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Editorial Open Access

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Editorial

It was seen that, physical exercise and meditation are the most effective strategy to cope up with daily life stress and anxiety. Even from the ancient documentary evidences, it is established that, health and mind somehow can be regulated by the regular practice of physical exercise and meditation. The rationale of such realization has made 'physical medicine' an 'influential pathway' to be healthy over any life style circumstances. Various modifications in the main theme of physical exercise have been observed in recent time in the name of 'Physical therapy' or 'Physiotherapy'. However, application of 'Physical medicine' in neurological rectification is globally a novel approach. It has been shown that, involvement of 'caregiver' in the manual exercise is crucial in patient perspective. Depending upon the application specificity, various associated techniques have been introduced in recent time like short wave diathermy, wax therapy, interferential therapy, ultrasonic, and muscle strengthening exercise, which have been shown to be effective to treat and relive from pain, recovery of stroke patients, recovery from cerebral palsy and cardio pulmonary rehabilitation. Globally, the awareness and study on 'Physical Medicine' is increasing gradually and the present 'International Journal of Physiotherapy & Physical Rehabilitation' provides a world-class platform to publish relevant works on related field of Physical medicine. The authors of the recently released issue (Volume 5, Issue 3) have documented several impactful articles, a brief of which has been discussed here.

The issue contains total eleven articles including eight research articles, one review article, one case report and one letter to editor. Together, the issue presents a valuable piece of research work in the field of 'Physical medicine'.

Bani-Ahmed et al. [1], have investigated the functional significance of the ipsilateral primary motor cortex (iM1) hyperactivity with respect to compensatory behavioral strategies employed by patients suffering from chronic arm paresis. Functional MRI and trunk kinematic studies were performed to validate their findings. The data were collected during paretic arm movements from eleven patients before and after a four-week training specifically designed to improve the motor control of the paretic arm and diminish the behavioral (trunk) compensation comprising of variable practice of a reach-to-grasp task with feedback given as knowledge-of-performance. Eight age-matched healthy controls underwent similar evaluations and training. Magnitude of iM1 (and cM1) activation and anterior trunk displacement were analysed. The authors found that, before training, patients exhibited significantly stronger iM1 activation, increased trunk motion, and significant positive correlations between these two variables compared to controls. After training, patients significantly decreased iM1 activation and displayed a trend toward decreased trunk use. The correlations between iM1 activation and trunk motion persisted and were different from those in controls. Conclusively the result implies that, functional iM1 plasticity is related to behavioral compensation, suggesting a maladaptive role of the iM1 in chronic subcortical stroke.

Obata et al. [2], documented a case report on acute effect of aquatic pole walking (PW) training intervention on a 64-year-old male patient with chronic hemiparesis and symptoms of spasticity in the right lower limb. A comparison of over ground walking before and after 20 minutes of aquatic PW training revealed a significant improvement in gait performance. As a main result, the average speed of walking after the intervention was 0.16 m/s after the intervention as compared to 0.04 m/s in the initial condition. The time taken for each stride cycle was drastically decreased, mainly due to shortening of the stance time. Underlying the improved gait performance was the emergence of functional muscle activity in the paralyzed and spastic leg muscles. The result observed in this patient should be further tested among a large population of patients presenting similar symptoms. Moreover, the basic mechanisms underlying aquatic PW intervention should be further elucidated.

The aim of the study by Tokunaga et al. [3], was to elucidate the most successfully method for the average improvement in motor Functional Independence Measure (mFIM) at each hospital with the least influenced by the difference of mFIM score at admission. For this purpose, the authors considered 3 groups divided based on motor FIM score at admission as 3 hospitals. The subjects were 575 stroke patients, who were hospitalized in a convalescent rehabilitation ward. The subjects were divided the subjects into 3 groups based on mFIM score during admission and investigated whether there were significant differences in the values derived from mFIM effectiveness, corrected mFIM effectiveness, deviation value of mFIM gain, and multiple regression analysis. As a result, significant difference in the improvement in mFIM between 3 groups divided by mFIM at admission was not observed only for the use of the deviation value of mFIM gain. Deviation value of mFIM gain, which is the least liable to the influence of differences in mFIM score at admission, is useful as a method to compare average improvement in mFIM among hospitals.

