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Evaluating interventions to improve gait in cerebral palsy: A meta-analysis of spatiotemporal measures. *Developmental Medicine & Child Neurology (DMCN)* , Volume 49(7) , Pgs. 542-549.

NARIC Accession Number: J77207.

Author(s): Paul, Scott M.; Siegel, Karen L.; Malley, James; Jaeger, Robert J..

Publication Year: 2007.

Number of Pages: 8.

Abstract: This meta-analysis reviewed studies in which an intervention was used in an attempt to improve gait in individuals with cerebral palsy (CP) to determine the overall efficacy of these interventions. A search in MEDLINE identified 89 relevant citations; additional searches were conducted based on the authors of the citations. The types of interventions were grouped into four categories: (1) spasticity treatments, (2) orthopedic (bony and soft tissue) surgery, (3) lower-extremity orthoses, and (4) other (serial casting, muscle strengthening exercise, and biofeedback). Effect sizes (Hedge's *g*) for spatiotemporal measures of gait (velocity, cadence, and stride length) before and after the intervention were analyzed. Sixty-three studies were included in the meta-analysis, and the overall effect size was statistically significant for both fixed effects and random models. The results of the meta-analysis on all 63 studies indicated that there was a statistically significant improvement in gait velocity as a result of intervention. When the data were analyzed in subgroups by type of intervention, each intervention had a statistically significant effect size except for the "other" intervention category. This study showed that interventions intended to improve gait in individuals with CP do have a statistically significant effect on spatiotemporal measures of gait. The findings also highlight the need to address participant inclusion criteria and power analysis more adequately in future research studies of interventions to improve gait in CP.

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Guest editorial: Rehabilitation robotics research at the National Institute on Disability and Rehabilitation Research. *Journal of Rehabilitation Research and Development (JRRD)* (formerly the *Bulletin of Prosthetics Research*) , Volume 43(5) , Pgs. xvii-xx.

NARIC Accession Number: J51737.

Author(s): Jaeger, Robert J.

Publication Year: 2006.

Number of Pages: 4.

Abstract: Article provides an overview of robotics-related research funded by the National Institute on Disability and Rehabilitation Research (NIDRR). NIDRR funding mechanisms for rehabilitation robotics include Rehabilitation Engineering Research Centers, Small Business Innovation Research grants, and field initiated project grants.

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Prosthetic device provision to landmine survivors in Bosnia and Herzegovina: Outcomes in 3 ethnic groups. *Archives of Physical Medicine and Rehabilitation* , Volume 85(1) , Pgs. 19-28.

NARIC Accession Number: J47205.

Author(s): Burger, Helena; Marincek, Crt; Jaeger, Robert J..

Publication Year: 2004.

Number of Pages: 10.

Abstract: Article describes the differences in prosthetic provision, use, and effectiveness among patients from 3 ethnic groups in Bosnia and Herzegovina with landmine-related, unilateral lower-extremity amputations. Patients from 3 distinct ethnic groups (Muslims, Serbs, and Croats) provided data on self-reported walking distance per day, prosthesis functionality, prosthesis status, and employment status. Ethnic groups differed significantly in types of prostheses provided, functional status of the prostheses, and use of the prostheses for community ambulation. Individuals in all 3 groups with functional prostheses were more mobile than those with nonfunctional prostheses. The employment rate was higher for people with functional prostheses.

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Assessing the research knowledge base in assistive technology: A case study using MEDLINE. In G. Craddock et al. (Eds.), Assistive technology – shaping the future, AAATE '03. Assistive Technology Series, Volume 11. IOS Press, 2003 , Pgs. 648-652.

NARIC Accession Number: J49305.

Author(s): Jaeger, Robert J.

Publication Year: 2003.

Number of Pages: 5.

Abstract: Paper provides a preliminary assessment of the assistive technology (AT) knowledge base in the MEDLINE system. The phrase "assistive technology" is not a defined search term in MEDLINE. Author presents examples of search strategies and the appropriate AT-related terms, estimates of the numbers of AT citations in MEDLINE, the journals most likely to contain articles related to AT, and the growth of citations in AT over time. This paper was presented at the 2003 annual conference of AAATE, the Association for the Advancement of Assistive Technology in Europe.

Can this document be ordered through NARIC's document delivery service?: N

Pulmonary function testing in spinal cord injury: Effects of abdominal muscle stimulation. Journal of Rehabilitation Research and Development , Volume 38(5) , Pgs. 591-597.

