

melatonin or placebo. A 7-day washout period was provided in between studies.

**Results:** There was a statistically significant difference between before and 1 hour after melatonin administration on sway area under dual-tasking condition. However, there was no statistically significant difference in cognitive task performance.

**Conclusion:** Melatonin decreases postural control in older adults while dual-tasking.

<http://dx.doi.org/10.1016/j.hkjpj.2015.09.016>

#### Evaluation of a 7-year return-to-work cognitive-behavioural based physiotherapy back rehabilitation programme

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**Background and purpose:** Studies found that psychological factors predicted extent of chronic disability and hinder the process of return to work. Thus, this study aimed to determine whether a programme of conventional therapy and education using cognitive behavioural therapy approach reduced pain, disability, fear-avoidance belief and also anxiety and depression among patients with low back pain.

**Methods:** This was a pre- and post-test study. Patients who had injured their back at work of less than 8 weeks and high fear avoidance beliefs were recruited. Outcome measures were Numerical Global Rating of Change Scale, Numeric Pain Rating Scale (NPRS), Roland Morris Disability Questionnaire (RMDQ), Hospital Anxiety and Depression Scale (HADS-Anxiety and HADS-Depression) and Fear-Avoidance Beliefs Questionnaire (FABQ)-Physical activity and FABQ-Work.

**Results:** From August 2007 to December 2014, a total of 712 patients were recruited. The mean value of NGRCS was  $5.6 \pm 2.2$ . The post-programme evaluation of NPRS (from mean value of  $5.9 \pm 2.4$  to  $4.8 \pm 2.7$  with  $p < 0.001$ ), RMDQ (from mean value of  $16.2 \pm 3.8$  to  $13.1 \pm 4.6$  with  $p < 0.001$ ), HADS-Anxiety (from mean value of  $12.1 \pm 4.6$  to  $7.8 \pm 4.7$  with  $p < 0.001$ ), HADS-Depression (from mean value of  $12.5 \pm 4.6$  to  $9.4 \pm 4.8$  with  $p < 0.001$ ), FABQ-Physical activity (from mean value of  $18.3 \pm 3.4$  to  $16.6 \pm 4.3$  with  $p < 0.001$ ) and FABQ-Work (from mean value of  $36.8 \pm 4.1$  to  $30.6 \pm 7.3$  with  $p < 0.001$ ) were found to be significantly improved.

**Conclusion:** Our study showed that cognitive behavioural-based physiotherapy programme was found to be effective in decreasing back pain, the fear-avoidance behaviours, the anxiety and depressive mood in patients with work-related back injury. However, randomized controlled trials are recommended to determine its effectiveness.

<http://dx.doi.org/10.1016/j.hkjpj.2015.09.017>

#### A 6-year evaluation of a preoperative and postoperative empowering physiotherapy programme for patients with lumbar pathologies

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**Background and purpose:** A comprehensive physiotherapy management programme was launched in Tuen Mun Hospital for patients with lumbar spine pathologies in order to enhance their function after lumbar spine surgery. The objective was to evaluate the effectiveness of the programme in reducing back pain, restoring functional activities and alleviating the psychological factors for those patients.

**Methods:** The programme consisted of a preoperative education session, postoperative physiotherapy training and follow-up clinic. Outcome measures included: (1) Numerical Global Rating of Change Scale (NGRCS); (2) Numeric Pain Rating Scale (NPRS); (3) Roland Morris Disability Questionnaire (RMDQ); (4) Fear-Avoidance Beliefs Questionnaire (FABQ); and (5) Hospital Anxiety and Depression Scale (HADS). Data were collected preoperatively, at the first postoperative session and final physiotherapy session.

**Results:** From July 2008 to December 2014, 353 patients completed the programme. NPRS ( $6.5 \pm 2.5$  to  $3.1 \pm 1.9$ ), RMDQ ( $12.6 \pm 2.9$  to  $8.4 \pm 4.2$ ), FABQ-Physical Activity ( $20.8 \pm 4.9$  to  $13.1 \pm 4.2$ ), FABQ-Work ( $27.2 \pm 6.8$  to  $17 \pm 4.9$ ) and

HADS-Anxiety ( $12.5 \pm 3.4$  to  $8.1 \pm 2.9$ ) were significantly improved ( $p < 0.05$ ) from the preoperative physiotherapy session to the final physiotherapy session. NPRS ( $4.1 \pm 1.8$  to  $2.7 \pm 1.5$ ), RMDQ ( $11.6 \pm 2.4$  to  $8.5 \pm 3.4$ ), FABQ-Physical Activity ( $16.2 \pm 6.6$  to  $12.8 \pm 4.8$ ) and FABQ-Work ( $24.7 \pm 4.8$  to  $20.2 \pm 6.5$ ) were also significantly improved ( $p < 0.05$ ) from the first postoperative physiotherapy session to the final physiotherapy session. Subjective improvement as measured by NGRCS was significantly increased ( $p < 0.05$ ) from  $4.2 \pm 2.7$  to  $7.6 \pm 1.8$  from the first post-operative to the final physiotherapy session.

