PMR Buzz

Prologue

Since last few months, it has been on the agenda to come up with a collection of unique articles appearing in various contemporary journals in the field of physical medicine & rehabilitation. Going through different journals and articles gives us a broad perspective of our branch, stimulates and usher us for better clinical practice and research work, but our daily chores keep us in blissful ignorance. This lack of perception about the leading-edge publications may be due to lack of time or lack of resources or lack of energy to fumble the dusty pages of journals in the library. So, during this COVID-19 lockdown, this scheme popped, to come up with an abstract review in an electronic form comprising inputs from well-known current journals covering various fields in rehabilitation medicine. Initially, we thought that it would be a couple of page review, but on dipping in, realized it to be a challenging and mammoth job. I stretched out to the young friends and contributors to give inputs and help to form the keel, while I coordinated their efforts.

This is our first edition, and we hope we will continue it for as long as the current contributors continue their efforts and more contributors volunteer to carve it in better shape. There will always be flaws, and scope of improvement, so keep us posted with suggestions, and we will grab the most feasible and bright.

We have selected one abstract from each volume of these journals published in the first quarter of the year. It does not mean that the others are any less in originality or quality, but we picked only those appearing to be practice-changing in Indian clinical scenario. Moreover, like any medley, there might be bias in the overture, but we are only humans.

*Keep buzzing with "**PMR Buzz**".*

-- Mrinal Joshi

Contributors

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Pain Physician. 2020 Jan;23(1):E41-E49.

An analysis of biomarkers in patients with chronic pain.

Gunn J, Hill MM, Cotten BM, Deer TR.

BACKGROUND:

Because of the subjective nature of current pain assessments, limited efficacy of treatment options and risks associated with opioid abuse and diversion, the need for objective data to assist with chronic pain management has never been greater. Successful identification of mechanistic biomarkers would not only improve our understanding and ability to accurately diagnose pain disorders but would also facilitate the development of disease-modifying pain drugs.

OBJECTIVES:

The objective of this study was to determine and evaluate the prevalence of abnormal biomarker findings in a population of patients with chronic pain.

STUDY DESIGN:

Retrospective, observational study.

SETTING:

Data analysis of biomarker test results was performed at a single industry site (Ethos Research & Development, Newport, KY) from clinical samples collected and analyzed from July to December 2018.

METHODS:

A novel, pain-specific biomarker test panel that evaluates biomarkers of systemic inflammation, oxidative stress, neurotransmitter turnover, and micronutrient status was employed to determine the prevalence of abnormal findings in 17,834 unique patient samples analyzed at a national reference laboratory (Ethos Laboratories, Newport, KY). Patient biomarker results were considered abnormal if they were outside of the 95% confidence interval reference ranges established using a healthy population of donors who had no history of chronic pain or opioid use.

RESULTS:

A total of 77% of patients with chronic pain exhibited at least one abnormal biomarker result (n = 13,765). The most common abnormal biomarker finding was elevated quinolinic acid, which was observed in 29% of patients (n = 5,107). Elevated pyroglutamate, indicative of

glutathione depletion, was observed in 19% of patients (n = 3,314). Elevated xanthurenic acid, indicative of vitamin B6 insufficiency, was observed in 17% of patients (3,025). Elevated levels of the acrolein metabolite 3-hydroxypropyl mercapturic acid were observed in 21% of patients (n = 3,667). Elevated methylmalonic acid, indicative of a vitamin B12 deficiency, was observed in 10% of patients (n = 1,827), whereas abnormally low levels of neurotransmitter metabolites were observed in 8% of patients (n = 1,456).

LIMITATIONS:

Medications and/or conditions other than those associated with chronic pain were not evaluated as potential causes of abnormal biomarker findings.

CONCLUSIONS:

A novel biomarker assay that measures objective correlates to the neurobiological processes underlying chronic pain reveals a high prevalence of atypical biochemistry in a population of patients with pain. Abnormal biomarker findings presented here provide objective support for the role of cytokine-mediated inflammation, oxidative stress, abnormally low production of neurotransmitters, and micronutrient deficiencies in the development or worsening of chronic pain. This unique panel of functional pain biomarkers provides practitioners with novel, objective insight into the underlying causes of pain, which will pave the way for truly personalized pain medicine. Correcting abnormal biomarker findings with targeted, nonopioid therapies to improve patient function and alleviate pain potentially could lessen the opioid burden and drastically reduce health care costs.

Eur J Phys Rehabil Med. 2020 Feb;56(1):41-46.

Use of the maximal phonation test for the screening of dysphagia in stroke patients: a preliminary study.

Lim JY, Yoo YH, Park CH, Joa KL, Jung HY.

BACKGROUND:

Dysphagia is a commonly developed complication after stroke and may lead to pneumonia. Several screening tests for dysphagia have been introduced, but no consensus has been reached regarding the test that best detects dysphagia or swallowing difficulties. Maximum phonation time (MPT) can measure laryngeal and pharyngeal function indirectly by providing a means of assessing vocal cord integrity. Because vocal cords play a role in sound production and also protect the airways, we considered MPT might be used to screen for penetration and aspiration into airways in stroke patients.

AIM:

The purpose of this study was to investigate the ability of MPT to differentiate between stroke patients with or without penetration/aspiration and the relationships between MPT and video fluoroscopic swallowing study (VFSS) findings and those of other swallowing screening tests.

DESIGN:

Prospective observational study.

SETTING:

Korean tertiary hospital.

POPULATION:

One hundred six Patients with acute stroke patients with suspected dysphagia referred for VFSS from January 2016 to December 2017.

METHODS:

MPT differences among a normal group, a penetration group, and an aspiration group were analyzed, and correlations between MPT and age, Penetration Aspiration Scale (PAS), American Speech-Language-Hearing Association National Outcome Measurement System Swallowing Scale (ASHA-NOMS), Functional Dysphagia Scale (FDS) scores were investigated.

RESULTS:

MPTs were found to be significantly different in normal, penetration, and aspiration groups in stroke patients ($P<0.01$). Furthermore, MPT was highly correlated with PAS, ASHA-NOMS, and FDS scores. ROC analysis provided MPT cut off values for the presence of penetration and aspiration in stroke patients of 9.08 and 7.98 sec, respectively.

CONCLUSIONS:

In stroke patients, MPT could be used to detect penetration or aspirations while swallowing. and seems to have appropriate validity and sensitivity.

CLINICAL REHABILITATION IMPACT:

MPT is proposed as a new screening tool for detecting dysphagia in stroke patients, especially airway aspiration.

J Head Trauma Rehabil. 2020 Mar/Apr;35(2):E95-E102.

Association of Simple Step Test With Readiness for Exercise in Youth After Concussion.

Fyffe A, Bogg T, Orr R, Browne GJ.

