Gait Parameters Of Patients With Osteoarthritis Of The Knee

...functioning, this approach emphasizes the importance of setting goals which are purposeful and meaningful to the patient. These goals are related to performance of motor tasks analyzed in...
terms of 6 key impairments. The assessment and treatment performance of each of these impairments for people with spinal cord injury is described in the following chapters: training motor tasks strength training contracture management pain management cardiovascular fitness training Dr Harvey develops readers' problem-solving skills equipping them to manage all types of spinal cord injuries. Central to these skills is an understanding of how people with different patterns of paralysis perform motor tasks and the importance of differences for motor tasks such as: transfers and bed mobility, wheelchair mobility, hand function for people with tetraplegia and people with spinal cord injury. The medical, healthcare, and rehabilitation professions key text for over 18 years on gait. Dr. Jacqueline Perry is joined by Dr. Judith Burnfield to present today's latest research findings on human gait. This Second Edition offers a re-organization of the chapters and presentation of material in a more user-friendly, yet comprehensive format. Essential information is provided describing gait parameters, functions, and clinical examples to identify and interpret gait deviations. Learning is further reinforced with images and photographs. Provides a detailed clinical introduction to the application of biomechanics to the understanding and treatment of walking disorders. Practical issues in the performance of a three-dimensional clinical gait analysis are covered, together with several clinical cases illustrating the interpretation of findings. These cases also demonstrate the use of a variety of treatment methodologies, including physical therapy, walking aids, prosthetics and orthotics, and botulinum toxin and surgery. The book provides readers with a comprehensive overview of the state of the art in gait analysis and factors to consider during their application in clinical settings. The book covers physiological and pathophysiological basis of locomotion and posture control, describes integrated approaches for the treatment of neurological diseases and spinal cord injury, as well as important principles for designing appropriate clinical studies. It presents computer and robotic technologies currently used in rehabilitation, such as exoskeleton devices, functional electrical stimulation, virtual reality and many more, highlighting the main advantages and challenges both from the clinical and engineering perspective. Written in an easy-to-understand style, the book is intended for people with different background and expertise, including medical and engineering students, clinicians and physical therapists, as well as technical developers of rehabilitation systems and their corresponding products. It is useful for researchers in locomotion and movement science and technology, as well as all those who work with people affected by neurological and musculoskeletal diseases. Dear Readers, If you are engaged in the treatment of patients with MS (pwMS), this e-book’s aim is to offer novel insights to improve on an understanding of one of the major problems of pwMS: fatigue. Although there is increasing research into fatigue and its impact on MS, this collection of ten articles supports a better understanding of fatigue in MS patients. It explores pathophysiological concepts, provoking mechanisms, objective measurements, personality interactions, pharmacological and non-pharmacological interventions and summarizes clinical management. It is written by neurologists, psychologists, scientists and therapists and addresses this group of people, who deal with pwMS in private, clinical, rehabilitation or scientific settings. Its aim is to communicate high-quality information, knowledge and experience on MS to healthcare professionals, while providing global support for the international MS community. The studies examined in this literature review can be divided into three categories: the use of visual cues, both fixed and flashing, the use of auditory cues, and the use of cueing at different frequencies. Based on the results of these studies, the use of visual cueing can improve the gait of people with Parkinson’s disease, with Hoehn and Yahr stages II-IV. Fixed visual cues are most effective at improving stride length when set at a distance of 150% of the individual’s preferred step length. Auditory cues are effective at increasing all parameters of gait at frequencies greater than 100% of the individual’s fastest walking cadence. In addition, there is evidence to support the use of auditory cues to decrease cadence without compromising stride length when the frequency is set at 70% of the individual’s fastest walking cadence. The use of flashing visual cues, shown to improve gait speed at a frequency of 110% of the individual’s fastest walking cadence, is not recommended. Flashing visual cues were found to be less effective than auditory cues and, when subjects were given a choice, the least preferred method of cueing. The current evidence provides guidance regarding mode and frequency of cueing to improve gait parameters in individuals with PD; however, generalization of these results is limited. Since a majority of the participants with PD, in the immediate cueing and long-term training phases, demonstrated cueing benefits, it is unknown whether similar effects are obtained with household or community ambulation. Gait Analysis: An Introduction focuses on the systematic study of human walking and its contributions in the medical management of diseases affecting the locomotor system. The book first covers normal gait and pathological gait. Discussions focus on common pathologies affecting gait, amputee gait, walking aids, particular gait abnormalities, gait in the elderly and the young, moments of force, energy consumption, gait cycle, muscular activity during gait, and optimization of energy usage. The manuscript then elaborates on the methods of gait analysis, including visual gait analysis, general gait parameters, timing the gait cycle, direct motion measurement systems, electrodynamometers, electromyography, accelerometers, gyroscopes, and force platforms. The publication is designed for undergraduate and postgraduate students, as well as professionals and practitioners of all general gait parameters. The manuscript is a valuable source of data for students of physical therapy, bioengineering, orthopedics, rheumatology, neurology, and rehabilitation. This book reviews in detail the history of motion analysis, including the earliest attempts to capture, freeze, study and reproduce motion. The state-of-the-art technology in use today, i.e. optoelectronic systems, is then discussed, as motion capture now plays an important role in clinical decisions regarding the diagnosis and treatment of motor pathologies from the perspective of evidence-based medicine. After reviewing previous experiments, the book presents two modern research projects, providing detailed descriptions of the methods used and the challenges that arose in the context of designing the experiments. In these projects, advanced signal processing and motion capture techniques were employed in order to design: (i) a protocol for the validation and quality assurance of clinical strength measurements; (ii) an algorithm for interpreting clinical gait analysis data; and (iii) a number of user-friendly software tools that can be used in clinical settings to process data and to aggregate the results into reports. In closing, a thorough discussion of the results is presented from a contextual standpoint. Gait analysis is the systematic study of human walking, using the eye and brain of experienced observers, augmented by instrumentation for measuring body movements, body functions, and clinical examples to identify and interpret gait deviations. Learning is further reinforced with images and photographs. Provides a detailed clinical introduction to the application of biomechanics to the understanding and treatment of walking disorders. Practical issues in the performance of a three-dimensional clinical gait analysis are covered, together with several clinical cases illustrating the interpretation of findings. These cases also demonstrate the use of a variety of treatment methodologies, including physical therapy, walking aids, prosthetics and orthotics, and botulinum toxin and surgery. The book provides readers with a comprehensive overview of the state of the art in gait analysis and factors to consider during their application in clinical settings. The book covers physiological and pathophysiological basis of locomotion and posture control, describes integrated approaches for the treatment of neurological diseases and spinal cord injury, as well as important principles for designing appropriate clinical studies. It presents computer and robotic technologies currently used in rehabilitation, such as exoskeleton devices, functional electrical stimulation, virtual reality and many more, highlighting the main advantages and challenges both from the clinical and engineering perspective. Written in an easy-to-understand style, the book is intended for people with different background and expertise, including medical and engineering students, clinicians and physical therapists, as well as technical developers of rehabilitation systems and their corresponding products. It is useful for researchers in locomotion and movement science and technology, as well as all those who work with people affected by neurological and musculoskeletal diseases.
Gait Analysis presents a comprehensive book on biomechanics that focuses on gait analysis. It is written primarily for biomedical engineering students, professionals and biomechanists with a strong emphasis on medical devices and assistive technology, but is also of interest to clinicians and physiologists. It allows novice readers to acquire the basics of gait analysis, while also helping expert readers update their knowledge.

