PMR BUZZ

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"Medicine is a science of uncertainty and an art of probabilty."

~ William Osler

Preface

In line with the previous edition of our PMR buzz, an abstract review in an electronic form comprising inputs from well-known current journals covering various fields in rehabilitation medicine.

This is fourth edition, and with this we welcome a new contributor Dr Harleen Uppal, Assistant Professor at Dr Baba Saheb Ambedker Medical College & Hospital, New Delhi. As we move forward we strive to be better than the last but feedbacks will help us to be even better. So keep us posted with your ideas, and we will grab the most feasible and bright.

We have selected one abstract from each volume of these journals published in the preceeding quarter 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"**.

- Dr. Mrinal Joshi

Contributors:

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The effects of lower extremity deep sensory impairments on walking capability in patients with incomplete cervical spinal cord injury

Tomoki Naka, Tetsuo Hayashi, Atsushi Sugyo, Ryouichi Watanabe, Fumihiro Towatari, Takeshi Maeda
J Spinal Cord Med. 2020 Jul 23;1-6.

Objective

To analyze the impact of lower extremity deep sensory impairment on the walking capability of patients with incomplete cervical spinal cord injury.

Design

Retrospective cohort study.

Setting

Spinal Injuries Center, Fukuoka, Japan.

Participants

Patients with incomplete cervical spinal cord injury who were transferred to the Spinal Injuries Center within 2 weeks of injury and whose progress was monitored for 6 months postinjury were included. Sixty-three patients with a lower extremity motor score of 42 points or more were enrolled. They were divided into lower extremity deep sensory impairment (16 patients) and normal (47 patients) groups, and their walking capability was compared.

Interventions

Not applicable.

Outcome Measures

Upper and lower extremity motor scores, the presence or absence of deep sensation impairment, and walking capability indices at 6 months postinjury were evaluated.

Results

The deep sensory impairment group performed significantly worse than the normal group across items in the Walking Index for Spinal Cord Injury II and in the indoor and outdoor mobility items of the Spinal Cord Independence Measure III. Indoor and outdoor mobility independence levels decreased further in the lower extremity deep sensory impairment group than in the normal group.

Conclusions

The presence of lower extremity deep sensation impairments was an important factor affecting the achievement of independent walking capabilities in patients with incomplete cervical spinal cord injury. Hence, when patients with incomplete cervical spinal cord injury undergo walking training, not only their lower extremity muscle strength but also their level of deep sensation impairment must be evaluated.

Frequency of turning in bed at home in persons with chronic spinal cord injury

Fatma Eren, Robert DeLuca, Steven Kirshblum
J Spinal Cord Med. 2020 Aug 18;1-5.

Objective:

To determine the routine turning frequency of persons with chronic spinal cord injury (SCI) in bed at night in their home environment.

Design:

An online questionnaire consisting of 22 questions.

Setting:

Free standing SCI rehabilitation facility.

Participants:

Persons between ages 18-75 with a traumatic SCI for ≥3 months, and living at home.

Interventions:

None.

Outcome measures:

Questionnaire-based evaluation of turning frequency of persons with SCI.

Results:

86 subjects (70 men) with traumatic SCI completed the survey; 66.3% with tetraplegia and 41.9% with a neurological complete SCI. Almost every participant (96%) recalled being counseled on the importance of turning in bed at night upon discharge from their rehabilitation facility with 48.4% recalling the frequency recommended as every 2 h. At present, 25.6% of subjects reported turning every 2 h, 15.1% every 3 h, 15.1% every 4 h, 3.5% every 6 h, and 40.7% of respondents stated that they do not turn regularly at night.

Conclusion:

Although frequently recommended for repositioning at night in bed every two hours for persons with chronic SCI, especially for those at risk for pressure injuries, only 25.6% of individuals report turning at this frequency and 40.7% report not turning at night time regularly. The reasons for limited turning may be multi-factorial, however, this finding may serve as a call to practitioners to best determine the most appropriate turning frequency that can meet compliance of the individual with SCI, as well as maintain skin protection in the chronic period after injury.

