OPEN ACCESS Freely available online

International Journal of Physical Medicine & Rehabilitation

Editorial Note

Importance of Physical Therapy in Individuals with Spinal Cord Injury and Analysis of Muscle Strength and Gait in Multiple Sclerosis, Knee Osteoarthritis in Older Patients

Elizabeth G. NeSmith*

Department of Physiological and Technical Nursing Georgia, Regents University, USA

EDITORIAL NOTE

International Journal of Physical Medicine and Rehabilitation is a bi-monthly, peer reviewed, Open access publication. It is a scientific, scholar journal for practitioners and rehabilitation researches in various medical and surgical specialties and rehabilitation disciplines. It aims to be an internationally leading journal which keeps physiatrists up-to-date by publishing clinically relevant and evidence-based research and review information on Physical Medicine and Rehabilitation.

International Journal of Physical Medicine and Rehabilitation welcomes research articles, review articles, methodologies, commentaries, case reports, perspectives and short communications encompassing all aspects of Physical Medicine and Rehabilitation. This journal provides latest developments in theoretical, experimental and clinical investigations in physical Medicine and Rehabilitation for Physiatrists and Rehabilitation researches.

The International Journal of Physical Medicine and Rehabilitation is successfully maintained at bimonthly release of articles, in 2019 volume 7 issue 1 an author named Hiroshi Irisawa, et al published an article entitled "Analysis of Muscle Strength and Gait after Excision of Hamstrings and Effect of an Ankle- foot Orthosis: A Case Report" summarizes that Limb-sparing surgery is important for treatment of soft tissue sarcoma, but resection of major neurovascular bundles and/or muscles in the lower extremities causes motor and gait dysfunction [1]. This case report documents the effect of an ankle-foot orthosis on muscle strength and gait in a 52-year-old woman who had limb sparing surgery for soft tissue sarcoma that removed the common peroneal nerve and hamstring muscles (biceps femoris, semimembranosus, and semitendinosus). The patient underwent knee flexor strength testing with and without the ankle-foot orthosis. Gait analysis was performed with and without the ankle-foot orthosis using a 3-dimensional motion analysis system, along with recording of the surface electromyogram and collection of ground reaction force data with a multicomponent force platform. After surgery, the maximum torque of the knee flexor muscles was higher when the patient used the ankle-foot orthosis than without it. Gait analysis demonstrated improvement of knee flexion with the ankle-foot orthosis. The surface electromyogram showed that gastrocnemius activity was increased markedly by using the ankle-foot orthosis [2]. Using an ankle-foot orthosis allowed gastrocnemius to act more effectively as a knee flexor after resection of the hamstrings. An ankle-foot orthosis may improve the gait of patients with hamstring resection.

Another article published in 7 volume issue 2 by Keita Aimoto entitled "Importance of the Rear and Non-dominant Leg in Supporting the Body in Tandem Stance" reveals that Falls are a serious problem among elderly people. 20-40% of community-dwelling elderly fall at least once per year [3,4]. 24% of those who fall have serious injuries and 6% have fractures [3]. Falling is an important issue for elderly people with poor balance and frailty. Therefore, determining whether a person has a high risk of falling or not using balance assessments is essential.

Forty healthy young people were recruited as subjects (aged 29 ± 6 years, 19 men). The subjects moved their rear leg across the rear of their body according to split treadmill belt movement. Maximum IFD was measured by a three-dimensional motion analysis system and defined as the largest IFD such that either foot could be removed from the treadmill belt while maintaining a standing posture. Four conditions were set for the measurements: the rear leg was dominant and non-dominant under two treadmill belt velocities (0.5 km/h and 1.0 km/h). Two-way analysis of variance was used for the analysis [5].