The book covers the most up-to-date acquisition and computational methods and advances in the field. Key topics include muscle mechanics and modeling, motor control and coordination, and measurements and assessments. This is the go to resource for an understanding of fundamental concepts and how to collect, analyze and interpret data for research, industry, clinical and sport.

The diagnosis and treatment of the patient with critically impaired walking abilities present the busy physician with a formidable challenge. This book provides a comprehensive account of the various balance, posture and gait disorders, and of the methods for their effective Read More management. The text is divided into five sections dealing with Evaluations Of Gait Parameters Of Patients With Lower Extremity Burn Injuries Ozden Ozkal, Semra Topuz, Ali Konan, Kemal KismetObjectives: Pain, range of motion limitations and impaired sensation are all possible complications of lower extremity burn injuries. The purpose of this study was to compare of gait parameters of the burned and nonburned limb in patients with lower extremity burn injuries.

Methods: Twelve adults with lower extremity burns (n = 9F, 3M; mean age = 34 ± 10 years, mean burn surface area = 4.3 ± 0.8%, unilateral limb burns: 7 bilateral limb burns: 5 patients) were included in this study. In cases with bilateral lower limb burns, the limb with higher burn surface area was noted as the burned side. Gait parameters were evaluated by GAITRite system which consist of an electronic walkway, within 3 days after burn accident. This equipment collected data on the following components: Step length, cadence, velocity (%Gait cycle) and base support. These values were evaluated using Wilcoxon test. Results: The results indicated that in patients with burns step length was significantly higher on the burned extremity compared to nonburned extremity (41.36 ± 10.58 cm vs. 37.43 ± 11.59 cm, p = 0.008). There was significant difference for stance (%Gait cycle) between burned and nonburned limb (64.32 ± 17.46 % vs. 69.86 ± 20.05 %, p = 0.013). Cadence and velocity (81.16 ± 121.65 steps/min vs. 56.63 ± 126.27 cm/sec) were lower than predictive values. Base support (15.31 ± 17.47 cm) was higher than normal values.