Implementing a self-management mobile app for spinal cord injury during inpatient rehabilitation and following community discharge: A feasibility study

Megan K MacGillivray, Mahsa Sadeghi, Patricia B Mills, Jared Adams, Bonita J Sawatzky, W Ben Mortenson
J Spinal Cord Med. 2020 Sep;43(5):676-684.

Objective:

To determine the feasibility of implementing and evaluating a self-management mobile app for spinal cord injury (SCI) during inpatient rehabilitation and following community discharge.

Design:

Pilot feasibility study.

Setting:

Rehabilitation hospital and community.

Participants:

Inpatients from rehabilitation hospital following admission for their first SCI.

Intervention:

A mobile app was developed to facilitate self-management following SCI. The app consisted of 18 tools focusing on goal setting, tracking various health aspects, and identifying confidence regarding components of self-management. In-person training and follow-up sessions were conducted during inpatient rehabilitation and follow-up calls were provided after participants were discharged into the community.

Main outcome measures: Participants completed outcome measures at baseline, community discharge, and 3-months post discharge. This study focused on feasibility indicators including recruitment, retention, respondent characteristics, adherence, and app usage. Additionally, participants' self-management confidence relating to SCI (e.g. medication, skin, bladder, pain) was evaluated over time.

Results:

Twenty participants (median age 39, IQR: 31 years, 85% male) enrolled in the study. Participants' Spinal Cord Injury Independence Measure (SCIM-III) median score was 23 and IQR was 33 (range: 7-84), which did not correlate with app usage. Retention from admission to discharge was 85% and 70% from discharge to 3-months post discharge. Individuals in the study who used the app entered data an average of 1.7x/day in rehabilitation (n = 17), and 0.5x/day in the community (n = 7). Participants' bowel self-management confidence improved between admission and discharge ($P < 0.01$).

Conclusions:

Feasibility indicators support a larger clinical trial during inpatient rehabilitation; however, there were challenges with retention and adherence following community discharge.

A scoping review of trials for cell-based therapies in human spinal cord injury

Alice G. Willison, Sam Smith, Benjamin M. Davies, Mark R. N. Kotter, Susan C. Barnett
Spinal Cord 58, 844–856 (2020).

Introduction:

Spinal cord injury (SCI) is associated with significant and life-long disability. Yet, despite decades of research, no regenerative treatment has reached clinical practice. Cell-based therapies are one possible regenerative strategy beginning to transfer to human trials from a more extensive pre-clinical basis.

Methods:

We therefore conducted a scoping review to synthesise all cell-based trials in SCI to consider the current state of the field and the cell transplant type or strategy with greatest promise. A search strategy of MEDLINE returned 1513 results. All clinical trials including adult human patients with acute or chronic, compete or incomplete SCI and a recorded ASIA score were sought. Exclusion criteria included non-traumatic SCI, paediatric patients and animal studies. A total of 43 studies, treating 1061 patients, were identified. Most trials evaluated cells from the bone marrow (22 papers, 660 patients) or the olfactory bulb (10 papers, 245 patients).

Results:

Cell transplantation does appear to be safe, with no serious adverse effects being reported in the short-term. 86% of trials described efficacy as a primary outcome. However, varying degrees of outcome reporting prevented meta-analysis. No emerging cell type or technique was identified. The majority of trials, 53%, took place in developing countries, which may suggest more stringent regulatory requirements within Western countries.

Conclusion:

We believe cell-based transplantation translation remains in its infancy and that, although further robust clinical research is required, it is an important strategy to consider in the treatment of SCI.

Gait rehabilitation in persons with spinal cord injury using innovative technologies: an observational study

Giulia Stampacchia, Matteo Olivieri, Alessandro Rustici, Carla D'Avino, Adriana Gerini, Stefano Mazzoleni
Spinal Cord 58, 988–997 (2020).

Study design:

Prospective, quasi-experimental study, pre- and post-design, single arm study.

