

Monday 6th September

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## Neuromodulation (free papers)

AC Nerve Blocking: in-vivo tests & potential applications  
**Andrews BJ, Williamson R**

A method of automated conditional neuromodulation of neurogenic detrusor overactivity using a combined sacral anterior and posterior nerve root stimulator implant in patients with spinal cord injury.

**Bycroft JA, Craggs MD, Knight SN, Wood S, Donaldson N, Shah PJR**

Long-term safety and efficacy of intrathecal baclofen (ITB) therapy for control of intractable spasticity

**Buschman HPJ, Kottink EJBL, Nene AV, Snoek GJ, Van der Aa HE**

Motor Cortex Stimulation: a computer modelling study

**Manola Lj, Roelofsen B, Holsheimer J**

## Upper extremities I

A randomised controlled trial to evaluate the effect of surface neuromuscular electrical stimulation (sNMES) to the upper limb following acute stroke

**Church C, Price C, Pandyan D, Huntley S, Curless R, Rodgers H**

Feasibility of randomised clinical trial of early initiation and prolonged, home-based FES training to enhance upper limb functional recovery following stroke

**Alon G, McBride K, Levitt AF**

Retraining Reaching and Grasping Functions in Hemiplegic Patients with the Chedoke McMaster Stages of Motor Recovery Scores 1 and 2

**Popovic MR, Hajek V, Zivanovic V**

Intramuscular NMES for Hemiplegic Shoulder Pain

**Yu DT, Chae J**

## Physiology of FES

Increased muscle force using high-frequency, wide-pulse FES in chronic spinal cord injury (SCI) patients

**Nickolls P, Collins DF, Gorman RB, Burke D, Gandevia SC**

Preventing Acute Atrophied Muscles by Therapeutic Magnetic Stimulation - RT-PCR study

**Sakuraba T, Shimada Y, Kawatani M, Takahashi S, Matsunaga T, Misawa A, Ito H, Aizawa T, Sato M, Chida S**

Effects of chronic electrical stimulation on the denervated tibialis anterior muscle of the rabbit

**Ashley Z, Russold MF, Sutherland H, Jarvis JC, Salmons S**

A direct fluorescence-based approach for elucidating the size and spatial distribution of motor fibres innervating the rat gastrocnemius muscles

**Prodanov D, Feirabend HKP, Marani E, Holsheimer J, Nagelkerke N, Lakke EAJF**

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Tuesday 7th September

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## Neuromodulation (invited papers)

To be announced

## Gait assist and posture I

Non-repetitive Stimulation of the Common Peroneal Nerve  
**Hart DJ, Taylor PN, Chappell PH, Wood DE**

Enhancement of Gait Retraining by Electrical Stimulation of Flexor Reflex Afferents in Acute Stroke Patients: A Randomized, Controlled Clinical Study  
**Quintern J, Krewer C, Bisle G, Husemann B, Heller S**

Impairment, Functional Mobility, and Gait Kinematic Gains In Response To FNS and Weight Supported Gait Training  
**Daly JJ, Roenigk K, Rogers J, Butler PTK, Marsolais B, Gansen J, Ruff R**

A Pilot Study to investigate the effects of Functional Electrical Stimulation on gait in Parkinson's Disease  
**Mann GE, Finn SM, Taylor PN**

Pressure Changes Under The Ischial Tuberosities Of Seated Individuals During Sacral Nerve Root Stimulation  
**Liu LQ, Craggs MD, Nicholson GP, Knight SL, Chelvarajah R, Bycroft J, Middleton FRI, Ferguson-Pell M**

## Paediatrics

Neuromuscular electrical stimulation and volitional strength training on in children with cerebral palsy: a preliminary study  
**Lee SCK, Stackhouse SK, Stackhouse CA, Schaefer M, McCarthy JJ, Smith BT**

An investigation of the effect of functional electrical stimulation to assist the gait of children with cerebral palsy  
**Durham S, Eve L, Turner-Simmonds C, Daniel C, Stevens C, Ewins DJ**

Combined Effect of Botulinum toxin A therapy and Functional Electrical Stimulation in Dynamic Equinus: Preliminary results  
**Galen SS, Granat MH**

Implanted Functional Electrical Stimulation for Upright Mobility in Paediatric Spinal Cord Injury: A Follow-up Report  
**Johnston TE, Smith BT, Betz RR, Mulcahey MJ**