**Conclusion:** The programme was found to be effective in reducing back pain, restoring functional activities, alleviating the psychological factors for those patients received lumbar spine surgery.

<http://dx.doi.org/10.1016/j.hkjpj.2015.09.018>

#### New impact of physiotherapy management on children with congenital talipes equinovarus (CTEV): Preliminary results

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**Background and purpose:** Congenital talipes equinovarus (CTEV), also named clubfoot, is a common deformity of the foot in newborns. Conservative treatment with physiotherapy and orthopaedic management can always achieve a good result. However, with the traditional French method (gradual manipulation and stretching followed by strapping of foot) that we applied, patients have to attend daily physiotherapy in order to achieve good correction of the deformity. In contrast, the Ponseti method involves weekly gentle stretching and manipulation of the misaligned bones followed by application of a well-molded long-leg plaster cast; patients only need to attend physiotherapy treatment twice a week. Therefore, the Ponseti method, together with massage therapy in-between each cast, was adopted as the new management programme of CTEV.

**Methods:** Newborn babies were referred to paediatric orthopaedic clinic for clubfoot diagnosis. Immediate treatment was given by physiotherapist with Ponseti method. Pre-treatment assessment was done with Pirani Score, passive range of movement of the foot and photos recording. Treatment included stretching, manipulation and application of a long-leg plaster cast. Casting was changed on a weekly basis for 5 weeks. In between each casting application, an additional session of massage therapy was given. Weekly re-assessment was performed and biweekly reviews by an orthopaedic surgeon was given in the clinic to refine the direction of the casting. Clubfoot deformity was further reviewed in the clinic to decide on the need for surgery by the orthopaedic surgeon after 5 weeks of treatment.

**Results:** Improvement was noted on each separate component in the foot deformity after 5 weeks of treatment. The Pirani score improved in both hindfoot (2.5 to 1) and forefoot (2.5 to 2). Corrective effect was seen in the series of photos taken on a weekly basis. In addition, no surgical intervention was needed after review by the surgeon at the end of the casting period. Treatment frequency decreased by 60% as compared with the French method. Both parents were very satisfied with the results.

**Conclusion:** According to this preliminary data, the Ponseti method with massage therapy appears to be effective in correcting deformities of clubfoot. Moreover, the significant reduction in treatment frequency not only minimizes the stress of parents in caring for a newborn baby but also saves hospital resources.

<http://dx.doi.org/10.1016/j.hkjpj.2015.09.019>

#### Public impression of an innovative stair-climbing power wheelchair: A pilot survey

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**Background and purpose:** Accessibility has always been challenging to the policy maker and the disabled alike, in both developing and developed countries, especially with the global problem of an aging population. Wheelchairs are only for smooth terrains. The Hong Kong Science & Technology Parks,

funded by the HKSAR, has recognized the need of an innovative stair-climbing power wheelchair to meet such challenge and has provided financial and advanced technological support for the research and development of a smart stair-climbing wheelchair locally in Hong Kong. The purpose of this pilot study is to survey the need for and the possible effect of this stair-climbing wheelchair on people with walking disability.

**Methods:** A questionnaire of 11 questions (with 9 Yes/No questions and 2 open-ended questions to fill in the blanks) was given to participants who attended Rehab Power Day 2014 and saw the demonstration and personally experienced as a user riding the wheelchair up and down a staircase with irregular inclinations. Participants filled out and returned the questionnaires onsite.

**Results:** A total of 24 questionnaires were collected with most questions answered. More than 90% Yes were selected from the 9 Yes/No questions, indicating that participants saw the need of and liked to have and use this stair-climbing wheelchair and felt that they could be more independent and that the quality of living for people with walking disability could be improved.

**Conclusion:** This pilot survey strongly suggests the need of the all-terrain stair-climbing power wheelchair and that it may have positive physical and psychological effect on people with walking disability.

<http://dx.doi.org/10.1016/j.hkpj.2015.09.020>

#### Could Tai Chi retard ageing-associated cognitive and physical decline in the elderly?

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**Background and purpose:** Tai Chi is a mind-body-exercise emphasizing the use of the mind to control bodily movement. It is a moderate-intensity exercise involving slow and rhythmic movements. Therefore, it is suitable for people of all ages. With its nature of mind-body component, it is of interest to examine whether or not Tai Chi could delay age-associated deterioration in cognitive and physical function. Thus, this study aimed to determine if Tai Chi could retard age-related cognitive and physical decline and its potential mechanism.

**Methods:** Eleven healthy Tai Chi masters with more than 5 years' experience of Tai Chi and 11 age- and sex-matched healthy individuals were recruited. Cognitive function was assessed by calculation task while physical function was assessed by symptom-limited ergometry test. Levels of oxy-haemoglobin (O<sub>2</sub>Hb) during these functional tasks were measured to evaluate the tissue oxygenation and extractability.