Objectives:

Investigate whether persons affected by SCI can safely experience walking function using Robotic Exoskeletons and Functional Electrical Stimulation (FES).

Setting:

Inpatient

Methods:

52 persons with SCI were recruited (36 completed the protocol) and assigned to one of two groups based on their Lower Limb Motor Scores (LEMS): Group A: LEMS $\geq$ 10 and Group B: LEMS < 10. Participants in Group A (n = 19) underwent 20 sessions of Robot-Assisted Gait Training (RAGT) on a treadmill followed by 20 sessions of FES during Overground Gait (FES-OG). Participants in Group B (n = 17) received 20 sessions of FES-cycling followed by 20 sessions of overground RAGT. The main outcome measures were: WISCI-II, 10MWT, 6MWT, TUG and SCIM-II.

Results:

36 persons completed the study with no complications; only 4 of the 16 dropped out because of mild complications during the RAGT. Participants in Group A exhibited significant improvements in WISCI-II, 10MWT, 6MWT and TUG ($p < 0.05$), while those in Group B did not significantly improve their gait function but their walking velocity and resistance with the assistance of the robotic exoskeleton increased. SCIM-II scores increased followed therapy only in Group A.

Conclusions:

Persons affected by SCI can safely experience their walking function with RAGT and FES therapy; only few mild complications were observed. Our data provides initial evidence of the potential value of these technologies, especially in persons with SCI having LEMS > 10.

Creation and validation of a new tool for the monitoring efficacy of neurogenic bowel dysfunction treatment on response: the MENTOR tool

Anton Emmanuel, Klaus Krogh, Steven Kirshblum, Peter Christensen, Michele Spinelli, Dirk van Kuppevelt, Rainer Abel, Dietrich Leder, Bruno Gallo Santacruz, Kimberly Bain, Valentina Passananti
Spinal Cord 58, 795–802 (2020).

Study design:

Prospective observational study.

Objectives:

A tool to help decision-making tool for Neurogenic Bowel Dysfunction (NBD) in individuals with SCI is needed. We present a project to create and validate a new tool, the Monitoring Efficacy of NBD Treatment On Response (MENTOR), and to determine its level of concordance with decisions made by experienced clinicians in the field.

Setting:

UK, Denmark, USA, Italy, The Netherlands, Germany.

Methods:

The first phase was creation of the tool through a modified Delphi process. The second phase was the validation, wherein individuals with spinal cord injury with NBD were asked to complete the MENTOR tool immediately prior to clinic consultation. From the responses to the questionnaire of the tool, each participant was allocated into one of three categories reflecting the possible therapeutic recommendations ("recommend change", "further discussion" and "monitoring"). An expert clinician then assessed the participant, blinded to MENTOR results, and made an independent treatment decision.

Results:

A total of 248 MENTOR forms were completed. Strong agreement was found when the MENTOR tool recommended monitoring (92%) or treatment change (83%); the lowest concordance when the decision was for the "further discussion" option (59%). Patient acceptability was reported by 97% of individuals.

Efficacy of Manual Therapy on Pain, Impact of Disease, and Quality of Life in the Treatment of Fibromyalgia: A Systematic Review

Nina B. Schulze, Marianna de Melo Salemi, Geisa G. de Alencar, Marcela C. Moreira, Gisela R. de Siqueira
Pain Physician 2020; 23:461-475.

Background:

Myofascial mobilization has been used as an intervention for patients with fibromyalgia (FM) for acting on ascending nociceptive pathways possibly involved in the central sensitization process, modulating the pain experience. However, there is still a gap in its efficacy compared with another hands-on approach because manual therapy has nonspecific effects, such as placebo.

Objectives:

This systematic review aims to review the scientific literature for an overview of the efficacy of manual therapy in pain, disease impact, and quality of life in patients with FM compared with control or other treatments through randomized clinical trials.

Study Design:

This study involved systematic review of published randomized controlled trials (RCTs).

Setting:

This study examined all RCTs evaluating the effect of manual therapy on pain, impact of disease, and quality of life for patients with FM.