OBJECTIVES:

We hypothesized that a submaximal step test would be associated with readiness to commence graded exercise in children and adolescents with concussion.

METHODS:

Children and adolescents aged 8 to 18 years performed standard concussion clinical assessment for vestibular/ocular and balance impairment, and exercise examination utilizing the 3-minute Kasch Pulse Recovery test (KPR) and a symptom-limited graded exercise test (GXT). Outcome measures included activity readiness and symptom exacerbation.

RESULTS:

Forty-five participants (mean age 13.2 ± 2.1 years, 76% male) had a confirmed concussion (73% sports-related). Some participants required follow-up testing giving 75 clinical presentations. Sensitivity and specificity of the KPR were 100% and 95.7%, respectively. Area under the receiver operating characteristics curve was 0.979. Activity readiness to GXT and KPR was strongly associated ($\chi = 21.672$, $P < .001$), while symptom exacerbation showed a significant correlation between testing methods ($r = 0.796$, $P < .001$). Better exercise performance on GXT and KPR was significantly correlated with normal Vestibular/Ocular Motor Screening ($rs = -0.380$, $P = .010$, and $rs = -0.281$, $P = .017$, respectively) and Modified Balance Error Scoring System ($rs = -0.452$, $P < .001$, and $rs = -0.301$, $P = .010$, respectively).

CONCLUSION:

The KPR is a simple and practical tool to determine whether it is appropriate for a child or adolescent with concussion to commence graded exercise.

Pain Physician. 2020 Mar;23(2):E175-E183.

Efficacy of Hyalase Hydrodissection in the Treatment of Carpal Tunnel Syndrome: A Randomized, Double-Blind, Controlled, Clinical Trial.

Elawamy A, Hassanien M, Hamed A, Roushdy ASI, Abass NA, Mohammed G, Hasan MRAR, Kamel EZ.

BACKGROUND:

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy, which results from median nerve compression. A lot of nonsurgical modalities are available for the

management of mild to moderate situations. Local Hyalase hydrodissection (HD) of the entrapped median nerve could offer a desirable sustained symptom alleviation.

OBJECTIVES:

To evaluate the clinical efficacy of Hyalase/saline solution carpal tunnel HD on pain, functional status, and nerve conduction in patients with CTS.

STUDY DESIGN:

A randomized, double-blinded trial.

SETTING:

Anesthesia, pain, and rheumatology clinics in a university hospital.

METHODS:

Patients: 60 patients with CTS (> 6 months' duration).

INTERVENTION:

patients were allocated equally into either group 1 (HD with Hyalase + 10 mL saline solution injection), or group 2 (HD with 10 mL saline solution only).

MEASUREMENTS:

assessment of pain using Visual Analog Scale (VAS), functional disability (FD) score, and nerve conduction studies before injection, and over 6 months after injection. Nerve conduction parameters before injection and post injection by the end of 3 and 6 months were evaluated as well.

RESULTS:

Statistically significant lower post injection values of VAS (1 ± 1.8, 2 ± 1.1, 2 ± 1.2, 2 ± 1.1) in group 1 versus (2 ± 1.2, 3 ± 1.7, 4 ± 1.5, 5 ± 2.6) in group 2 by the end of the first week, and the first, third, and sixth months, and significantly lower FD scores (15.3 ± 1.2, 13 ± 1.3, 10.2 ± 1.3, 10.2 ± 1.3) in group 1 versus (17.5 ± 1.8, 16.6 ± 2.8, 19.4 ± 3.2, 21.2 ± 2.5) in group 2 during the same time intervals. Nerve conduction study parameters have shown significantly higher velocity and lower latency in the Hyalase group than in the saline solution group by the 3 and 6 month follow-up.

LIMITATION:

We suggest a longer period could be reasonable.

CONCLUSIONS:

Carpal tunnel HD with Hyalase with saline solution is considered as an efficient technique offering a rapid onset of pain relief and functional improvements, and better median nerve conduction in patients with CTS over 6 months follow-up duration.

Journal of Head Trauma Rehabilitation: January/February 2020 - Volume 35 - Issue 1 - p 76-83

Pharmacotherapy for Treatment of Cognitive and Neuropsychiatric Symptoms After mTBI

Rabinowitz, Amanda R. PhD; Watanabe, Thomas K. MD

OBJECTIVES:

Cognitive and neuropsychiatric symptoms are extremely common following mild traumatic brain injury (TBI), also known as concussion. Although most patients will recovery rapidly, a significant minority go on to experience persistent symptoms. There are currently no FDA-approved medications for treatment of cognitive and neuropsychiatric problems in the context of mild TBI, yet a number of agents are prescribed “off-label” for these complaints. Rigorous trials are lacking, but there are a number of open-label studies, and some small randomized controlled trials that support the safety and possible efficacy of pharmacotherapies in this population. Clinical trials conducted in samples with more severe brain injuries can also serve as a guide.

METHODS:

Review of the literature.

RESULTS & CONCLUSIONS:

There is the most support in the literature for the neurostimulant methylphenidate for treatment of mild TBI–related cognitive dysfunction, and the selective serotonin reuptake inhibitor, sertraline, for the treatment of postinjury depression. There is clearly a need for more well-designed studies to guide clinicians in selecting the appropriate medication and dose. Without clear guidance from the literature, a cautious approach of starting low and titrating slowly is recommended.

J Rehabil Med 2020; 52: jrm00005

Does casting after botulinum toxin injection improve outcomes in adults with limb spasticity ? A SYSTEMATIC REVIEW

Jordan Farag, MD Rajiv Reebya, MD, Carl Ganzert, MSc and Patricia Mills, MD, MHSc

OBJECTIVE:

To determine current evidence for casting as an adjunct therapy following botulinum toxin injection for adult limb spasticity.

DESIGN:

The databases MEDLINE, EMBASE, CINAHL and Cochrane Central Register of Controlled Trials were searched for English language studies from 1990 to August 2018. Full-text studies using a casting protocol following botulinum toxin injection for adult participants for limb spasticity were included. Studies were graded according to Sackett's levels of evidence, and outcome measures were categorized using domains of the International Classification of Disability, Functioning and Health. The review was prepared and reported according to PRISMA guide- lines.

RESULTS:

Five studies, involving a total of 98 participants, met the inclusion criteria (2 randomized controlled trials, 1 pre-post study, 1 case series and 1 case report). Casting protocols varied widely bet- ween studies; all were on casting of the lower limbs. There is level 1b evidence that casting following botulinum toxin injection improves spasticity outcomes compared with stretching and taping, and that casting after either botulinum toxin or saline injections is better than physical therapy alone.

CONCLUSION:

The evidence suggests that adjunct casting of the lower limbs may improve outcomes following botulinum toxin injection. Casting protocols vary widely in the literature and priority needs to be given to future studies that determine which protocol yields the best results.