Normalized maximum IFD (NMIFD) was 8-9% of subject height. Interaction between the rear leg and treadmill belt velocity was not significant. There was no significant main effect of treadmill belt velocity and the dominant foot on NMIFD. Comparing the results of our previous study, under the condition of the dominant foot moving, the NMIFD of the front leg moving across the front of the body was significantly larger than that of the rear leg moving across the rear of the body. The function of the rear leg is important as a support under the

Correspondence to: Elizabeth G. NeSmith, Department of Physiological and Technical Nursing Georgia, Regents University, USA, Tel: (706) 721-3101; E-mail: BNESMITH@augusta.edu

Received date: April 10, 2020; **Accepted date:** April 24, 2020; **Published date:** April 30, 2020

Citation: NeSmith EG (2020) Importance of Physical Therapy in Individuals with Spinal Cord Injury and Analysis of Muscle Strength and Gait in Multiple Sclerosis, Knee Osteoarthritis in Older Patients. Int J Phys Med Rehabil 8:544. DOI: 10.35248/2329-9096.20.08.e124

condition of crossing the legs from a standing posture such as tandem stance [6].

"Barriers for Individuals with Spinal Cord Injury during Community Reintegration: A Qualitative Study" published by Sharmin Alam disclosed many interesting points regarding Barriers for Individuals with Spinal Cord Injury. Spinal Cord Injury (SCI) leads to long-lasting and challenging disability which leading to temporary and permanent functional impairment. Person with SCI confronted diverse types of impairments and limitation of activities after discharge [7,8]. Rehabilitation is a crucial part for person with SCI to restore full physical and psychological functioning and renovating social connection in their livelihood [9].

Participants, who had sustained an SCI with the ages between 26 to 45 years, responded to semistructured written questions which were categorized as one Health-related; barriers for patients with SCI inaccessibility of community reintegration; two, Mobility aids and equipment issues as barrier of inaccessibility in the community; three, Environmental issues as a barrier of inaccessibility in community reintegration; four, Barriers to transportation in community reintegration; five, Societal barriers of inaccessibility in community reintegration; six, Employment and economic barriers inaccessibility of community reintegration. A total eleven individuals were interviewed conveniently and analyzed by Qualitative Content Analysis (QCA). Content was analysed by several thematic factors that based on the utmost physical, social, economic and environmental barriers. The mean age the respondents were 35.45 (± 7.39) years. The most prominent categories of barrier were transportation barrier (infrastructure 100%), environmental barrier (slops and stairs 90%) and socio-economical barrier (lack of acceptance and poverty both 81.8%).

From the transcripts, among eleven participants, eight of them reported pain, incontinence and bowel bladder were the main problems, six participants had spasticity, four participants had weakness and balance problem, one participant had swelling in the ankle that create restriction to access in the community and seven participants had depression about access in the community reintegration as residual problem [10].

One participant said that, "I have a frequent problem with pain and incontinence, bowel bladder also a reason that's why I do not want to participate. I always fear because when I want to go to another house, where to do the toilet? [11]. Another one participant said that- "There is more inflammation in my hands and legs that I cannot sit in a wheelchair more than 2 hours. Again defecation-urination also problem, I have no sensation of it for these I cannot go to the community." About bowel bladder incontinence one participant said that- "when I am in a meeting and need to do defecation and catheterization, there were too many crowds and I am unable to do my catheterization as well as defecation properly then my cloth becomes a spoil, I think it is one kind of barriers in the community".

Spinal cord injured people experience barriers in community reintegration phase this study, identifies issues confronting barriers in terms of physical, mental, mobility and equipment issues, environmental, social and economic aspects. Although SCI causes a residual disability to a person they can be reintegrated if the barriers in accessibility identified and resolution occurs on the basis of severity. So, emphasizing on overcoming strategy of these challenges can improve the level of integration towards community.