Methods:

Systematic review. The research was performed in 9 databases: MEDLINE/PubMed, CINAHL, Web of Science, Scopus, ScienceDirect, Lilacs, SciELO, PEDro, and Cochrane. Searches were carried out from the end of the project until September 2019, with no language and year restrictions. Randomized controlled clinical trials that used the following outcome measures were included: Visual Analog Scale, Fibromyalgia Impact Questionnaire, and SF-36 Quality of Life Questionnaire. The risk of bias and quality of studies was assessed using the PEDro scale; the Cochrane risk-of-bias tool; and Grading of Recommendations Assessment, Development, and Evaluation System.

Results:

Seven studies were included (368 patients). The quantitative analysis was performed on 4 studies because of the lack of data in the others. Myofascial release was the most used modality. The level of evidence ranged from very low to moderate, mainly because of the inconsistency and inaccuracy of results.

Limitations:

The present systematic review presented limitations because of the heterogeneity of the included studies and only a short-term analysis of the intervention results. It was observed that other information, such as pressure, repetition, and/or sustaining manual therapy techniques, could be better described in future protocols, aiming at a better comparison between the techniques and their subsequent reproducibility.

Conclusions:

Current evidence of manual therapy in patients with FM, based on a very low to moderate quality of evidence, was inconclusive and insufficient to support and recommend the use of manual therapy in this population. To date, only general osteopathic treatment has achieved clinically relevant pain improvement when compared with control.

Triaging Interventional Pain Procedures During COVID-19 or Related Elective Surgery Restrictions: Evidence-Informed Guidance from the American Society of Interventional Pain Physicians (ASIPP)

Christopher Gharibo, Amit Sharma, Amol Soin, Shalini Shah, Kartic Rajput, Sudhir Diwan, Ricardo Buenaventura, Devi E. Nampiaparampil, Steve M. Aydin, Sanjay Bakshi, Salahadin Abdi, Sachin Sunny Jha, Harold J. Cordner, Alan D. Kaye, Alaa Abd-Elsayed, Kenneth D. Candido, Nebojsa Nick Knezevic, Sairam Atluri, Bradley W. Wargo, Mahendra R. Sanapati, Sukdeb Datta, Joshua A. Hirsch, Laxmaiah Manchikanti
Pain Physician 2020; 23:S183-S204

Background:

The COVID-19 pandemic has worsened the pain and suffering of chronic pain patients due to stoppage of "elective" interventional pain management and office visits across the United States. The reopening of America and restarting of interventional techniques and elective surgical procedures has started. Unfortunately, with resurgence in some states, restrictions are once again being imposed. In addition, even during the Phase II and III of reopening, chronic pain patients and interventional pain physicians have faced difficulties because of the priority selection of elective surgical procedures.

Chronic pain patients require high intensity care, specifically during a pandemic such as COVID-19. Consequently, it has become necessary to provide guidance for triaging interventional pain procedures, or related elective surgery restrictions during a pandemic.

Objectives:

The aim of these guidelines is to provide education and guidance for physicians, healthcare administrators, the public and patients during the COVID-19 pandemic. Our goal is to restore the opportunity to receive appropriate care for our patients who may benefit from interventional techniques.

Methods:

The American Society of Interventional Pain Physicians (ASIPP) has created the COVID-19 Task Force in order to provide guidance for triaging interventional pain procedures or related elective surgery restrictions to provide appropriate access to interventional pain management (IPM) procedures in par with other elective surgical procedures.

In developing the guidance, trustworthy standards and appropriate disclosures of conflicts of interest were applied with a section of a panel of experts from various regions, specialties, types of practices (private practice, community hospital and academic institutes) and groups. The literature pertaining to all aspects of COVID-19, specifically related to epidemiology, risk factors, complications, morbidity and mortality, and literature related to risk mitigation and stratification was reviewed. The evidence -- informed with the incorporation of the best available research and practice knowledge was utilized, instead of a simplified evidence-based approach. Consequently, these guidelines are considered evidence-informed with the incorporation of the best available research and practice knowledge.