The study by Vakanski et al. [4], proposes a set of metrics for evaluation of patient performance in physical therapy exercises. Taxonomy is employed in the study that classifies the metrics into quantitative and qualitative categories, based on the level of abstraction of the captured motion sequences. Further, the quantitative metrics are classified into modelless and model-based metrics, in reference to whether the evaluation employs the raw measurements of patient performed motions, or whether the evaluation is based on a mathematical model of the motions. The reviewed metrics include root-mean square distance, Kullback Leibler divergence, log-likelihood, heuristic consistency, Fugl-Meyer Assessment, and similar. The metrics can potentially be integrated into a system that employs

machine learning for modelling and assessment of the consistency of patient performance in home-based therapy setting. Automated performance evaluation can overcome the inherent subjectivity in human performed therapy assessment, and it can increase the adherence to prescribed therapy plans, and reduce healthcare costs.

Raghavan et al. [5], performed a study to evaluate the safety and feasibility of training with a non-powered device, the Bimanual Arm Trainer (BAT), in facilitating motor recovery in individuals with severe hemiparesis. The BAT enabled coupled bimanual training of shoulder external rotation, which is reduced in individuals with severe post-stroke hemiplegia. The rationale for bimanual training was to harness contralesional cortical activity to drive voluntary movement in the affected arm in patients who could barely perform unimanual movements. Nine participants with post-stroke hemiparesis, preserved passive range of motion and Modified Ashworth score of <3 in the shoulder and elbow joints, trained with the device for 45 minutes, twice a week for six weeks, and were assessed pre- and post-training. All participants tolerated the training and no adverse events were reported. Participants showed significant improvement in the upper extremity Fugl-Meyer score post-training with an effect size of 0.89. Changes in the flexor synergy pattern accounted for 64.7% of the improvement. Improvement in active range of motion in the paretic limb occurred for both trained and untrained movements. Some participants showed improvement in the time taken to perform selected tasks on the Wolf Motor Function Test post-training. The results demonstrate the safety and feasibility of using the Bimanual Arm Trainer to facilitate motor recovery in individuals with severe hemiparesis.

A clinically defined condition characterized by persistent, severe, disabling fatigue lasting more than six months that is not reversed by sleep is regarded as chronic fatigue (CF). Fatigue is a complex phenomenon determined by several factors, including psychological health but at the biochemical level fatigue is related to the metabolic energy available to tissues and cells, mainly through mitochondrial respiration. Fatigue is the most common symptom of poorly functioning mitochondria. therefore dysfunction of these organelles may be the cause of the fatigue seen in CF. There is a great progress in the molecular understanding of mitochondrial disorder but the relation of mitochondrial dysfunction with CF and the underlying mechanism is not identified well in addition treatment of fatigue is still inadequate. In this review by Muluye and Bian [6], the authors have tried to summarize the relation between CF with mitochondrial dysfunction and determine the underline mechanism.

In the research article by Mieke et al. [7], the authors have aimed to perform an electrophysiologic evaluation in patients with Tarlov cysts to determine whether the cysts create electrical abnormalities that could translate into clinical symptoms. The findings of the study are correlated with the data currently available in the literature. The study was conducted with thirty patients with unexplained pelvic, sacral, perineal and/or leg pain, which harboured small and/or large Tarlov cysts were selected at an outpatient clinic for physical medicine in musculoskeletal disorders. An MRI of the lumbosacral spine of each patient was reviewed. An experienced physiatrist acquired information related to pain and paresthesia in addition to bladder, bowel and sphincter symptoms. An expert electrophysiologist performed nerve conduction and electromyography studies on the patient's legs and the pelvic floor. In all cases, the presence of Tarlov cysts was associated with sensory neuron symptoms, such as pain and paresthesia, and with bladder, bowel, sexual, and/or sphincter complaints. In all cases, electromyography documented axonal damage in multiple lumbar and sacral nerve root myotomes. Symptomatic Tarlov cysts clinically and electrophysiologically represent a progressive chronic cauda equine syndrome. In patients with intractable sacral, perineal, pelvic or leg pain, symptomatic Tarlov cysts should be included in the differential diagnosis.

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