In issue 4 "Effect of Balance Training Using Different Compliant Surfaces on Performance of One Leg Stance Test and Star Excursion Balance Test" published by Huda M. Alotaibi et al explains that In their study, the aim was to determine the effect of balance training using two different compliant surfaces (Sanddune® vs AirEx® balance pad) on performance of One Leg Stance Test (OLST) (eyes open and eyes closed) and Star Excursion Balance Test (SEBT) in healthy young adults. A repeated-measures design was used. Forty subjects participated in this study. Twenty participants were in each group (Sanddune® group and AirEx® group) [12-14]. Subjects performed the OLST to determine static balance and the SEBT to determine dynamic balance. One group of participants performed balance exercises on the AirEx® balance pad over a 6-week period of time twice per week, and the second group of participants performed balance exercises on the Sanddune® over a 6-week period of time twice per week. ANOVA (repeated measures and two ways) was used to analyze the data. The results showed that, the differences between the pre-test and post-test scores and the eyes-open and eyes-closed scores of the OLST were statistically significant, but there was no statistically significant interaction between variables. Statistically significant differences were also found between the pre-test and post-test scores with the right-leg and left-leg tests on the SEBT, and statistically significant interactions were also found between the pre-test and post-test and the three normal reaches. The results suggested that both devices significantly changed balance results on the OLST and the SEBT. These results will enable physical therapists to better advice and incorporate balance exercise protocols using compliant surfaces for their patients/clients to enhance balance.

An article entitled "Pattern of Physical Activity Level, Pain Intensity, Range of Motion and Physical Function among Older Patients with Knee Osteoarthritis " published by Taofik Oluwasegun Afolabi , et al., discusses that Osteoarthritis is a chronic degenerative joint disease which is common among middle aged and elderly persons, it is a common chronic condition resulting in pain, fatigue and functional limitation, and it is the leading cause of disability affecting population older than 60 years [15]. Despite available therapies to patients with osteoarthritis, persistent pain and joint stiffness remains a daily experience. The purpose of this study was to assess the pattern of physical activity level, pain intensity, range of motion and physical function among older patients with knee osteoarthritis in Ibadan. The physical activity level was assessed using the International Physical Activity Questionnaire-Short Form (IPAQ) short form questionnaire, the active range of motion was assessed using a universal goniometer, pain intensity was assessed using the numerical pain rating scale, while the physical function level was determined using the timed up and go test [16,17].

A total number of 88 elderly participants with age ranging from 60 to 91 years, participated in this study, 21 (23.9%) were males, while 67 (76.1%) were females. The mean age 69 ± 7.05 years; the mean pain level was 4.03 ± 1.36; mean ROM was 91.730 ± 1.930. Out of the 88 participants, 2 (2.30%) were physically active, 13 (14.80%) were minimally active, and 73 (82.95%) were inactive. The mean physical function level was 13.01 ± 3.07 secs. The outcome of this study suggested that physical activity level in the elderly with knee osteoarthritis is low and most of them present with pain of moderate intensity, it also suggested that elderly with knee osteoarthritis have limited range of motion, and that they have a good mobility for their physical function level. It was then concluded that there was no effect of physical activity level on the physical function of the elderly, but pain intensity affected the physical function level. It was also concluded that physical activity level has a negative influence on physical function level in elderly with knee osteoarthritis.

" Comparison between Interferons and Physiotherapy Treatment on Quality of Life in Multiple Sclerosis Patients" by Rajneet Kaur Sahni in Issue 6 explains regarding Physiotherapy Treatment on Quality of Life in Multiple Sclerosis [18]. Multiple Sclerosis (MS) is a chronic inflammatory disease of the central nervous system. The major factors that contribute to a patient's quality of life (QOL) are the ability to perform daily life activities, the level of wellbeing and of satisfaction with life. Patients with MS rate their health related QOL lower than general populations [19]. Physical rehabilitation is generally accepted as useful for such MS patients. Interferons exert effects of potential relevance to multiple sclerosis. The main objective of this study is to see the effect of interferon, physiotherapy and their combine treatment on quality of life in Multiple sclerosis patients.

The study was comparative in nature. 30 subjects suffering from MS were selected by purposive sampling technique from in and around Ludhiana. The subjects were divided into 3 groups with 10 subjects each i.e. Group A taking physical therapy, Group B taking interferon therapy and Group C taking combination of both therapies. The quality of life of MS patients in different groups was assessed through a SF-36 health questionnaire. Data was analysed using ANOVA as a descriptive measure. The results showed that there is a significant difference between the groups Conclusion: This study concluded that physical therapy is much better than interferon therapy and the dual approach of both therapies is also performing well as compared to independent interferon therapy.