NARIC Accession Number: J43431.

Author(s): Langbein, W. E.; Maloney, C.; Kandare, F.; Stanic, U.; Nemchausky, B.; Jaeger, R. J.

Publication Year: 2001.

Number of Pages: 7.

Abstract: Study was conducted to assess the effects of electrical stimulation on paralyzed abdominal muscles during pulmonary function testing (PFT) of individuals with spinal cord injury (SCI). Ten subjects performed PFTs with and without electrical stimulation. With stimulation, 9 of the 10 subjects demonstrated an increase in expiratory volumes and 7 subjects demonstrated an increase in expiratory flow rate. Results of the study indicate the potential of using abdominal muscle stimulation to improve pulmonary function and reduce pulmonary complication in individuals with SCI.

Can this document be ordered through NARIC's document delivery service?: Y

Functional Electrical Stimulation: Technical Advances and Clinical Applications. Physical Medicine and Rehabilitation: State of the Art Reviews , Volume 11(1) , Pgs. 39-53.

NARIC Accession Number: J33101.

Author(s): Chen, D; Jaeger, R J.

Publication Year: 1997.

Number of Pages: 15.

Abstract: Reviews recent work in functional electrical stimulation (FES). Describes the different FES stimulators and electrodes: surface electrode systems, percutaneous electrode systems, and implanted electrode systems. Discusses various clinically beneficial uses for FES including: strengthening and conditioning exercises, particularly for people with spinal cord injuries (SCI); respiratory management; and bladder and bowel management.

Can this document be ordered through NARIC's document delivery service?:

Cough in Spinal Cord Injured Patients: The Relationship Between Motor Level and Peak Expiratory Flow. Spinal Cord , Volume 35(5) , Pgs. 299-302.

NARIC Accession Number: J33634.

Author(s): Wang, A Y; Jaeger, R J; Yarkony, G M; Turba, R M.

Publication Year: 1997.

Number of Pages: 4.

Abstract: Examines the ability of people with higher level spinal cord injury (SCI) to cough independently. Argues that cough efficacy and motor level are correlated.

Project Number: H133N00008.

Can this document be ordered through NARIC's document delivery service?: Y

Electrical Stimulation and Biofeedback Effect on Recovery of Tenodesis Grasp: A Controlled Study. Archives of Physical Medicine and Rehabilitation , Volume 77(7) , Pgs. 702-706.

NARIC Accession Number: J32114.

Author(s): Kohlmeyer, K M; Hill, J P; Yarkony, G M; Jaeger, R J.

Publication Year: 1996.

Number of Pages: 5.

Abstract: Study evaluating the effectiveness of electrical stimulation and biofeedback on the recovery of tenodesis grasp in tetraplegic individuals during the initial phase of acute rehabilitation. Extremities to be studied were randomly assigned to one of four treatment groups: conventional strengthening techniques, electrical stimulation, biofeedback, and combined electrical stimulation and biofeedback. Patients participated 5 days a week for 5 to 6 weeks, and were evaluated by manual muscle tests and assessment of four self feeding tasks. Forty five patients completed the study. All four treatment groups showed improvement; with no single treatment superior to the others.

Project Number: H133B80007.

Can this document be ordered through NARIC's document delivery service?:

Electrical Stimulation of The Sacral Dermatomes In Spinal Cord Injury: Effect On Rectal Manometry And Bowel Emptying, P 696- 701. Archives Of Physical Medicine And Rehabilitation , Volume 74(7)

NARIC Accession Number: J25337.

Author(s): Frost, F; Hartwig, D; Jaeger, R; Leffler, E; Wu, Y.

Publication Year: 1993.

Number of Pages: 6.

Abstract: Study examined whether surface dermatomal electrical stimulation (ES) could help alter colonic motility and bowel emptying patterns in individuals with spinal cord injuries (SCI). Study involved seven males and female subjects with recent SCI and seven male control subjects. Researchers applied ES of the second sacral dermatome during rectal manometry in both groups, adding ES to bowel programs of individuals with SCI. Results indicated a significant rise in number of rectal pressure spikes in both groups after applying ES. The study did not find significant difference between SCI and control groups when measuring amplitude of spike waves in colon. There were no significant changes in time needed for individuals with SCI to initiate bowel movement or in time needed to complete bowel emptying. Study results suggest that ES of sacral dermatomes can alter bowel activity of recto-sigmoid colon.

