Queen Elizabeth National Spinal Injuries Unit for Scotland: Research Profile 2015

Research in basic sciences, clinical treatment and prevention including translational approaches is a fundamental and embedded function of the spinal injuries unit. The ultimate aim is to act as a host and supporter of all scientists who can have a positive impact on the care of the traumatic spinal cord injured.

We have set up SCI². The Scottish Centre for Innovation in Spinal Cord Injury as an umbrella group to support translational research in a clinical setting. The unit is supported by Glasgow University, whose Centre for Rehabilitation Engineering is based in the SRIF and GRPE funded Research Mezzanine.

It is envisaged that the unit acts as an embedded research micro site within the NHS to promote research and to provide access and stimulation for clinicians, patients and researchers to work together. The group conducts research in all areas of spinal cord injury from clinical review and outcome through understanding and promoting neural repair and regeneration to active intervention assessment and treatment strategies all based on basic science. The research is patient orientated and extends from harvesting and growing olfactory stem cells to robotic walking and brain computer interfacing. Psychological studies and the impact of disability are equally important. Spinal Injuries Scotland is a collaborative partner within Scotland and the unit has links with ISRT, SIA, Aspire and Back Up.
Scottish Centre for Innovation in Spinal Cord Injury

Glasgow University – NHS, GGC
– NHS Scotland

Queen Elizabeth National Spinal Injury Unit for Scotland

GU Centre of Rehabilitation Engineering SU Dept of Bioengineering
HWU SU Psychology Dept GU Cellular Neuroscience
Glasgow School of Art, School of Design

Current Areas of Interest

BCI - FES - Control Systems - WBV – Lokomat- Erigo—pQCT - Osteoporosis-
Primary Intervention – Psychology - OEC Stem Cell

Team Leaders

Professor Manuel Salmerez-Sanchez (GU) Professor Bernie Conway(SU)
Professor Sue Barnett(GU)
John Riddell(GU) Professor Alistair Macdonald(GSA) Adele Dickson (HW)
Mariel Purcell (GGHB)

Participants

NHS, GGC Alan McLean Mathew Fraser Mariel Purcell John Hasler Leslie Wallace
David Allan
GU Henrik Gollee, Aleksandra.Vuckovic
SU Sylvie Coupaud Helen Berry Euan McCaughey

Scaffolds FES Plasticity Spinal Stimulation Sensors
Stem Cell Implantation
Multi Component Therapy Neural Protection- Neural Repair, Neural Plasticity
Repetitive Stimulation and Training

Aberdeen, Edinburgh, EMSCI, Toledo, Balgrist, Perth
Staffing February 2015

National Health Service

M.A. Fraser FRCS, A. N McLean FRCP, M. Purcell MRCP

Dr M Jigajinni, Jon Hasler, Leslie Wallace, Claire Lincoln

Glasgow University

CRE: Professor Manuel Salmeron-Sanchez, Dr Henrik Gollee, Dr Aleksandra Vuckovic, Muhammad Abul Hasan, Bethel Osuagwu, Lynn Meng

Dr E H Coulter

Professor Sue Barnett, Dr John Riddell

Strathclyde University

Professor Bernie Conway, Dr Sylvie Coupaud, Dr Helen Berry, Dr Euan McCaughey, Dr Heba Lakany, Danieal Kahani

Stirling University

Professor Ronan O’Carroll

Heriott Watt University

Dr Adele Dickson

Glasgow School of Art

Professor A.S.Macdonald

Gemma Wheeler

Papers and Authorship SCI² Oct 1999 – Feb 2015

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Only papers with direct involvement with mezzanine or SCI²

NHS - National Health Service, GU - Glasgow University, SU - Strathclyde University, GSA – Glasgow School of Art, Stir U - Stirling University
A detailed explanation of SCI² is available @ SCISCI.ac.uk

Papers 2015

McCaughey E, Purcell M, McLean A, Fraser M, Allan D B, Bewick A. Changing demographics of spinal cord injury over a 20 year period: A longitudinal population based study in Scotland (In Review)