## Bladder and bowel

Electrical stimulation of the descending colon in pigs with chronically implanted electrodes  
**Sevcencu C, Rijkhoff NJM, Nygaard Lærke H, Jørgensen H, Mark M, Sinkjær T**

A stomal sphincter configured from the rectus abdominis muscle in pigs. First results.  
**Russold MF, Ramnarine I, Ashley Z, Sutherland H, Salmons S, Jarvis JC**

Conditional Electrical Stimulation of the Dorsal Penile/Clitoral Nerve for Management of Neurogenic Detrusor Overactivity in Multiple Sclerosis  
**Fjorback MV, Rijkhoff NJM, Petersen T, Nøhr M, Sinkjær T**

Improvement of storage function of the complicated bladder with semi-conditional dorsal penile nerve stimulation in spinal cord injury  
**Young-Hee Lee, Sung Hoon Kim, Sang Min Jang, Iksoo Kim, Kyubum Eo, Jiyong**

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## Wednesday 8th September

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### Stimulator and sensor technology I

Design of an implantable multichannel neurostimulator for restoring impaired gastrointestinal motility  
**Jalilian E, Turner L, Jullien G, Mintchev MP**

On the development of modular miniaturized neural prostheses  
**Stieglitz T, Koch KP**

Cross-talk in Nerve Root Stimulator Implants  
**Vanhoest A, Donaldson N**

A Modular Approach to Sensing Limb Position in FES Patients  
**Loeb GE, Tan W, Sachs N, Zou Q, Kim ES**

FES as a rehabilitation tool for orthopaedics and neurological patients (view from Russia)  
**Skvortsov DV**

### Upper extremities II

Can treatment with upper limb electrical stimulation can be justified in the severely disabled acute stroke patient?  
**Pandyan AD, Granat MH**

An Implanted Upper Extremity Neuroprosthesis Utilizing Myoelectric Control  
**Kilgore KL, Peckham PH, Montague FW, Hart RL, Bryden AM, Bhadra N, Keith MW**

A Modular Approach to Retraining Muscles after Stroke  
**Richmond FJR, Baker LL, Winstein C, Waters RL, Loeb GE**

Variation in system gain when using voluntary EMG to control electrical stimulation of the same muscle  
**Taylor P, Chappell P**

Tenodesis grip augmented by EMG controlled FES  
**Thorsen R, Occhi E, Boccardi S, Ferrarin M**

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## Thursday 9th September

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### Control techniques

A Study of a Knee Extension Controlled by a Closed Loop Functional Electrical Stimulation  
**Schmitt C, Métrailler P, Al-Khodairy A, Brodard R, Fournier J, Bouri M, Clavel R**

Real time description of lower limb motion for nonanalytical neuroprosthetic control applications

**Moser D, Catalfamo P, Ghoussayni SN, Ewins DJ**

Mathematical Model That Predicts Lower Leg Motion In Response To Electrical Stimulation  
**Perumal R, Wexler AS, Binder-Macleod SA**

The feasibility of a FNS powered mechanical gait orthosis with coordinated joint locking  
**To CS, Kirsch RF, Kobetic R, Triolo RJ**

Evaluation of user-interfaces for FES systems by means of a dual-task experiment  
**Vanoncini M, Andrews BJ**

## **Gait assist and posture II**

A preliminary non-randomised study to evaluate the safety and performance of the ActiGait implanted drop-foot stimulator in established hemiplegia  
**Haugland M, Larsen B, BurrIDGE J, Svaneborg N, Iversen H, Christensen PB, Sinkjaer T**

Can alternatives to the forceplate be used for accurate detection of key gait events?  
**Findlow AH, Kenney L, Howard D**

A model to predict the effect of calf muscle stimulation at push-off  
**Bosgraud T, Monaghan CC, Kotiadis D, Riener R, Veltink PH**

Efficacy of Intraspinal Microstimulation in Restoring Stepping after Spinal Cord Injury  
**Mushahwar VK, Saigal R, Bamford J, Guevremont LG, Norton JA**

Increasing trunk stiffness via FES in paraplegic subjects **Vanoncini M, Thrasher A, Andrews BJ, Holderbaum W**