Project Number: H133B80007.

Can this document be ordered through NARIC's document delivery service?:

Lower Extremity Applications of Functional Neuromuscular Stimulation, P 19-30. Assistive Technology, Vol 4, No 1, 1993

NARIC Accession Number: J24285.

Author(s): Jaeger, R J.

Publication Year: 1993.

Number of Pages: 12.

Abstract: Review of the state of the art of clinical applications of functional electrical stimulation (FES) in the lower extremity, with a focus on applications for mobility restoration. The first section reviews basic concepts in FES and their relevance to current clinical application. These concepts include open-loop and closed-loop control of stimulated muscles, sensors, muscle fatigue, mathematical modeling of musculoskeletal systems, and stimulation electrodes (surface, percutaneous, and implanted). The second section reviews lower extremity FES protocols for restrengthening and therapeutic applications, standing, and walking as well as protocols that combine electrical stimulation and orthotics (hybrid systems).

Can this document be ordered through NARIC's document delivery service?: Not available from NARIC

Cough in Spinal Cord Injured Patients: Comparison of Three Methods to Produce Cough. Archives Of Physical Medicine And Rehabilitation , Volume 74(12) , Pgs. 1358-1361.

NARIC Accession Number: J26366.

Author(s): Jaeger, R J; Turba, R M; Yarkony, G M; Roth, E J.

Publication Year: 1993.

Number of Pages: 4.

Abstract: Researchers examined the efficacy of coughs produced by electrical stimulation in patients with spinal cord injury (SCI). The study involved 24 SCI patients who were asked to produce three types of coughs: voluntary with no assist, manually assisted, and electrically stimulated. Each cough was repeated 5 times with a 30 second to 1 minute break between coughs. Coughs were measured by the amount of peak expiratory flow using a peak flow rate meter. Of the 24 subjects enrolled in the study, 5 of them had incomplete injuries and were not able to tolerate the electrical stimulation. Five of the remaining 19 subjects had a poor response of the abdominal muscles to electrical stimulation, therefore data was analyzed only for the remaining 14 subjects. Data analysis indicated that coughs produced by electrical stimulation were as equally effective as manually assisted coughs. Due to these findings, the article suggests additional research for this potentially effective treatment for prevention of pulmonary complications in patients with SCI.

Project Number: H133N00008.

Can this document be ordered through NARIC's document delivery service?:

Session 2: Upper Limb and Therapeutic Stimulation, P 24-41. Proceedings Of The Resna International '92 Conference: Technology For Consumers, Held June 6-11, 1992, In Toronto, Ontario, Canada

NARIC Accession Number: O10652.

Author(s): Jaeger, R J; Woloszko, J; Turba, R M; Yarkony, G M; Roth, E J; Peckham, P H; Keith, M W; Kilgore, K L; Stroh, K C; Hart, R L; Cliquet, A, Jr; Mendeleck, A; Quesnel, D R F; Sovi, F X; Felipe, P, Jr; Oberg, T D; Lemos, G J P; Guimaraes, E A; Quevedo, A A F; Cameron, T; Peppard, L E; Needham-Stropshire, B; Broton, J; Klose, K J; Thrope, G B; Naples, G G; Hart, R G; Stroh, K C; Buckett, J R; Ignagni, A R; Keith, M W; Peckham, P H; Van Doren, C L; Kambic, H E; Manning, T; Reyes, E; Hyodo, A; Reger, S I; Jacobs, J; Barnicle, K; Marsolais, E B.

Publication Year: 1992.

Number of Pages: 18.

Abstract: Papers from Session 2 of the RESNA International 1992 Conference on technology for consumers. (See AN No. XO10650 for entire conference proceedings and No. XO10651-XO10680 for individual sessions.) Session 2 presents seven papers on the topic of upper limb and therapeutic stimulation: 1) a neuroprosthetic cough assist device for use in spinal cord injury; 2) surgical alterations and functional electrical stimulation for restoration of hand function; 3) a neural network-voice controlled neuromuscular electrical stimulation system for tetraplegics; 4) an upper body exercise system incorporating resistive exercise with electromyographic feedback; 5) technology transfer of a functional electrical stimulation hand system; 6) enhancement of the healing strength of electrically stimulated pressure sore wounds; 7) improved gait and motor control post head injury following FNS exercise and gait training.