Discussion/Conclusion: This study showed that gait parameters of burned lower extremity differ from nonburned lower extremity. The larger base of support, increased step length, decreased velocity and cadence have been recorded in order to maintain balance and stability. In addition to, pain, fear of movement may have contributed to the decreased stance phase, cadence and velocity.

Several studies have been published about gait analysis, many specific papers are available in literature, and a lot of conferences, symposiums and congresses have been dedicated to this matter. The quantity of information is enormous and sometimes it is not easy for the beginner to manage the different acquisition systems, acquisition methodologies and clinical interpretation of the resultant data. However, the consciousness of gait analysis s effective utility both in the research finding and in clinical decision making has made it indispensable in the present context. Our attempt, through this volume is to present an overview.

Since we have worked up to now both in research and in clinical gait analysis, we have followed two major approaches in developing, on one hand the more appropriate methodology to obtain accurate and precise data, and on the other hand the best clinical results.

This book presents selected peer-reviewed papers from the International Conference on Mechanical and Energy Technologies, which was held on 7-8 November 2019 at Galgotias College of Engineering and Technology, Greater Noida, India. The book reports on the latest developments in the field of mechanical and energy technology in contributions prepared by experts from academia and industry. The broad range of topics covered includes aerodynamics and fluid mechanics, artificial intelligence, nanomaterials and nonmanufacturing technologies, rapid manufacturing technologies and prototyping, remanufacturing, renewable energies technologies, metrology and computer-aided inspection, etc. Accordingly, the book offers a valuable resource for researchers in various fields, especially mechanical engineering and industrial engineering.

1. Clinical Bottom Line: Based on our critical appraisal of this topic, we recommend the use of external sensory cues to improve gait parameters in persons with Parkinson’s disease (PD). More specifically, we would utilize temporal cues to positively impact temporal gait parameters and spatial cues to improve spatial gait parameters. However, these treatments cannot be assumed to have lasting effects as most studies lack a long-term follow-up (greater than three months), thus warranting further research.

2. Clinical Scenario: A patient with PD approached us regarding the most effective external sensory cue to improve his shuffling gait. When researching on the internet, he found many methods for sensory cueing to improve gait such as using visual, auditory and tactile cues. He has questions regarding which is most appropriate for his current limitations. After a thorough physical therapy evaluation, we found this patient’s gait to be consistent with the typical presentation of PD: shortened stride length, decreased velocity and increased cadence. We decided to do a literature review to assist us in making the best clinical decision regarding which type of external sensory cue is most effective in addressing the gait deficits found in people with Parkinson’s disease (PD).

3. Our clinically answerable question: Our clinically answerable question is to determine the efficacy of external sensory stimuli on the parameters of gait.

Comparison: Our comparison group is a control group who will not receive any external sensory stimuli. Outcome: We will look at both spatial (stride/step length) and temporal (initiation, initiation, velocity, cadence) variables of gait.


Robotic exoskeleton devices, such as the Ekso GTM robotic exoskeleton (Ekso), enable individuals with lower extremity weakness to stand up and walk over ground. Research relevant to the effects of the Ekso on gait parameters and muscle activity in patients with incomplete spinal cord injury (SCI) is limited. Therefore, the purpose of this study was to evaluate whether people with incomplete SCI would walk differently when they wore the Ekso. Specifically, the temporalgait parameters as well as kinematics and muscle activity of the lower extremities during level walking were compared between two conditions: without wearing the Ekso (R120) and wearing the Ekso. Subjects (age: 39 ± 17 years, 9 men and 1 woman) with complete SCIcompleted the study. Average time since injury was 7 ± 5.5 years with a Walking Index for Spinal Cord Injury II (WISCI II) score of 14.5 ± 2.8. METHODS: A 10-camera motion analysis system, synchronized with a surface electromyographic (EMG) unit, was used to obtain temporospatial gait parameters, range of motions (ROMs) of hip flexion-extension, knee flexion-extension and ankle dorsiflexion-plantarflexion, and muscle activity of the lower extremities.

Each participant performed walking under two conditions: with and without wearing the Ekso. RESULTS: There were significant differences between the two conditions in gait speed (p = 0.006, no EKSO: 0.61 ± 0.23 m/s, EKSO: 0.65 ± 0.25 m/s), stride-length (p = 0.006), mid-stance (p = 0.013, no EKSO: 0.61 ± 0.17s, EKSO: 0.60 ± 0.17s), swing time (p = 0.013), no EKSO: 0.126 ± 0.019s, EKSO: 0.125 ± 0.017s), and cadence (p = 0.006, no EKSO: 61.4 ± 2.1 steps/min vs. 62.6 ± 1.4 steps/min).

Conclusions: The Ekso increased walking speed, decreased mid-stance time and improved overall gait pattern. Future studies are needed to further explore the effects of robotic exoskeletons on walking speed and gait parameters in patients with SCI.