## **Cycling and Rowing**

Oxygen Cost of Different Stimulation Patterns for FES Cycling  
**Ferrario C, Stone B, Hunt KJ, Ward SA, Mclean AN, Fraser MH**

Physiological responses after 4 weeks training with a hybrid FES tricycle in spinal cord injured individuals

**Berkelmans HWA, Thijssen DHJ, Heesterbeek P, van Ginneken BTJ, Hopman MTE, van Kuppevelt DH, Duysens J**

Design history of a leg-propelled wheelchair using FES  
**James KB, Stein RB, Chong SL, Thompson AK**

FES-rowing for persons with Spinal Cord Injury  
**Hettinga DM, Andrews BJ, Wheeler GD, Jeon JY, Verellen J, Laskin JJ, Olenik LM, Lederer R, Burnham R, Steadward RD**

## **Stimulator and sensor technology II**

Detection and Filtering of EMG for Assessing Voluntary Muscle Activity during FES  
**Schauer T, Salbert RC, Negård N-O, Raisch J**

Inertial Gait Phase Detection system: Design  
**Kotiadis D, Hermens HJ, Veltink PH, Slycke P**

Portable FES System optimises Electrode Array using Twitch Response  
**Elsaify A, Fothergill JC, Peasgood W**

Development of a new FES system with trained Super-Multichannel Surface electrodes  
**Fujii T, Seki K, Handa Y**

## POSTERS

### Cycling and rowing

A biomechanical model to simulate cycling induced by functional electrical stimulation  
**Ferrante S, Pedrocchi A, Ferrigno G**

Cycling closed loop FES: customized cycle ergometer and first experiments @NITLab  
**Ferrante S, Pedrocchi A, Foglia GM, Iannò M, Ferrigno G**

Finding the metabolically optimal stimulation pattern for FES-cycling  
**Idsø ES, Johansen TA, Hunt KJ**

Simple EMG Control for FES-Cycling  
**Norton JA, Fry ME, Day BL, Donaldson N**

Driving a cycling chair without FES in the non-ambulatory hemiplegic patients  
**Seki K, Sato M, Fujii T, Handa Y**

"Strong" vs "weak" paraplegic cyclists - A work physiological approach to FES cycling  
**Szecsí J, Krafczyk S, Straube A, Quintern J**

FES Cycling Chair for the Lower Limbs Disabled People with Electric Motor Power Assist  
**Takahashi T, Takazawa M, Nishiyama Y, Nakano E, Handa Y**

Activation of the Trunk Muscles during Wheelchair Propulsion  
**Yang Y, Koontz A, Nogan S, Boninger ML, Cooper RA, Triolo RJ**

A structured functional neural network control system for FES cycling  
**Zhang DG, Zhu KY**

### Neuromodulation (free papers)

Effect of subthreshold stimulation of vagal nerve on food intake pattern in swine  
**Díaz Güemes I, Sánchez FM, Pascual S, Usón J**

Vagal nerve histopathological findings after electrical stimulation to control food intake in pig  
**Díaz Güemes I, Sánchez FM, Pascual S, Usón J**

Deep Brain Stimulation of STN in patients with Parkinson's Disease: effects on EMG signals of leg muscles during walking  
**Ferrarin M, Rizzone M, Lopiano L, Recalcati M, Rabuffetti M**

Block of Nerve Conduction Using High Frequency Alternating Current  
**Kilgore KL, Bhadra N**

Blocking of peripheral nerve conduction using AC signals: Which frequency is best?  
**Schuetzler M, Andrews BJ, Donaldson NdeN**

Heart Rate Control through Vagal Nerve Stimulation  
**Tosato M, Toft E, Yoshida K, Nekrasas V, Struijk JJ**

Diameter selective nerve fiber stimulation in the vagal nerve using anodal block, depolarising prepulses and long exponentially rising pulses  
**Vuckovic A, Struijk JJ, Rijkhoff NJM**

## Physiology of FES

Re-innervating Muscle for FES Using Neurones Derived from Adult Mesenchymal Stem Cells  
**Andrews BJ, Ray S**

Electrical Stimulation To Improve Movement: Practical Application of Electroneuromyographic [ENMG] Assessment to Patient Selection  
**Campbell J**