Can this document be ordered through NARIC's document delivery service?:

Neuromuscular Stimulation in Spinal Cord Injury II: Prevention of Secondary Complications, P 195-200. Archives Of Physical Medicine And Rehabilitation , Volume 73(2)

NARIC Accession Number: J22123.

Author(s): Yarkony, G M; Roth, E J; Cybulski, G R; Jaeger, R J.

Publication Year: 1992.

Number of Pages: 6.

Abstract: Review of the literature on electrical neuromuscular stimulation applications after spinal cord injury. The article examines developments in this field from 1983 to 1990, focusing on applications of neuromuscular stimulation to restore ventilatory and bladder function and to prevent secondary complications. The first part considers applications of functional neuromuscular stimulation for diaphragmatic pacing and for bladder control. The second part describes applications of therapeutic electrical stimulation for pressure sore prevention and treatment, deep venous thrombosis prevention, contracture prevention, spasticity control, cardiovascular conditioning and bicycle ergometry, and for increasing muscle bulk.

Project Number: H133B80007.

Can this document be ordered through NARIC's document delivery service?:

Neuromuscular Stimulation in Spinal Cord Injury: I: Restoration of Functional Movement of Extremities, P 78-86. Archives Of Physical Medicine And Rehabilitation , Volume 73(1)

NARIC Accession Number: J21940.

Author(s): Yarkony, G M; Roth, E J; Cybulski, G; Jaeger, R J.

Publication Year: 1992.

Number of Pages: 9.

Abstract: Article discusses neuromuscular electrical stimulation in spinal cord injury (SCI), focusing on restoration of functional movement in extremities: (1) neurophysiologic considerations and theoretic considerations (open-loop versus closed-loop, muscle fatigue, and neurophysiologic and biomechanical modeling); (2) methods of delivering electrical stimulation (surface electrodes, percutaneous electrodes, implanted electrodes, and sensors); and (3) functional neuromuscular stimulation (lower extremity mobility restorations, standing, walking, hybrid systems, estimation of lower extremity users, and estimation of upper extremity users). Paper suggests that subjects who will benefit most from participation in functional neuromuscular stimulation are those who have adjusted well to disabilities, who are realistic in expectations of electrical stimulation, and who can tolerate uncertainty related to such therapy.

Project Number: H133B80007.

Can this document be ordered through NARIC's document delivery service?:

Estimating the User Population of a Simple Electrical Stimulation System for Standing, P 505-511. Paraplegia , Volume 28(8)

NARIC Accession Number: J18605.

Author(s): Jaeger, R J; Yarkony, G M; Roth, E J; Lovell, L.

Publication Year: 1990.

Number of Pages: 7.

Abstract: Study estimating the size of the potential user population of a specific functional electrical stimulation (FNS) system for standing. A review of medical records was conducted for 192 patients with traumatic thoracic, lumbar, or sacral spinal cord injury resulting in paraplegia. The following inclusionary criteria for the FNS protocol were applied in a sequential manner: paraplegia, T4-T12 lesion, absence of upper extremity injury, knee-ankle-foot orthosis prescribed, no associated medical problems, no substance abuse, age 18 to 50 years. The results suggest that between 10% and 25% of the sample population, and between 4.7% and 11.25% of all spinal cord injured persons, would be eligible for the FNS protocol.

Can this document be ordered through NARIC's document delivery service?:

Analysis of Standing Up and Sitting Down in Humans: Definitions And Normative Data Presentation, P 1123-1138. Journal Of Biomechanics , Volume 23(11)

NARIC Accession Number: J20469.

Author(s): Kralj, A; Jaeger, R J; Muni, M.

Publication Year: 1990.

Number of Pages: 16.

Abstract: Presents data from a study which made a formal definition of human standing up and sitting down movements based on sagittal plane goniometric and force plate data from 20 participants with no disabilities. The essential functions of standing up and sitting down are not well standardized or uniformly defined. The motivation for the study arose from a desire to improve application of functional electrical stimulation technology for certain functions in people with disabilities. Researchers measured subjects' body segment parameters and collected data using a commercially available force plate with strain gauge transducers, a clinical goniometric system, a computer, foot switches to record seat contact, and cameras. Subjects sat on styrofoam blocks then stood up and sat down in a comfortable, natural manner. The study provided a conceptualization for the movements of standing up and sitting down. Study data indicated that standing up was accomplished more rapidly than sitting down.

