked to our understanding of pressure ulcer etiology. Some technologies exist and are widely used but have significant limitations (e.g. Laser Doppler Flowmetry, transcutaneous partial pressure of oxygen, microdialysis). None of these systems currently offer simultaneous measurement of physiological parameters at different depths within the tissue.

In this seminar, I will describe our work in the development and application of non-invasive visible and near infra-red spectroscopic techniques to examine tissue characteristics when subjected to prolonged loading by support surfaces such as mattresses and cushions. Tissue reflectance spectroscopy (TRS) analyses the absorption spectrum of tissues to determine the concentration of chromophores associated with de-oxygenated and oxygenated blood, cytochrome oxidase (a by-product of cell metabolism) and water content. Initial clinical studies of these techniques have shown their potential to classify incipient tissue damage by training a neural network. Input parameters are the temporal changes in relative absorbance of light at a range of carefully chosen wavelengths in response to an applied perturbation of the tissues (sliding blanch). With a relatively simple measurement system we are able to classify different early stage pressure ulcers into 5 groups with 93% correct categorization.

Pizza will be served after the presentation