Maximum Period of Rest Between Daily Treatment Sessions of Electrical Stimulation for Denervated Muscles of Rats  
**Dow DE, Dennis RG**

A Theory for Breakdown of Accommodation in Mammalian Nerve; Functional Significance of Persistent Sodium Channels  
**Hennings K, Arendt-Nielsen L, Andersen OK**

Effects of training with functional electrical stimulation (FES) on ankle joint torque  
**Koryak Y**

Functional electromyostimulation (FES) as a countermeasure of the negative effects of weightlessness to prolonged spaceflights  
**Koryak Y, Kozlovskaya I, Grigor'ev A, Mayr W, Rafolt D, Freilenger G**

The European FP5-project RISE: FES of denervated degenerated musculature  
**Mayr W, Hofer C, Rafolt D, Bijak M, Lanmueller H, Reichel M, Sauermann S, Unger E, Kern H**

Tissue-electrode interface changes in the first week after spiral cuff implantation: Preliminary results  
**Thil M-A, Gerard B, Jarvis JC, Vince V, Veraart C, Colin IM, Delbeke J**

Effect of Random Modulation of FES Parameters on Muscle Fatigue  
**Thrasher TA, Graham GM, Popovic MR**

Investigation of Long Pulse Electrical Stimulation of Denervated Muscle in Humans to evaluate Therapeutic and Functional benefits  
**Wright PA, Taylor PN, Ewins D**

## Control techniques

EEG-based Brain-Computer Interface For Hand Grasp Control: Feature Extraction by Using ICA  
**Erfanian A, Erfani A**

Model identification for FES supported standing up and sitting down  
**Ferrante S, Previdi F, Ferrigno G**

Effectiveness of Control Strategies in Reducing Muscle Fatigue  
**Huq MS, Gharooni CS, Tokhi MO**

A Transcutaneous Computer-based Closed-loop Motor Neuroprosthesis for Real-Time Movement Control  
**Kobravi HR, Erfanian A**

Enhancement of physiological and mechanical modelling of the skeletal muscle controlled by Functional Electrical Stimulation

**Makssoud HEL, Guiraud D, Poignet P**

Using a complex, physiological based modelling of the muscle to perform realistic simulation and test control strategies: closed loop controlled stand up example

**Mohammed S, Guiraud D, Fraise P, Poignet PEI, Makssoud H**

Controller Design of Musculoskeletal Model for Simulating Bipedal Walking

**Obinata G, Hase K, Nakayama A**

Stanmore Stimulator Application Programme to Sustain a Standing-Up, Standing and Sitting-Down Chained Motion in Paraplegia

**Poboroniuc MS, Wood DE, Donaldson N, Riener R**

Communication speed enhancement for visual based Brain Computer Interfaces

**Sami S, Nielsen KD**

## Paediatrics

Patterns of Lower Extremity Innervation in Pediatric Spinal Cord Injury

**Johnston TE, Greco MN, Gaughan JP, Smith BT**

The use of principles of motor learning in a fes gait training program for children with hemiplegic cerebral palsy: a pilot study

**Shewokis PA, Pierce SR, Stackhouse CA, Smith BT, McCarthy JJ**

Assessing FES-assisted walking in cerebral palsy children using a visual gait analysis scale

**Wareham WJ, Stone TA, Wood DE**

## Bladder and bowel

Bladder Contractions Evoked by Electrical Stimulation of Sensory Nerve Fibers Innervating the Urethra

**Grill WM, Boggs JW, Gustafson KJ, Wenzel BJ**

Experimental Treatment of Neurogenic Detrusor Overactivity in Spinal Cord Injured Patients by Automatic Event Driven Electrical Stimulation

**Hansen J, Fjorback MV, Nøhr M, Media S, Biering-Sørensen F, Sinkjær T, Rijkhoff NJM**

## Stimulator and sensor technology

Design of antennas to power injectable micro-stimulators: a systematic approach

**De Balthasar C, Cosendai G, Hansen M, Arcos I, Dearden B, Schulman J**

A Modeling Study of the Recording Selectivity of Longitudinal Intrafascicular Electrodes