McCaughey E, Allan D B, Purcell M, Barnett S. Spinal cord injuries caused by stab wounds: Incidence, natural history and relevance to future research. (In Submission)


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Anwar, F., Al-Khayer, A., El-Mahrouki, H., Purcell, M. “Gastrointestinal bleeding in spinal injuries: is prophylaxis essential?” British Journal of Medical Practitioners March 2013 Vol6 No1

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Kalauzi A, Vuckovic A, Bojic T, EEG alpha phase shifts during transition from wakefulness to drowsiness Int J Psychophysiol 2012 May 9 PMID 22580156

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Vuckovic A, Hasan MA, Conway BA, Allan DB, Fraser M. Neurofeedback for treatment of neuropathic pain in SCI patients SClence Research Update 14 p

Vuckovic A, Wallace L, Allan D, FES for rehabilitation of the hand in acute SCI patients SClence Research Update 18 p

Vuckovic A, Sepulveda F A two stage four-class BCI based on imaginary movements of the left and right wrist Med Eng Phys 2011 Nov 24 PMID 22119365


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Anderson J.” The making of a Psychologist: Clinical Psychology in a medical setting” 2010 Psychology In Press


Deady D.K, North NT ,Allan DB, Law Smith MJ, O’Carroll RE “Examining the effect of spinal cord injury on emotional awareness, expressivity and memory for emotional material” Psychology Health &Medicine DOI: 10.1080/13548506.2010.482138


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McComb C., Allan D., Condon B., Evaluation of the translational; and rotational forces acting on a highly ferromagnetic spinal implant in magnetic resonance imaging. Journal of Magnetic Resonance Imaging 29: 449-453


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**Papers 2007**


Dewar D., Bentley D. and Barnett S.C., "Implantation of olfactory ensheathing cells into a striatum after a 6-hydroxydopamine lesion of the substantia nigra has no effect on amphetamine-induced rotation or synaptic sprouting," ActaNeurochirurgica, vol. 149, pp 407-14.


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Gollee H, Hunt KJ, Fraser MH, McLean AN, Allan DB. A control system for automatic electrical stimulation of abdominal muscles to assist respiratory function in tetraplegia. Med Eng Phys. 2006 In press


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Oliver A, Allan DB. Lateral flexion distraction injury of the spine. Injury, Int J Care Injured 2005;36:222-225


Papers 2004


Harrison CS, Grant M & Conway BA Haptic interfaces for wheelchair navigation in the built environment. Presence-Teleoperators and Virtual Environments 2004;13:520-534


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Prasad RS, Fraser MH, Urquhart GD, McLean AN. Rupture of tuberculous spinal abscess resulting in tuberculous empyema and chylothorax. Spinal Cord 2003;41:410-12

Deep K., Bhalaik V., “Pain as a presenting feature of acute abdomen in spinal injuries” Injury 2003;34;(1);33-34


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Hunt KJ, Gollee, Jaime R-P. Control of paraplegic ankle joint stiffness using FES while standing. Medical Engineering and Physics, 2001:23;541-555.


Hunt KJ, Jaime R-P, Gollee H. Robust control of electrically-stimulated muscle using polynomial H-infinity design. Control Engineering Practice 2001; 9; 3;313-328

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PRESENTATIONS

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2014


Aleksandra Vuckovic, Muhammad A Hasan, Matthew Fraser, Bernie Conway, David B Allan. A Pilot Study on Clinical and Neurological Effects of Neurofeedback Training for Treatment of Central Neuropathic Pain in Replace, Repair, Restore, Relieve – Bridging Clinic and Engineering Solutions in Neurorehabilitation ICNR, 24-26th June, Aalborg, Denmark. Ipp 823-833.SBN 978-3-319-08071-0

Muhammad Abul Hasan, Aleksandra Vuckovic, Matthew Fraser, Bernard Conway, Bahman Nasseroleslami, David B Allan. Reduced Activation at Cortical Level Following Neurofeedback Treatment is Associated with Reduction in Central Neuropathic Pain Intensity, the 6th International BCI Conference 2014, held in Graz September, 16-19,2014

Bethal A. Osuagwa, Aleksandra Vuckovic, Matthew Fraser, Leslie Wallace and David B Allan. BCI-FES hand therapy for patient with sub-acute tetraplegia. The 6th International BCI Conference 2014, Graz September, 16-19, 2014

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Coupaud, S., McLean, A. and Allan, D. "Longitudinal changes in bone in the first year of spinal cord injury" 'Proc. 7th International Workshop for Musculoskeletal Neuronal Interactions', Cologne (Germany), 2010, pp. 21-22.