J Rehabil Med 2020; 52: jrm00016

Abobotulimtoxina and rehabilitation vs rehabilitation alone in post-stroke spasticity: a cost utility analysis

Carlo Lazzaro, BSc, Alessio Baricich, MD, PhD, Alessandro Picelli, MD, PhD, Patrizia Maria Caglioni, MD, Marco Ratti, BEc, MSc and Andrea Santamato, MD

OBJECTIVE:

To investigate costs and quality-adjusted life years of rehabilitation combined with abobotulinumtoxinA (aboBoNT-A) (rehab/aboBoNT-A) vs rehabilitation alone (rehab) in post-stroke spasticity in Italy.

DESIGN:

Based on both Italian National Health Ser- vice and societal perspectives, a 2-year cost-utility analysis model was performed.
Subject/patients: The cost-utility analysis model considered hypothetical patients.

METHODS:

The cost-utility analysis model was populated with data concerning demographics, disease severity, healthcare and non-healthcare resource consumption. Data were collected via a questionnaire administered to 3 highly experienced Italian physiatrists (864 out of 930 post-stroke spasticity patients on rehab/aboBoNT-A in total). Costs are ex- pressed in Euro (€) based on the year 2018. Results: The cost to society (rounded to the nearest whole €) was €22,959 (rehab/aboBoNT-A) vs €11,866 (rehab). Italian National Health Service- funded cost was €7,593 (rehab/aboBoNT-A) vs €1,793 (rehab). Over a period of 2 years rehab/ aboBoNT-A outperforms rehab in terms of quality- adjusted life years gained (1.620 vs 1.150). The incremental cost-utility ratio was €12,341 (Italian National Health Service viewpoint) and €23,601 (societal viewpoint). Sensitivity analyses confirmed the robustness of the baseline results.

CONCLUSION:

Despite some limitations, the higher number of quality-adjusted life years gained vs rehab and the high probability of reaching a cost-utility ratio lower than the Italian informal acceptability range (€25,000–40,000) make rehab/aboBoNT-A a cost effective healthcare programme for treating patients with post-stroke spasticity in Italy.

J Rehabil Med 2020; 52: jrm00038

Does inspiration efficiency influence the stability limits of the trunk in patients with chronic low back pain?

Regina Finta, PhD , Krisztina Boda, PhD, Edit Nagy, PhD and Tamás Bender, PhD, DSc

OBJECTIVE:

To determine the effects of diaphragm- strengthening training on the stability limits of the trunk and inspiratory function in patients with low back pain.

DESIGN:

A randomized comparative trial including a diaphragm training group that took part in conventional training together with diaphragm strengthening, and a control group that took part in conventional training only. Both groups participated in an 8-week training, 2 times/week. All subjects under- went the same measurement protocol before and after the intervention.

PATIENTS:

The study included 52 subjects with chronic low back pain.

METHODS:

The inspiratory functions (chest excursion, maximal inspiratory pressure, peak inspiratory flow, and volume of inspired air) and stability limits of the trunk with the subject in the sitting position (modified functional and lateral reach test) were assessed. Results: Maximal inspiratory pressure and stability limit tests showed a statistically significant improvement only in the diaphragm training group. Statistically significant improvements in chest excursion and peak expiratory flow tests were found in both groups; however, the improvement was more greater in the diaphragm training group.

CONCLUSION: Conventional exercises together with diaphragm training result in a greater improvement than conventional exercises alone in patients with chronic low back pain.

Medicine and Science in Sports and Exercise, 01 Jan 2020, 52(1):56-66

Low-Frequency HIIT Improves Body Composition and Aerobic Capacity in Overweight Men.

Chin EC, Yu AP, Lai CW, Fong DY, Chan DK, Wong SH, Sun F, Ngai HH, Yung PSH, Siu PM

BACKGROUND:

The relationship between the frequency of high-intensity interval training (HIIT) and the resultant adaptations is largely unclear. PURPOSE:This study compared the effects of different frequencies of HIIT with those of moderate-intensity continuous training (MICT) on body composition in overweight or obese adults. METHODS:

Fifty-six overweight or obese (body mass index = 26.4 ± 2.9) men between 18 and 30 yr old (age = 22.8 ± 3.1 yr) were randomly assigned to the following groups: no-intervention control (CON; n = 14), MICT performed thrice weekly (MICT×3/wk; n = 9), HIIT performed thrice weekly (HIIT×3/wk; n = 14), HIIT performed twice weekly (HIIT×2/wk; n = 10), and HIIT

performed once weekly (HIIT×1/wk; n = 9). Each HIIT session consisted of 12 × 1-min bouts at 90% heart rate reserve, interspersed with 11 × 1-min bouts at 70% heart rate reserve. Aerobic capacity, body composition, resting heart rate, vascular function, insulin resistance, and biomarkers of metabolic syndrome risk factor were examined at baseline, after 4 wk, and after 8 wk of intervention.

RESULTS:

Aerobic capacity and percent fat-free mass significantly increased in all exercise groups compared with those in the CON group (CON vs all exercise groups, $P < 0.05$), whereas body fat mass and systolic blood pressure significantly decreased after 8 wk of intervention in all exercise groups compared with those in the CON group (CON vs all exercise groups, $P < 0.05$). Body fat mass significantly decreased after 4 wk in all HIIT groups compared with those in the CON group (CON vs all HIIT groups, $P < 0.05$) but not in the MICT×3/wk group.
CONCLUSION:

These novel results demonstrated that performing HIIT once weekly, even with a lower weekly volume of exercise, improved cardiorespiratory fitness, body composition, and blood pressure in overweight/obese adults. Low-frequency HIIT might be a feasible and effective strategy for the prescription of an initial exercise program for inactive, overweight, or obese young men.

Med Sci Sports Exerc. 2020 Feb;52(2):323-334

The Effect of Exercise Timing on Glycemic Control: A Randomized Clinical Trial.

Teo SYM, Kanaley JA, Guelfi KJ, Marston KJ, Fairchild TJ.

Despite the acknowledgment of exercise as a cornerstone in the management of type 2 diabetes (T2D), the importance of exercise timing has only recently been considered.

PURPOSE:

This study sought to determine the effect of diurnal exercise timing on glycemic control in individuals enrolled in a 12-wk supervised multimodal exercise training program. A secondary aim was to determine the effect of diurnal exercise timing on the circadian rhythm of wrist skin temperature.

METHODS:

Forty sedentary, overweight adults (mean ± SD, age = 51 ± 13 yr; body mass index = 30.9 ± 4.2 kg·m; women, n = 23) with and without (n = 20) T2D diagnosis were randomly allocated

to either a morning (amEX) or an evening (pmEX) exercise training group. The supervised 12-wk (3 d·wk) program, comprised 30 min of moderate-intensity walking and 4 resistance-based exercises (3 sets, 12-18 repetitions each). Glycemic outcomes (glycated hemoglobin, fasting glucose, postprandial glucose) and wrist skin temperature were assessed at baseline and postintervention.