REFERENCES

1. Kawai A, Miyakawa T, Senda M, Endo H, Naito N. Gait characteristics Dier limb-sparing surgery with sciatic nerve resection: a report of two cases. J Bone Joint Surg Am 2002;84:264-268.
2. Markhede G. Stener B Function Dier removal of various hip and thigh muscles for extirpation of tumors. Acta Orthop Scand 1981;52(4):373-395.
3. Tinetti ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. N Engl J Med 1988;319(26):1701-1707.
4. Verma SK, Willetts JL, Corns HL, Marucci-Wellman HR, Lombardi DA, Courtney TK. Falls and fall-related injuries among community-dwelling adults in the United States. PLoS ONE 2016;11(3):1-14.
5. Akram SB, Frank JS, Chenouri S. Turning behavior in healthy older adults: Is there a preference for step versus spin turns? Gait and Posture 2010;31(1):23-26.
6. Teranishi T, Sakurai H, Ohtsuka K, Yamada M, Tsuzuki A, Miyasaka H, et al. Relationship between Feet Position and Anterior-posterior Center of Pressure (COP) location-What are the Determining Factors in the Adjustment of Center of Gravity? Journal of Physical Therapy Science 2013;25(1):41-43.
7. Bloemen-Vrencken J, de Witte L, Post M. Follow-up care for persons with spinal cord injury living in the community: a systematic review of interventions and their evaluation. Spinal Cord 2005;43(8):462-475.
8. Rahman A, Ahmed S, Sultana R, Taoheed F, Andalib A, Arafat SY. Epidemiology of spinal cord injury in bangladesh: a five-year observation from a rehabilitation center. J Spine 2017;6(2).
9. Soberg H, Finset A, Roise O, Bautz-Holter E. Identification and comparison of rehabilitation goals after multiple injuries: An ICF analysis of the patients', physiotherapists' and other allied professionals' reported goals. J Rehabil Med 2008;40(5):340-346.
10. Zinman A, Digout N, Bain P, Haycock S, Hébert D, Hitzig SL. Evaluation of a community reintegration outpatient program service for community-dwelling persons with spinal cord injury. Rehabil Res Pract 2014;989025.
11. Utz S. Enabling america: assessing the role of rehabilitation science and engineering. Family and Community Health 1999;22:97-98.
12. Pollock AS, Durward BR, Rowe PJ, Paul JP. What is balance? Clin Rehabil 2000;14(4):402-406.
13. Mackintosh S. Functional balance assessment of older community dwelling adults: a systematic review of the literature. Internet J Allied Health Sci Pract 2007;7(4):1-11.
14. Huxham FE, Goldie PA, Patla AE. Theoretical considerations in balance assessment. Aust J Physiother 2001;47(2):89-100.
15. Litwic A, Edwards MH, Dennison EM, Cooper C. Epidemiology and burden of osteoarthritis. Br Med Bull 2013;105:185-199.
16. Toda Y, Tsukimura N. A six-month follow up of a randomized trial comparing the eجcac\ of a lateralwedge Insole with subtalar strapping and an In-shoe lateral-wedge Insole in patients with varus deformity Osteoarthritis of the knee. Arthritis Rheum 2004;50(10):3129-3136.
17. Pells J, Shelby RA, Keefe FJ, Dixon KE, Blumenthal JA, et al. Arthritis self-eجcac\ and self-eجcac\ for resisting eating: Relationships 2007.
18. Sepulcre J, Masdeu JC, Goñi J, ArrondoG, Mendizábal NV, Bejarano B, et al. Fatigue in multiple sclerosis is associated with the disruption of frontal and parietal pathways. Mult Scler 2009;15(3):337-344.
19. Avasarala J. Redefining Acute Relapses in Multiple Sclerosis: Implications for Phase 3 Clinical Trials and Treatment Algorithms. Innov Clin Neurosci 2017;14(3-4):38-40.