**Chemineau ET, Schnabel V, Yoshida K**

Inductive Powering for Biomedical Applications

**Chevalerias O, O'Reilly S, Alderman J**

Playing the Numbers - Quality System Accreditation for Regulatory Approval

**Crook SE**

Retrieval of Microstimulators at Human Implant Surgery and Post-Operatively

**Davis R, Cosendai G, Ripley AM, Mishler D, Sanderson D, Zilberman Y, Schulman J**

Flexible microelectrode arrays with integrated organic semiconductors  
**Feili D, Schuettler M, Stieglitz T**

Gait Re-education System for Incomplete Spinal Cord Injured Patients - Measurement of Leg Joint Angles by Piezoelectric Gyroscope -  
**Furuse N, Watanabe T, Hoshimiya N**

Experience in the use of a single Gyroscope as a sensor for FES foot drop correction systems  
**Ghoussayni SN, Catalfamo PC, Moser D, Ewins DJ**

A highly parallelizable signal conditioning module dedicated to cortical implantable monitoring devices  
**Gosselin B, Sawan M**

Muscle stimulation in a rodent model: electrode design, implantation and assessment  
**Ichihara K, Venkatasubramanian G, Labelle A, Ashton E, Abbas JJ, Jung, RJ**

A User Centred Approach to Stimulator Design - "Can you make it smaller and do more please?"  
**Lane RP, Taylor PN**

Analysis of a Patient-Selected Programs from a New Spinal Cord Stimulation System  
**Meadows P, Varga C, Prager J, Krames E, Oakley J, Bradley K, Grandhe S, Whitehurst T**

Control of Triceps Surae Stimulation based on shank orientation using a uniaxial gyroscope  
**Monaghan CC, Veltink PH, Bultstra G, Droog E, Kotiadis D, van Riel W**

Evaluation of fatigue property of titanium wires by rotating-bending testing in 1 mass% lactic acid solution  
**Narushima T, Ueda K, Yamashita M, Murakami T, Ouchi C, Iguchi Y**

Impedances of common surface stimulation electrodes  
**Perkins TA**

A simple to program but sophisticated distributed control system for surface FES applications  
**Poulton AS, Andrews BJ**

System Test of a Smart, Bidirectional Interface for Regenerating Peripheral Nerves  
**Ramachandran A, Brueck O, Kammer S, Koch KP, Stieglitz T**

Fabricating microelectrode arrays by laser-cutting of platinum foil and silicone rubber  
**Schuettler M, Stiess S, King BV, Suaning GJ**

3D modelling of a hydrogel sheet - electrode array combination for surface functional electrical stimulation  
**Sha N, Heller BW, Barker AT**

Healthy AIMS (Ambient Intelligent Micro-Systems for Health)  
**Taylor P, Lane R, Esnouf J, Mann G, Wood D, Crook S, Hobby J, Spensley J, Hodgins D**

Tissue response on chronic selective stimulation of a dog's vagus nerve  
**Tegou E, Bunc M, Rozman J**

An Adaptive ENG Amplifier for FES Applications  
**Triantis IF, Demosthenous A**

Continuous on-body sensing of ground-reaction forces  
**Veltink PH, Liedtke CB, Droog A, Van der Kooij H**

Spatial sensitivity comparisons between an implanted and surface dropped foot neuromuscular stimulator  
**Wood DE, Taylor PN**

## Upper extremities

A simulation model of FES for the treatment of shoulder subluxation  
**Aizawa T, Shimada Y, Iwami T, Nakamura K, Matsunaga T, Misawa A, Sakuraba T, Itoi E**

Exploratory data in support of the upper limit values and reproducibility of the Box & Block and Jebsen-Taylor tests following stroke  
**Alon G, McBride K, Levitt AF**

A preliminary clinical study using RF BION® microstimulators to facilitate upper limb function in hemiplegia  
**Burridge JH, Etherington R, Davis R, Cosendai G, Ripley AM**

A quantitative method to evaluate hand voluntary range of movement  
**Carpinella I, Rabuffetti M, Mazzoleni P, Thorsen R, Ferrarin M**

Relation between the EMG recordings from prime movers of the arm and the Drawing Test scores in post stroke hemiplegics  
**Eder C, Popovic MB, Popovic DB, Sinkjær T**

Effects of Botulinum Toxin Therapy on Wrist Movements in Spastic Hemiparesis  
**Gregoriè M, Goljar N, Gros A, Klemen A, Tomšič I**

Stimulation parameters for increased muscle force and selectivity of elbow extensors in chronic stroke subjects  
**Keller T, Dewald JPA**