RESULTS:

Exercise training improved (main effect of time, all $P < 0.01$) all glycemic outcomes; however, this was independent of allocation to either the amEX (Hedge's g, 0.23-0.90) or the pmEX (Hedge's g, 0.16-0.90) group. Accordingly, the adopted exercise training program did not alter the circadian rhythm of skin temperature. When only T2D individuals were compared, amEX demonstrated greater effects (all Hedge's g) on glycated hemoglobin (amEX, 0.57; pmEX, 0.32), fasting glucose (amEX, 0.91; pmEX, 0.53), and postprandial glucose (amEX, 1.12; pmEX, 0.71) but was not statistically different.

CONCLUSIONS:

Twelve weeks of multimodal exercise training improved glycemic control and postprandial glycemic responses in overweight non-T2D and T2D individuals. However, no distinct glycemic benefits or alterations in circadian rhythm were associated with morning versus evening exercise, when performed three times per week in this cohort.

Med Sci Sports Exerc. 2020 Mar;52(3):627-636

Lifelong Physical Activity Determines Vascular Function in Late Postmenopausal Women.

Gliemann L, Rytter N, Tamariz-Ellemann A, Egelund J, Brandt N, Carter HH, Hellsten Y.

INTRODUCTION:

The study evaluated the role of lifelong physical activity for leg vascular function in postmenopausal women (61 ± 1 yr).

METHOD:

The study design was cross-sectional with three different groups based on self-reported physical activity level with regard to intensity and volume over the past decade: inactive (n = 14), moderately active (n = 12), and very active (n = 15). Endothelial-dependent and smooth muscle-dependent leg vascular function were assessed by ultrasound Doppler measurements of the femoral artery during infusion of acetylcholine (Ach), the nitric oxide

(NO) donor sodium nitroprusside and the prostacyclin analog epoprostenol. Thigh muscle biopsies, arterial and venous plasma samples were obtained for assessment of vasodilator systems.

RESULTS:

The very active group was found to have 76% greater responsiveness to Ach compared with the sedentary group accompanied by 200% higher prostacyclin synthesis during Ach infusion. Smooth muscle cell responsiveness to sodium nitroprusside and epoprostenol was not different between groups. The protein amount of endothelial NO synthase and endogenous antioxidant enzymes in muscle tissue was higher in the very active than the inactive group. The moderately active group had a similar endothelial and smooth muscle cell responsiveness as the inactive group. A secondary comparison with a smaller group (n = 5) of habitually active young (24 ± 2 yr) women indicated that smooth muscle cell responsiveness and endothelial responsiveness are affected by age per se.

CONCLUSIONS:

This study shows that leg vascular function and the potential to form prostacyclin and NO in late postmenopausal women, is influenced by the extent of lifelong physical activity.

Prosthet Orthot Int. 2020 Feb;44(1):18-26.

Clinical utility of pressure feedback to socket design and fabrication.

Armitage L, Buller A, Rajan G, Prusty G, Simmons A, Kark L.

BACKGROUND:

The clinical utility of measuring pressure at the prosthetic socket-residual limb interface is currently unknown.

OBJECTIVES:

This study aimed to identify whether measuring interface pressure during prosthetic design and fabrication results in closer agreement in pressure measurements between sockets made by different clinicians, and a reduction in pressure over areas of concern. It also investigated whether clinicians value knowing the interface pressure during the fabrication process.

STUDY DESIGN:

Mixed methods.

METHODS:

Three prosthetists designed a complete prosthetic system for a transtibial residual limb surrogate. Standardised mechanical testing was performed on each prosthetic system to gain pressure measurements at four key anatomical locations. These measurements were provided to the clinicians, who subsequently modified their sockets as each saw fit. The pressure at each location was re-measured. Each prosthetist completed a survey that evaluated the usefulness of knowing interface pressures during the fabrication process.

RESULTS:

Feedback and subsequent socket modifications saw a reduction in the pressure measurements at three of the four anatomical locations. Furthermore, the pressure measurements between prosthetists converged. All three prosthetists found value in the pressure measurement system and felt they would use it clinically.

CONCLUSIONS:

Results suggest that sensors measuring pressure at the socket-limb interface has clinical utility in the context of informing prosthetic socket design and fabrication. If the technology is used at the check socket stage, iterative designs with repeated measurements can result in increased consistency between clinicians for the same residual limb, and reductions in the magnitudes of pressures over specific anatomical landmarks.

CLINICAL RELEVANCE:

This study provides new information on the value of pressure feedback to the prosthetic socket design process. It shows that with feedback, socket modifications can result in reduced limb pressures, and more consistent pressure distributions between prosthetists. It also justifies the use of pressure feedback in informing clinical decisions.

Brain Inj. 2020;34(2):187-194.

Factors associated with the remission of insomnia after traumatic brain injury: traumatic brain injury model systems study.

Lequerica AH, Weber E, Dijkers MP, Dams-O'Connor K, Kolakowsky-Hayner SA, Bell KR, Bushnik T, Goldin Y, Hammond FM.

OBJECTIVE:

To examine the factors associated with the remission of insomnia by examining a sample of individuals who had insomnia within the first two years after traumatic brain injury (TBI) and assessing their status at a secondary time point.

DESIGN & METHODS:

Secondary data analysis from a multicenter longitudinal cohort study. A sample of 40 individuals meeting inclusion criteria completed a number of self-report scales measuring sleep/wake characteristics (Pittsburgh Sleep Quality Index, Epworth Sleepiness Scale, Insomnia Severity Index, Sleep Hygiene Index), fatigue and depression (Multidimensional Assessment of Fatigue, Patient Health Questionnaire-9), and community participation (Participation Assessment with Recombined Tools-Objective). One cohort was followed at 1 and 2 years post-injury (n = 19) while a second cohort was followed at 2 and 5 years post-injury (n = 21).

RESULTS:

Remission of insomnia was noted in 60% of the sample. Those with persistent insomnia had significantly higher levels of fatigue and depression at their final follow-up and poorer sleep hygiene across both follow-up time-points. A trend toward reduced community participation among those with persistent insomnia was also found.

CONCLUSION:

Individuals with persistent post-TBI insomnia had poorer psychosocial outcomes. The chronicity of post-TBI insomnia may be associated with sleep-related behaviors that serve as perpetuating factors.

Brain Inj. 2020 Feb 23;34(3):407-414.

S100B outperforms clinical decision rules for the identification of the intracranial injury on head CT scan after mild traumatic brain injury.

Jones CMC, Harmon C, McCann M, Gunyan H, Bazarian JJ.