Can this document be ordered through NARIC's document delivery service?:

Functional Neuromuscular Stimulation for Standing After Spinal Cord Injury. Archives Of Physical Medicine And Rehabilitation , Volume 71(3)

NARIC Accession Number: J16039.

Author(s): Yarkony, G M; Jaeger, R J; Roth, E; Kralz, A R; Quinter, J.

Publication Year: 1990.

Number of Pages: 6.

Abstract: Presents information from study designed to evaluate, in select group of individuals with paraplegia, use of functional neuromuscular stimulation (FNS) system for standing. Notes electrical bracing could eliminate need for expensive, custom made orthotic devices. Hypothesized that people with SCI could stand without use of orthotic devices if FNS was used correctly. Study involved subjects from inpatient and outpatient populations and referral institutions, all of whom were motor complete and sensory complete or sensory incomplete with only vague perception of pinprick. Exercise stimulator and standing stimulator used. Patients followed stimulation protocol designed to exercise paralyzed muscles (emphasizing quadriceps). Once they had exercised quadriceps, feasibility of standing by FNS was evaluated. Standing with FNS was achieved by bilateral quadriceps stimulation to stabilize knees. No stabilization was provided at ankle joints, so patients used external balance aids. In all, 21 patients achieved standing via FNS, six of whom could stand safely without assistance of therapist. Study supports hypothesis that individuals with SCI can stand with assistance of bilateral electrical stimulation of quadriceps. Future applicability of FNS is discussed.

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"Functional Neuromuscular Stimulation for Stance and Ambulation: Six Month Evaluation of Psychological Effects," Resna '89, Proceedings of the 12th Annual Conference: New Orleans, LA, June 25-30, 1989, P 401-402. Technology for the Next Decade (AN XR04788)

NARIC Accession Number: R04988.

Author(s): Baker, R C; Heinemann, A W; Yarkony, G M; Jaeger, R.

Publication Year: 1989.

Number of Pages: 2.

Abstract: Study assessing the psychological effects of functional neuromuscular stimulation (FNS) used for stance with five spinal cord injured subjects. The subjects were participants in an FNS project that was research oriented rather than treatment oriented. Two psychological evaluations were administered six months apart. Two participants had received their stimulators prior to the first evaluation, and three received theirs after the first evaluation. The evaluations included several psychological tests: Linkowski's Acceptance of Disability Scale, Beck's Depression Inventory, the Tennessee Self-Concept Scale, and a Q-sort questionnaire that assesses theoretical stages of reaction to crises. Normative range values were obtained for most subjects on most tests. Each participant's adjustment appeared to be unique, but the two subjects who had received the stimulator before the first evaluation appeared to have lower levels of psychological well-being than those who received the stimulator after the first evaluation. The results and their implications are discussed; data are included in a table.

Project Number: H133B80007.

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"Bone Bending Profiles in Standing," In: Resna '89, Proceedings of the 12th Annual Conference, New Orleans, LA, June 1989, P 175-176. Technology for the Next Decade (AN XR04788)

NARIC Accession Number: R04877.

Author(s): Munih, M; Kralj, A; Bajd, T; Jaeger, R.

Publication Year: 1989.

Number of Pages: 2.

Abstract: Presents bone bending profiles for lower extremity long bones of normal and spinal cord injured (SCI) subjects. Twenty normal subjects and six completely paralyzed SCI subjects were studied. The SCI subjects had successfully completed a functional electrical stimulation (FES) restrengthening program of the atrophied paralyzed knee extensors. They varied in their ability to perform FES-assisted standing, but all were able to stand for at least 10 minutes by means of stimulated knee extensors. Ground reaction forces and corresponding orthogonal moments were recorded as patients performed three movements: standing up from a chair, standing for several seconds, and sitting down. The results show similar bending stressing in normal subjects and SCI subjects standing by means of FES. The study materials, methods, and results are discussed.

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Final Report: Fellowship Number H133f70022.

NARIC Accession Number: O09004.

Author(s): Jaeger, R J.

Publication Year: 1988.

Number of Pages: 12 P plus extensive appendices.