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A Gulati, CJ Yeo, AD Cooney, AN McLean, MH Fraser, DB Allan. Functional outcome of traumatic,fourteen year experience within a National Spinal Unit. In Proc. 2nd World Congress Sports

RM McKenna, RJ Drummond2, AN McLean1, DB Allan. Spinal injuries following cycling accidents. Injuries Prevention, (Tromso, Norway). June 2008


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Oliver A, Allan D.B Anterior Tibial Compartment Pressures in Spinal Cord Injured Patients EFFORT (Lisbon, Portugal) June 2005

Hems T, Wallace L. Experience with the Freehand Functional Electrical Stimulating Implant in Scotland FESSH (Gothenburg, Sweden) June 2005


Joseph G, Allan DB, Fraser MH Philip D, Jigiajini MV, Mclean AN Audit on the use of a structured transfer guidelines for inter-hospital transfer of patients with spinal cord injuries Proc. 44th Annual Scientific Meeting, Int. Spinal Cord Soc. (Munich, Germany) 2005

Joseph G, Jigajini MV, Philip D, Raja M, McLean AN, Fraser MH, Allan DB Use of a structured referral protocol for the safe inter-hospital transfer of patients with spinal injury British Orthopaedic Association 2005


Bell S, Shaw-Dunn J, Gollee H, Fraser MH, Allan DB. Improving respiration in patients with tetraplegia. in Proc. British Ass Clin Anatomists (Sheffield, UK) Dec 2005

McRae CGA, Hunt KJ. Development of methods and equipment for functional electrical stimulation induced cycling for use within the paediatric spinal cord injured population. in Proc. 4th Ann. Conf. IEEE EMBSS UKRI PG Biomedical Engineering and Medical Physics, (Reading, UK), pp. 7-8, July 2005.


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Hunt KJ, Saunders BA, Sutherland R, Grant S, McLean AN, Fraser MH. “Mobile cycling for people with spinal cord injury using functional electrical stimulation: a case study,” in 3rd Int. Congress on Restoration of (wheeled) Mobility in SCI Rehabilitation, (Amsterdam, the Netherlands) April 2004

Oliver A, Allan DB. Tibial compartment pressures in spinal cord injured patients. Scottish Orthopaedic Meeting (Stirling, UK) May 2004

Gollee H, Coupaud S, Hunt KJ, Allan DB, Fraser MH, McLean AN. A feedback system for autonomic electrical stimulation of abdominal muscles to assist respiratory function in tetraplegia. 8th Vienna Int. Workshop on Functional Electrical Stimulation (Vienna, Austria) Sept 2004

Gollee H, Coupaud S, Hunt KJ, Fraser MH, Allan DB, McLean AN. Automatic electrical stimulation of abdominal muscles to increase tidal volume and cough peak flow rates in tetraplegia. in Proc. 43rd Annual Scientific Meeting Int. Spinal Cord Soc (Athens, Greece) Sept 2004


Joseph G, Jigajinni MV, Johnston RA, Fraser MH, McLean AN. Delayed presentation and diagnosis of cervical; injuries in ankylosing spondylitis Britspine (Nottingham, UK) April 2004


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Holderbaum W, Hunt KJ, GolleeH. Application of H-infinity robust control to paraplegic standing. in Proc. IFAC World Congress, (Barcelona, Spain), 2002.


2001


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Hunt KJ, Munih M, Donaldson N, Barr FMD. Application of optimal control theory in rehabilitation engineering. in Proc. IFAC World Congress, (Beijing, China), 1999.