OBJECTIVE:

To compare the classification accuracy of S100B to two clinical decision rules- Canadian CT Head Rule (CCHR) and New Orleans Criteria (NOC)-for predicting traumatic intracranial injuries (ICI) after mild traumatic brain injury (mild TBI).

METHODS:

A secondary analysis of a prospective observational study of mild TBI patients was performed. The diagnostic performance of S100B for predicting ICI on head CT was compared to both the CHRR and NOC. Area under receiver operator characteristic (AUC) curves were used and multivariable analysis was used to create a new decision rule based on a combination of S100B and decision rule-related variables.

RESULTS:

S100B had the highest negative predictive value (97.3%), positive predictive value (7.21%), specificity (33.6%) and positive likelihood ratio (1.3), and the lowest negative likelihood ratio (0.5). The proportion of mild TBI subjects with potentially avoidable head CT scans was highest using S100B (37.7%). The addition of S100B to both clinical decision rules significantly increased AUC. A novel decision rule adding S100B to three decision rule-related variables significantly improved prediction ($p < 0.05$).

CONCLUSION:

Serum S100B outperformed clinical decision rules for identifying mild TBI patients with ICI. Incorporating clinical variables with S100Bmaximized ICI prediction, but requires validation in an independent cohort.

Brain Inj. 2020 Mar 20;34(4):556-566.

Long-term mortality and causes of death among patients with mild traumatic brain injury: a 5-year multicenter study.

Sercy E, Orlando A, Carrick M, Lieser M, Madayag R, Vasquez D, Tanner A 2nd, Rubin B, Bar-Or D.

OBJECTIVE:

Undergoing mild traumatic brain injury (mTBI) increases mortality risk, but it is unclear what drives this finding. This study explored associations with mortality in patients with mTBI.

METHODS:

This was a retrospective study of patients with mTBI and controls admitted to six level 1 trauma centers in 1/1/2009-12/31/2013. Mortality data were from the CDC National Death Index. Patients with mTBI were identified by ICD-9 code, Glasgow Coma Scale 13-15, Injury Severity Score (ISS) <16, and loss of consciousness ≤1 hour. Controls had hospital length of stay ≤24 hours, ISS<16, and no head injury.

RESULTS:

This study included 964 patients with mTBI and 5,567 controls. mTBI was associated with a 47% increased 5-year mortality risk (HR = 1.47, 95% CL 1.08-2.01). Patients with mTBI were more likely to die of a neurodegenerative disease (17% vs 11%, $P = .119$). Cardiovascular (HR = 1.80, 95% CL 1.17-2.77), neurological (HR = 3.33, 95% CL 2.07-5.38), and respiratory

(HR = 1.70, 95% CL 1.01-2.86) comorbidities were associated with mortality in patients with mTBI.

CONCLUSIONS:

Patients with mTBI are at increased mortality risk in the 5 years post-injury. Mortality in patients with mTBI was most influenced by preexisting conditions.

Brain Inj. 2020 Apr 15;34(5):595-601.

Accuracy in prediction of long term functional outcomes in patients with traumatic axonal injury: a comparison of MRI scales.

van Eijck MM, Herklots MW, Peluso J, Schoonman GG, Oldenbeuving AW, de Vries J, van der Naalt J, Roks G.

PURPOSE:

Functional outcome prediction for patients with traumatic axonal injury (TAI) is not highly related to the MRI classifications. The aim of this study was to assess the accuracy in predicting functional outcome in patients with TAI with several MRI scoring methods and to define the most accurate method.

METHODS:

Patients with TAI (2008-2014) confirmed on MRI <6 months after injury were included in this retrospective study. Long-term functional outcome was prospectively assessed using the Glasgow Outcome Score Extended. The Gentry classification is most used in clinical practice. This method was compared to methods that score lesion load, lesion locations, and to modified Gentry classifications. The area under the curve (AUC) was calculated for the scoring methods.

RESULTS:

A total of 124 patients with TAI were included, medium follow-up 52 months. The AUC for the Gentry classification was 0.64. All tested methods were poor predictors for functional outcome, except for the 6-location score (area under the curve: 0.71). No method was significantly better than the Gentry classification.

CONCLUSION:

The Gentry classification for TAI correlates with functional outcome, but is a poor predictor for the long-term functional outcome. None of the other tested methods was significantly better.

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Exploratory Randomized Double-Blind Placebo-Controlled Trial of Botulinum Therapy on Grasp Release After Stroke (PrOMBiS)

Amanda Claire Wallace, PhD, Penelope Talelli, PhD, Lucinda Crook, Duncan Austin, MSc, Rachel Farrell, PhD, Damon Hoad, MBBS, Aidan G. O'Keeffe, PhD, Jonathan F. Marsden, PhD, Richard Fitzpatrick, PhD, Richard Greenwood, MD, John C. Rothwell, PhD, David J. Werring, PhD

BACKGROUND:

OnabotulinumtoxinA injections improve upper-limb spasticity after stroke, but their effect on arm function remains uncertain.

OBJECTIVE:

To determine whether a single treatment with onabotulinumtoxinA injections combined with upper-limb physiotherapy improves grasp release compared with physiotherapy alone after stroke.

METHODS:

A total of 28 patients, at least 1-month poststroke, were randomized to receive either onabotulinumtoxinA or placebo injections to the affected upper limb followed by standardized upper-limb physiotherapy (10 sessions over 4 weeks). The primary outcome was time to release grasp during a functionally relevant standardized task. Secondary outcomes included measures of wrist and finger spasticity and strength using a customized servomotor, clinical assessments of stiffness (modified Ashworth Scale), arm function (Action Research Arm Test [ARAT], Nine Hole Peg Test), arm use (Arm Measure of Activity), Goal Attainment Scale, and quality of life (EQ5D).

RESULTS:

There was no significant difference between treatment groups in grasp release time 5 weeks post injection (placebo median = 3.0 s, treatment median = 2.0 s; $t(24) = 1.20$; $P = .24$; treatment effect = −0.44, 95% CI = −1.19 to 0.31). None of the secondary measures passed significance after correcting for multiple comparisons. Both groups achieved their treatment goals (placebo = 65%; treatment = 71%), and made improvements on the ARAT (placebo +3, treatment +5) and in active wrist extension (placebo +9°, treatment +11°).

CONCLUSIONS:

In this group of stroke patients with mild to moderate spastic hemiparesis, a single treatment with onabotulinumtoxinA did not augment the improvements seen in grasp release time after a standardized upper-limb physiotherapy program.

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Anatomical and Functional Characterization in Children with Unilateral Cerebral Palsy: An Atlas-Based Analysis

Claudio L. Ferre, PhD, Jason B. Carmel, MD, PhD, Véronique H. Flamand, PhD

Background.

Variability in hand function among children with unilateral cerebral palsy (UCP) might reflect the type of brain injury and resulting anatomical sequelae.