Abstract: A loosely connected collection of documents relating to the National Institute on Disability and Rehabilitation Research Fellowship awarded to Robert J. Jaeger, Ph.D., an associate professor at the Pritzker Institute of Medical Engineering. Included are correspondence, a summary of fellowship activities, curriculum vitae (CV), and manuscripts arising from work done while a fellow. The focus of research is electrical stimulation of spinal cord-injured persons so as to allow standing. Two papers describe this work, one a review document, the other an original piece of research carried on over 5 years that produced a device that shows promise as an aid to standing for 10% of the spinal cord injured population.

Project Number: H133F70022.

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Standing Performance of Persons with Paraplegia: Archives of Physical Medicine and Rehabilitation Vol 67 No 2 Feb 1986, P 103-108.

NARIC Accession Number: J05387.

Author(s): Cybulski, G R; Jaeger, R J.

Publication Year: 1986.

Abstract: Describes measurements of the standing stability of four patients with paraplegia using knee-ankle-foot orthoses (KAFOs) with center-of-force monitoring platform, as compared with similar data from neurologically healthy subjects. Discusses the advantages of KAFOs. Includes 5 tables, 5 figures, and 14 references.

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Quantitative Analysis of Standing Balance in Paraplegic Individuals: Proceedings, Second International Conference on Rehabilitation Engineering: Ottawa, Canada, JUN 17-22 1984.

NARIC Accession Number: R03123.

Author(s): Cybulski, G; Jaeger, R; Troyk, P.

Publication Year: 1984.

Number of Pages: 2.

Abstract: Conference held in conjunction with the seventh annual conference of the Rehabilitation Engineering Society of North America (RESNA). For entire Proceedings see NARIC CN R2555. Describes the evaluation of KAFO (knee-ankle-foot orthosis) and functional electrical stimulation in providing postural stability for paraplegics, involving quantitative analysis of the center of force. Compares the use of these assistive devices for standing by paraplegics. Includes tables and eight references. Authors affiliated with Illinois Institute of Technology, Pritzker Institute of Medical Engineering Chicago, Illinois.

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Measurement of Weightbearing During Standing. Journal of Rehabilitation Research and Development (JRRD) (formerly the Bulletin of Prosthetics Research) , Volume 21(2) , Pgs. 46-59.

NARIC Accession Number: J01412.

Author(s): Poyezdala, J J; Jaeger, R J.

Publication Year: 1984.

Number of Pages: 4.

Abstract: Describes a study aimed toward constructing a device to continuously monitor the weight borne by the lower extremities of disabled individuals during standing. The device was designed for general clinical utility in the accurate measurement of total weight, weight borne by each leg, and the difference in weight distribution between the two legs. Other considerations were that the output should be capable of direct connection to a recording device and that it should be simple to use. Reviews other attempts to construct appropriate devices and the method used to construct the present one. Includes 5 figures and 10 references.

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Measurement of Weightbearing During Standing: Journal of Rehabilitation Research and Development, Vol 21, No 2, 1984, P 46-49.

NARIC Accession Number: J09423.

Author(s): Poyezdala, J J; Jaeger, R J.

Publication Year: 1984.

Abstract: Describes a device designed to continuously monitor the amount of weight borne by the legs of disabled persons during standing. The device was constructed to meet several design criteria. General clinical utility was desired as well as simplicity of use, with no complicated transducer attachments or calibration procedures. Another requirement was the ability to produce accurate measurements of total weight, the weight borne by each leg, and the difference in weight distribution between the two legs. Furthermore, it was considered desirable that output be capable of direct connection to either a chart recorder or an analog-to-digital converter for computer processing. This article describes design, construction, and evaluation of the measurement device.

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Studies in Functional Electrical Stimulation for Standing and Forward Progression: Sixth Annual Conference on Rehabilitation Engineering: San Diego, California JUN 12-16, 1983.

NARIC Accession Number: R03206.

Author(s): Jaeger, R J; Kralj, A.

Publication Year: 1983.

Number of Pages: 3.

Abstract: From Proceedings of conference on "The Promise of Technology" (NARIC CN R1899). Describes use of Functional Electrical Stimulation (FES) for standing and forward progression in paraplegia resulting from complete spinal cord injury. Discusses stimulator, surface stimulation system, bracing, and psychosocial issues. Includes figures, photos, and six references. Authors affiliated with Illinois Institute of Technology Pritzker Institute of Medical Engineering, Chicago, and Edvard Kardelj University, Ljubljana, Yugoslavia.

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