**Results:** Time for completing calculation task was similar in both groups ( $p=0.42$ ) with similar trend of changes in O<sub>2</sub>Hb (side  $\times$  group:  $p=0.80$ ) demonstrated in both left and right prefrontal regions. Regarding the physical performance, no between-group differences were observed in peak Watts achieved at the end of ergometry test ( $p=0.612$ ). During the ergometry test, a trend of decreasing O<sub>2</sub>Hb was observed throughout the exercise phase followed by a marked increase during the active recovery phase (time effect:  $p<0.01$ ) with no time  $\times$  group interaction observed.

**Conclusion:** These findings suggest that Tai Chi does not have a protective effect against age-associated decline in cognitive and physical performance or on tissue oxygenation during functional tasks.

<http://dx.doi.org/10.1016/j.hkpj.2015.09.021>

#### Influence of ageing on oxygen kinetics during functional tasks

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**Background and purpose:** Ageing associated decline in physical performance is well reported. Such decline increases the likelihood of functional impairment and associated disabilities. This cross-sectional study aimed to investigate the impact of ageing on oxygen kinetics and its association with functional performance.

**Methods:** Eleven healthy youngsters and eleven sex-matched elderly were recruited. Participants were asked to perform symptom-limited ergometry test to examine their aerobic capacity. Resting level of tissue oxygenation

index and changes in oxy-haemoglobin (O<sub>2</sub>Hb) during ergometry of respiratory muscles and quadriceps were measured to determine the potential underlying mechanisms that may limit the functional performance.

**Results:** Elderly demonstrated a similar level of tissue oxygenation index (SmO<sub>2</sub>) in respiratory muscles (Elderly: 71.9%, Youngsters: 71.7%,  $p=0.936$ ) but a significantly lower level in quadriceps than youngsters (Elderly: 63.6%, Youngsters: 70.6%,  $p=0.001$ ). Regarding the aerobic capacity, elderly achieved a lowered maximal power by 20 Watts ( $p=0.011$ ). Throughout the exercise phase, both groups demonstrated a decreasing trend in O<sub>2</sub>Hb (time effect:  $p<0.001$ ) with significant time and group interaction ( $p=0.002$ ) and between-group difference ( $p=0.001$ ) in both quadriceps and respiratory muscles. Pearson's correlation revealed that there was significant correlation between the changes in O<sub>2</sub>Hb in quadriceps with maximal power achieved ( $r=-0.47$ ,  $p=0.027$ ) but not in respiratory muscles.

**Conclusion:** This study demonstrated that ageing has a detrimental effect on tissue oxygenation and extractability. It appears that the impact is more significant in skeletal muscles than in respiratory muscles, and that the changes could be one factor leading to the reduced functional capacity in elderly.

<http://dx.doi.org/10.1016/j.hkpj.2015.09.022>

#### Association of hip abductor strength with functional performance in patients after unilateral total knee arthroplasty: A longitudinal study

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**Background and purpose:** Residual functional deficits could persist in people with total knee arthroplasty (TKA). Investigating modifiable factors that contribute to functional performance in patients after TKA is clinically important. One such modifiable factor is lower extremity weakness. The quadriceps muscle strength has been extensively demonstrated to have a positive association to physical functions after TKA. However, the role of hip abductor muscle strength has not received much attention. The purpose of this study was to evaluate the association of hip abductor muscle strength with functional performance in patients after unilateral TKA.

**Methods:** Thirty-five participants underwent repeated quadriceps and hip abductor muscle strength testing and three functional performance measurements following 6-month after TKA. Hierarchical regression analysis was used to analyze the association of quadriceps and hip abductor muscle strength with the three functional performance measurements (Timed-Up-and-Go Test, 5-Chair Rise Test and Stair Ascend/Descend Test) at difference time intervals.

**Results:** Quadriceps muscle was significantly associated with performance on the Timed-Up-and-Go Test, 5-Chair Rise Test and Stair Ascend/Descend Test over and above that of covariates with  $R^2$  ranging from 0.22 to 0.34. Hip abductor muscle strength was significantly associated with performance on the 5-Chair Rise Test and Stair Ascend/Descend Test over and above that of covariates and quadriceps muscle strength with  $R^2$  ranging from 0.31 to 0.44.

**Conclusion:** Hip abductor muscle strength is related to functional outcomes more than quadriceps muscle strength. We should emphasize not only quadriceps muscle strengthening but also hip abductor muscle enhancement in the clinical pathway of perioperative rehabilitation regimens to enhance recovery.

<http://dx.doi.org/10.1016/j.hkpj.2015.09.023>

#### Community ambulation training programme for enhancing ability of elderly in safe outdoor ambulation

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**Background and purpose:** Active aging is highly recommended and the ability of outdoor ambulation is crucial in order for elderly to live actively. A unique training room, community ambulation training facility was set up at Tuen Mun Hospital. This facility provides an elderly-friendly environment where they can practise outdoor mobility training with mud, brick and concrete paths, kerbs, stairs, ramps, travelator and road crossing with traffic light management. A community ambulation training programme (CATP) was thus implemented to enhance the ability of elderly in safe outdoor mobility.