OBJECTIVE:

We used atlas-based analysis of structural images to determine whether children with periventricular (PV) versus middle cerebral artery (MCA) injuries might exhibit unique anatomical characteristics that account for differences in hand function.

METHODS:

Forty children with UCP underwent structural brain imaging using 3-T magnetic resonance imaging. Brain lesions were classified as PV or MCA. A group of 40 typically developing (TD) children served as comparison controls. Whole brains were parcellated into 198 structures (regions of interest) to obtain volume estimates. Dexterity and bimanual hand function were assessed. Unbiased, differential expression analysis was performed to determine volumetric differences between PV and MCA groups. Principal component analysis (PCA) was performed and the top 3 components were extracted to perform regression on hand function.

RESULTS:

Children with PV had significantly better hand function than children with MCA. Multidimensional scaling analysis of volumetric data revealed separate clustering of children with MCA, PV, and TD children. PCA extracted anatomical components that comprised the 2 types of brain injury. In the MCA group, reductions of volume were concentrated in sensorimotor structures of the injured hemisphere. Models using PCA predicted hand function with greater accuracy than models based on qualitative brain injury type.

CONCLUSIONS:

Our results highlight unique quantitative differences in children with UCP that also predict differences in hand function. The systematic discrimination between groups found in our study reveals future questions about the potential prognostic utility of this approach.

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Position Sense Deficits at the Lower Limbs in Early Multiple Sclerosis: Clinical and Neural Correlates

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OBJECTIVES:

Position sense, defined as the ability to identify joint and limb position in space, is crucial for balance and gait but has received limited attention in patients with multiple sclerosis (MS). We investigated lower limb position sense deficits, their neural correlates, and their effects on standing balance in patients with early MS.

METHODS:

A total of 24 patients with early relapsing-remitting MS and 24 healthy controls performed ipsilateral and contralateral matching tasks with the right foot during functional magnetic resonance imaging. Corpus callosum (CC) integrity was estimated with diffusion tensor imaging. Patients also underwent an assessment of balance during quiet standing. We investigated differences between the 2 groups and the relations among proprioceptive errors, balance performance, and functional/structural correlates.

RESULTS:

During the contralateral matching task, patients demonstrated a higher matching error than controls, which correlated with the microstructural damage of the CC and with balance ability. In contrast, during the ipsilateral task, the 2 groups showed a similar matching performance, but patients displayed a functional reorganization involving the parietal areas. Neural activity in the frontoparietal regions correlated with the performance during both proprioceptive matching tasks and quiet standing.

CONCLUSIONS:

Patients with early MS had subtle, clinically undetectable, position sense deficits at the lower limbs that, nevertheless, affected standing balance. Functional changes allowed correct proprioception processing during the ipsilateral matching task but not during the more demanding bilateral task, possibly because of damage to the CC. These findings provide new insights into the mechanisms underlying disability in MS and could influence the design of neurorehabilitation protocols.

PM R. 2020 Jan;12(1):8-15.

Effectiveness of Phonophoresis Treatment in Carpal Tunnel Syndrome: A Randomized Double-blind, Controlled Trial.

Boonhong J, Thienkul W.

OBJECTIVE:

To determine the effects of phonophoresis of piroxicam (PH-P) and phonophoresis of dexamethasone sodium phosphate (PH-Dex) on mild to moderate carpal tunnel syndrome (CTS), and to compare each of them with the control group of nondrug ultrasound (US) therapy.

DESIGN:

A randomized, double-blind controlled trial.

SETTING:

Department of rehabilitation medicine, university hospital.

PARTICIPANTS:

Patients with clinical signs and symptoms of CTS underwent an electrophysiological study to confirm the diagnosis of CTS and severity grading. Thirty-three patients, 50 hands (52% of the patients had bilateral CTS, n = 17) with mild to moderate CTS were randomly allocated into three study groups: PH-P, PH-Dex, or US.

INTERVENTION:

All three groups received 10 sessions of 1-MHz frequency, 1.0 w/cm^2 intensity ultrasound wave with stroking technique, continuous mode, at the palm side of the hand over the carpal tunnel area-10 minutes per session, two to three times per week for 4 weeks, for a total of 10 sessions. During each session, the patients received 15 cm^3 of study gel according to the study groups. The PH-P group received 0.5% piroxicam gel mixture (equivalence of 20 mg of piroxicam). The PH-Dex group received 0.4% dexamethasone sodium phosphate gel mixture (equivalence 60 mg of dexamethasone). The US group received nondrug gel.

MAIN OUTCOME MEASUREMENTS:

Boston Carpal Tunnel Questionnaire for symptom severity (BCTQ SYMPT), Boston Carpal TunnelQuestionnaire for functional status (BCTQ FUNCT) and electrophysiological parameters of the median nerve including distal sensory latency (DSL) and distal motor latency (DML) were evaluated before the first treatment and after the last treatment.

RESULTS:

After treatment, all treatment groups (PH-P, PH-Dex, and US) showed significant improvements of the BCTQ SYMPT ($P < .001$, -0.74 ± 0.73 [-1.12, -0.37], -0.91 ± 0.96 [-1.41, -0.42], and -0.68 ± 0.71 [-1.05, -0.30], respectively) and the BCTQ FUNCT ($P < .001$, -0.68 ± 0.89 [-1.14, -0.22], -0.74 ± 0.84 [-1.17, -0.30], and -0.80 ± 0.80 [-1.22, -0.37], respectively). For the BCTQ SYMPT, only the PH-Dex showed an improvement score above MCID at 0.8 level [-0.91 ± 0.96]. The improvement of BCTQ FUNCT score of all groups was above Minimal Clincally Important Difference (MCID) at 0.5 level (-0.68 ± 0.89, -0.74 ± 0.84 and -0.80 ± 0.80, respectively).The DSL was decreased in all groups but the changes were not statistically significant ($P = .70$, -0.11 ± 0.34 [-0.28, 0.06], -0.09 ± 0.32 [-0.26, 0.07], and -0.14 ± 0.29 [-0.29, 0.02], respectively). The DML showed decrease only in PH-DEX and the US group but it was not statistically significant ($P = .68$, 0.05 ± 0.44 [-0.17, 0.27], -0.09 ± 0.51[-0.34, 0.17], and -0.27 ± 0.49 [-0.53, 0.01], respectively). All measured outcomes were not statistically different in between-group-comparison of BCTQ SYMPT, BCTQ FUNCT, DSL, and DML ($P = .58$, $P = .79$, $P = .20$ and $P = .39$, respectively). However, there was a clinically significant difference of the improvement of BCTQ SYMPT in between-group comparison; only the PH-DEX was above the MCID level, while the PH-P and US were not.