The Use of the RF BION® Microstimulator to Relieve Pain Due to Shoulder Subluxation in Chronic Hemiplegic Stroke Patient - A Case Report  
**Misawa A, Shimada Y, Matsunaga T, Aizawa T, Hatakeyama K, Chida S, Sato M, Davis R, Zilberman Y, Cosendai G, Ripley AM**

Activity of arm muscles during machine therapeutic exercise  
**Munih M, Ponikvar M, Bajd T**

RF BION microstimulator implantation technique for shoulder subluxation  
**Shimada Y, Matsunaga T, Misawa A, Aizawa T, Hatakeyama K, Chida S, Sato M, Davis R, Zilberman Y, Cosendai G, Ripley AM**

## Gait assist and posture

Clinical application of an eight channel stimulation system for mobilization of paraplegic patients: First results  
**Bijak M, Rakos M, Hofer C, Mayr W, Strohhöfer M, Raschka D, Kern H**

An implantable 2-channel lower-extremity neuroprosthesis: long-term clinical follow-up in five patients  
**Buschman HPJ, Kottink-Hutten AIR, Bultstra G, Hermens HJ, van der Aa HE**

A comparison of energy consumption in upper limb during swing-through gait with axillary and elbow crutches in normal subjects

**Chida S, Shimada Y, Matsunaga T, Sato M, Hatakeyama K, Misawa A, Sakuraba T, Aizawa T, Iwami T, Miyawaki K, Iizuka K**

Does the Canadian Occupational Performance Measure determine if the Odstock Drop Foot Stimulator improves Activities of Daily Living for people with Multiple Sclerosis?

**Esnouf JE, Taylor PN**

Comparisons of the swing through gait motion with and without the short leg brace

**Hatakeyama K, Shimada Y, Matsunaga T, Iwami T, Nakamura M, Kamada K, Sato M, Chida S, Misawa A, Ando S, Sakuraba T, Aizawa T, Miyawaki K, Iizuka K**

Baseline results of a 'spasticity' test in stroke patients using an implanted stimulator

**Kottink AIR, Tenniglo MJB, Hermens HJ**

An investigation into the effect of Functional Electrical Stimulation on mobility and quality of life in patients with Multiple Sclerosis - preliminary results.

**Mann GE, Jolley CL, Taylor PN**

Joint moment of lower extremities during swing-through axillary crutch gait with knee free in non-disabled individuals

**Matsunaga T, Shimada Y, Sato M, Chida S, Hatakeyama K, Itoi E, Misawa A, Aizawa T, Iwami T, Nakamura M, Miyawaki K, Iizuka K**

Does FES of Triceps Surae affect the Activation Patterns of other lower leg muscles? A healthy subject pilot study

**Monaghan CC, Veltink PH, Tenniglo MJB**

Usage Patterns of an Implanted Neuroprosthesis for Exercise and Standing after Spinal Cord Injury

**Nogan SJ, Triolo RJ, Bieri CL, Rohde LM, Miller ME, Davis JA**

Robot-Supported Spasticity Evaluation

**Riener R, Brunschweiler A, Lünenburger L, Colombo G**

Functional Electrical Stimulation (FES) Service Audit from April 1996 to August 2003 (Birmingham, UK)

**Singleton CMB**

Stimulation of peripheral nerves with a microstimulator: experimental results and clinical application to correct foot drop

**Stein RB, Weber DJ, Chan KM, Loeb GE, Rolf R, Chong SL**

Patterns of use and users' perceptions of the Odstock Dropped Foot Stimulator following stroke and multiple sclerosis

**Taylor P, Johnson M, Mann G, Swain I**

Is efficiency of gait improved in stroke patients using a dropped foot stimulator?

**Van Vaerenbergh J, De Kegel A, De Ruijter S, Vandenberghe S, D'Hont Y**

Early FES Intervention for the Restoration of Ankle Dorsiflexion in Incomplete SCI

**Whittaker MW**

Retrospective study of patients using Functional Electrical Stimulation for drop foot correction and increased hip stability

**Wilkinson IA, Taylor PN**

A comparison of electrical stimulation and the conventional ankle foot orthosis in the correction of a dropped foot following stroke

**Wright PA, Mann GE, Swain I**