CONCLUSIONS:

Neither nondrug US nor phonophoresis treatments (PH-P and PH-Dex) were effective to improve the DSL and DML in mild to moderate CTS. All three groups showed significant improvements in clinical symptoms (BCTQ SYMPT) and functional status (BCTQ FUNCT). At 1 MHz frequency and 1.0 w/cm$_2$ intensity of ultrasound wave, there is no statistically significant difference between phonophoresis and the nondrug US.

PM R. 2020 Feb;12(2):119-129.

Spasticity and Pain after Spinal Cord Injury: Impact on Daily Life and the Influence of Psychological Factors.

Tibbett JA, Field-Fote EC, Thomas CK, Widerström-Noga EG.

BACKGROUND:

Spasticity and pain frequently co-occur in persons with spinal cord injury (SCI), yet, how these sequelae interact in daily life is unclear. Additionally, little is known about how psychological factors relate to the perception of spasticity and its impacts on daily life.

OBJECTIVES:

(1) Characterize relationships between spasticity and chronic pain with regard to perceived severity, difficulty dealing, and life interference. (2) Determine the extent to which

perceived spasticity severity and physiological, psychological, and pain-related factors contribute to impacts of spasticity on daily life (difficulty in dealing, life interference). (3) Determine the effects of painful spasticity on aspects of chronic pain and spasticity (severity, life interference, interference with sleep, and spasm duration).

DESIGN:

Observational study.

SETTING:

University laboratory.

PARTICIPANTS:

Twenty participants with SCI and lower extremity spasticity.

METHODS:

Measures included International SCI Pain Basic Data Set, Pain and Spasticity Inventories, Difficulty Dealing with Pain/Spasticity, SCI-Spasticity Evaluation Tool, Connor-Davidson Resilience and Moorong Self-Efficacy Scales, Spinal CordAssessment Tool for Spastic Reflexes, spasm duration, and injury-related and demographic factors. Bivariate correlations, multiple regression analyses, and pairwise comparisons were performed.

RESULTS:

Spasticity and chronic pain were directly related, with respect to perceived severity, difficulty dealing, and life interference (rho = 0.514-0.673, $P < .05$). Shorter injury duration, greater perceived spasticity severity, and greater difficulty dealing with pain explained 61% of variance in difficulty dealing with spasticity. Greater perceived spasticity severity and lower resilience explained 72% of variance in life interference of spasticity. Spasm duration was not significantly associated with perceived spasticity severity. Participants with painful spasticity had significantly greater chronic pain severity ($P = .02$) and sleep-related impact of spasticity ($P = .03$) than participants without painful spasticity.

CONCLUSIONS:

Perceived severity of spasticity, injury duration, ability to deal with chronic pain, resilience, and painful spasms appear to play important roles in the negative impacts of spasticity on life after SCI.

PM R. 2020 Mar;12(3):257-262.

Upper Extremity Rehabilitation Using Fully Immersive Virtual Reality Games With a Head Mount Display: A Feasibility Study.

Lee SH, Jung HY, Yun SJ, Oh BM[1], Seo HG.

BACKGROUND:

Rehabilitation therapy using a virtual reality (VR) system for stroke patients has gained attention. However, few studies have investigated fully immersive VR using a head-mount display (HMD) for upper extremity rehabilitation in stroke patients.

OBJECTIVE:

To investigate the feasibility, preliminary efficacy, and usability of a fully immersive VR rehabilitation program using a commercially available HMD for upper-limb rehabilitation in stroke patients.

DESIGN:

A feasibility study.

SETTING:

Two rehabilitation centers.

PARTICIPANTS:

Twelve stroke patients with upper extremity weakness.

INTERVENTIONS:

Five upper extremity rehabilitation tasks were implemented in a virtual environment, and the participants wore an HMD (HTC Vive) and trained with appropriate tasks. Participants received a total of 10 sessions two to three times a week, consisting of 30 minutes per session.

MAIN OUTCOME MEASURES:

Both patient participation and adverse effects of VR training were monitored. Primary efficacy was assessed using functional outcomes (Action Research Arm Test, Box and Block Test, and modified Barthel Index), before and after the intervention. Usability was assessed using a self-reported questionnaire.

RESULTS:

Three patients discontinued VR training, and nine patients completed the entire training sessions and there were no adverse effects due to motion sickness. The patients who received all sessions showed significant functional improvement in all outcome measures after training ($P < .05$ for all measures). The overall satisfaction was 6.3 ± 0.8 on a 7-point Likert scale in all participants.

CONCLUSIONS:

A fully immersive VR rehabilitation program using an HMD for rehabilitation the upper extremities following stroke is feasible and, in this small study, no serious adverse effects were identified.

J Spinal Cord Med.2020 Jan;43(1):111-121. Satisfaction with access and quality of healthcare services for people with spinal cord injury living in the community.

Ronca E, Scheel-Sailer A, Koch HG, Essig S, Brach M, Münzel N, Gemperli A; SwiSCI Study Group.

OBJECTIVES:

To identify barriers to access healthcare services and reveal determinants of satisfaction with healthcare services in people with chronic spinal cord injury (SCI).

DESIGN:

Cross-sectional survey.

SETTINGS:

Community setting in Switzerland.

PARTICIPANTS:

People with chronic SCI.

INTERVENTIONS:

Non-applicable.

OUTCOME MEASURES:

Questionnaire-based evaluation of availability and quality of healthcare services for secondary health conditions, satisfaction with fulfillment of healthcare needs, and preference for care from a hypothetical service provider with limited specialized SCI care expertise but in close proximity over comprehensive care from an existing specialized SCI center located at a greater distance.

RESULTS:

Close to three-quarter of participants (70%) indicated satisfaction with healthcare services received for SCI related health conditions. Elderly individuals (61+ years old) rated the availability and quality of healthcare 6% to 11% higher than younger individuals. The perceived fulfillment of healthcare needs was lower in people with incomplete paraplegia (odds ratio (OR) 2.11, 95%-credibility interval (CI)

1.18-3.84), chronic pain (OR 1.85, CI 1.12-3.08), insufficient access to long distance transportation (OR 5.81, CI 2.74-12.82), and longer travel distances to specialized SCI centers.

CONCLUSIONS:

Perceived inadequateness of access to healthcare services was partly related to transportation barriers, suggesting that outreach services or support with transportation are possible solutions. People with incomplete paralysis and pain consistently rated the fulfillment of care needs associated with SCI less favorably, pointing to the need for enhanced advocacy for this vulnerable groups.

J Spinal Cord Med. 2020 Mar;43(2):141164

Recommendations for evaluation of neurogenic bladder and bowel dysfunction after spinal cord injury and/or disease.

Tate DG, Wheeler T, Lane GI3, Forchheimer M, Anderson KD, Biering-Sorensen F, Cameron AP, Santacruz BG, Jakeman LB, Kennelly MJ, Kirshblum S, Krassioukov A, Krogh K, Mulcahey MJ, Noonan VK, Rodriguez GM, Spungen AM, Tulsky D, Post MW.

OBJECTIVE:

To provide an overview of clinical assessments and diagnostic tools, self-report measures (SRMs) and data sets used in neurogenic bladder and bowel (NBB) dysfunction and recommendations for their use with persons with spinal cord injury /disease(SCI/D).

METHODS:

Experts in SCI/D conducted literature reviews, compiled a list of NBB related assessments and measures, reviewed their psychometric properties, discussed their use in SCI/D and issued recommendations for the National Institutes of Health (NIH), National Institute of Neurological Disorders and Stroke (NINDS) Common Data Elements (CDEs) guidelines.

RESULTS:

Clinical assessments included 15 objective tests and diagnostic tools for neurogenic bladder and 12 for neurogenic bowel. Following a two-phase evaluation, eight SRMs were selected for final review with the Qualiveen and Short-Form (SF) Qualiveen and the Neurogenic Bowel Dysfunction Score (NBDS) being recommended as supplemental, highly-recommended due to their strong psychometrics and extensive use in SCI/D. Two datasets and other SRM measures were recommended as supplemental.

CONCLUSION:

There is no one single measure that can be used to assess NBB dysfunction across all clinical research studies. Clinical and diagnostic tools are here recommended based on specific medical needs of the person with SCI/D. Following the CDE for SCI studies guidelines, we recommend both the SF-Qualiveen for bladder and the NBDS for bowel as relatively short measures with strong psychometrics. Other measures are also recommended. A combination of assessment tools (objective and subjective) to be used jointly across the spectrum of care seems critical to best capture changes related to NBB and develop better treatments.

Spinal Cord. 2020 Jan;58(1):53-57.

The time course of dysphagia following traumatic cervical spinal cord injury: a prospective cohort study.

Hayashi T, Fujiwara Y, Sakai H, Kubota K, Kawano O, Mori E, Takao T, Masuda M, Morishita Y, Maeda T.

STUDY DESIGN:

Prospective cohort study.

OBJECTIVES:

To elucidate serial changes in dysphagia and elucidate the critical period for dysphagia following acute traumatic cervicalspinal cord injury (CSCI).

SETTING:

Spinal Injuries Center, Fukuoka, Japan.

METHODS:

We prospectively examined individuals with acute traumatic CSCI admitted within 2 weeks after injury. Severity of dysphagia was evaluated using both the dysphagia severity scale (DSS) and functional oral intake scale (FOIS) at 2 weeks, 1 month, 2 months, and 3 months after injury. Condition of oral intake before injury was assessed by history taking. American Spinal Injury Association (ASIA) impairment scale grade and motor scores were also assessed at the same timepoints, and the correlation between dysphagia and paresis was analyzed.

RESULTS:

Sixty-five individuals with CSCI were assessed consecutively for 3 months after injury. Swallowing function, evaluated using both the DSS and FOIS, was significantly decreased at 2 weeks after injury, but significantly improved thereafter. Significant correlations between severity of dysphagia (DSS and FOIS scores) and motor scores were found at 2 weeks

after injury ($r_s = 0.66$ and 0.61; $p < 0.001$ and $p < 0.001$, respectively), indicating that individuals with lower motor scores had more severe swallowing dysfunction.

CONCLUSIONS:

Dysphagia occurred immediately after injury, but gradually improved over time. Individuals with more severe paralysis had significantly more severe dysphagia. Special attention for dysphagia should be paid to individuals with severe paralysis in acute phase.

Spinal Cord. 2020 Feb;58(2):216-223.

The effects of two periods of rehabilitation for people with spinal cord injury from Sha nghai, China.

Chang F[1], Zhang Q[2], Xie H[3], Yang Y[1], Shen C[3], Shen X[3], Chen G[1], Wu A[3], Wang H[3], Li X[1], Lu J[4].

STUDY DESIGN:

Retrospective cohort study.

OBJECTIVES:

To evaluate the effects of two periods of rehabilitation among people with spinal cord injury(SCI).

SETTING:

Shanghai Sunshine Rehabilitation Center (SSRC), China.

METHODS:

A total of 130 people with SCI who received two periods of rehabilitation participated in the study. Outcome measures included basic life skills (15 items) and their applications in family and social life (8 items). Six factors were identified from the 23 items by factor analysis: self-care and transfer skills; basic life skills application in social life; cognition and emotion; basic life skills application in family life; walking and climbing stairs; and wheelchair skills. Standardized scores ranging from 0 to 100 were used to show the rehabilitation outcome in a histogram.

RESULTS:

Median scores for self-care and transfer skills, wheelchair skills, cognition and emotion, and their applications in family and social life improved significantly (7-80%, $p < 0.01$) over the first rehabilitation period, while no improvement was observed in walking and climbing stairs. Five factors showed a significant sustained effect ($p < 0.01$) upon admission to the second rehabilitation period, except walking and climbing stairs. By enrolling in the second period of rehabilitation, participants acquired significant additional improvement (5-43%,

$p < 0.01$) in rehabilitation outcomes, except in cognition and emotion, walking and climbing stairs.

CONCLUSIONS:

Two periods of rehabilitation were efficacious at increasing the abilities of basic life skills and their applications in family and social life. The potential benefits of continuous rehabilitation merit further research.

Spinal Cord. 2020 Mar;58(3):341-347

Serum cystatin C is increased in acute spinal cord injury: a multicentre retrospective study.

Zhang J, Ding R, Xian Q, Wang Z, Liu Z, Yang J, Chen J.

STUDY DESIGN:

A multicentre retrospective study.

OBJECTIVE:

A multicentre retrospective study was performed to observe the changes in serum cystatin C (CysC) levels in patients with acute spinal cord injury (SCI).

SETTING:

Four hospitals in China.

METHODS:

Over a 5-year study period, the CysC, creatinine (Cr), and blood urea nitrogen (BUN) levels of people who had incurred SCI in the preceding 7 days were collected and compared with those of people with limb fracture (LF) who were matched for injury time and gender. People with SCI also were grouped by injury duration, ASIA Impairment Scale (AIS) grade and the presence or absence of steroid therapy and compared each day.

RESULTS:

Three hundred and twenty-three samples from people with SCI were retrospectively collected; their mean serum CysC levels were significantly higher than those of people with LF ($p < 0.001$); No significant difference was observed in Cr or BUN levels between the two groups ($p > 0.14$). CysC levels increased on the second day, peaked on day 3, and returned to normal on day 5. The more severely injured individuals had higher CysC levels. Steroid therapy or not had no influence for CysC levels.

CONCLUSION:

CysC levels are increased in patients with acute SCI, possibly as a direct result of injury. Serum CysC is a potential biomarker of SCI.