Results:

The Task Force defined the medical urgency of a case and developed an IPM acuity scale for elective IPM procedures with 3 tiers. These included emergent, urgent, and elective procedures. Examples of emergent and urgent procedures included new onset or exacerbation of complex regional pain syndrome (CRPS), acute trauma or acute exacerbation of degenerative or neurological disease resulting in impaired mobility and inability to perform activities of daily living. Examples include painful rib fractures affecting oxygenation and post-dural puncture headaches limiting the ability to sit upright, stand and walk. In addition, urgent procedures include procedures to treat any severe or debilitating disease that prevents the patient from carrying out activities of daily living. Elective procedures were considered as any condition that is stable and can be safely managed with alternatives.

Limitations:

COVID-19 continues to be an ongoing pandemic. When these recommendations were developed, different stages of reopening based on geographical regulations were in process. The pandemic continues to be dynamic creating every changing evidence-based guidance. Consequently, we provided evidence-informed guidance.

Conclusion:

The COVID-19 pandemic has created unprecedented challenges in IPM creating needless suffering for pain patients. Many IPM procedures cannot be indefinitely postponed without adverse consequences. Chronic pain exacerbations are associated with marked functional declines and risks with alternative treatment modalities. They must be treated with the concern that they deserve. Clinicians must assess patients, local healthcare resources, and weigh the risks and benefits of a procedure against the risks of suffering from disabling pain and exposure to the COVID-19 virus.

Microscopic Study of Injectable Steroids: Effects of Postmixing Time on Particle Aggregation

Jorge M. Orduña-Valls, David L. Cedeno, Carlos Nebreda-Clavo, Carlos Tornero-Tornero, Julián Álvarez-Escudero, Mireya Ferrandis Martinez, Alfonso A. Valverde-Navarro, Amparo Ruiz-Sauri
Pain Physician 2020; 23:E417-E424.

Background:

Epidural steroid injection (ESI) is a common practice for pain treatment since 1953. In 2014, the FDA issued a warning about ESI. Studies have focused on the effect of the particle size and their ability to generate harmful aggregates. Although steroid aggregates provide longer times for reabsorption, therefore a longer anti-inflammatory effect, they are potentially harmful to the central nervous system via embolic mechanisms.

Previous studies have established that steroidal aggregates with asizes over 100 μm are potentially able to occlude blood vessels. Studies by Tiso et al and Benzon et al addressed the role of steroids on CNS adverse events, with similar outcomes. The main difference was on the role of aggregates with a size over 100 μm, which Benzon et al. attributed to the ability of certain steroid preparations to rapidly precipitate and form large aggregates.

Objectives:

Studying the effect of the time elapsed between mixing the steroid preparation and injection on the number and size of aggregates with sizes above 100 μm.

Study Design:

Original study in basic science.

Setting:

Basic science.

Methods:

Steroids evaluated are commonly used in Spain for ESI: betamethasone, triamcinolone, and dexamethasone. The size and number of the aggregates was determined for undiluted commercial steroid preparations in the usual amount for a single and double dosage used for ESI.

Samples were examined with a Leica TCS-SP2 microscope at the first, the fifth and the 30th minute after shaking the preparations. Aggregates observed in the different preparations were manually counted and grouped in the following size range: 0-20, 20-50, 50-100, 100-300, 300-500 and > 500 μm.

Statistical analysis was carried out using the R software. Nonparametric techniques were used in the comparison of aggregate size. Global comparison of the groups using the Kruskal-Wallis test and post-hoc comparisons using the Wilcoxon test, adjusting P-values by the Holm method for multiple comparisons.

Results:

Aggregates present in triamcinolone and betamethasone samples were statistically larger than in dexamethasone samples. Triamcinolone suspensions produced significantly larger aggregates than betamethasone five minutes after mixing. Triamcinolone preparations produced greater particle aggregates (> 500 μm), which were not present in dexamethasone and betamethasone preparations.

Limitations:

Study how the human internal factors like blood elements and spinal fluid could interact with steroids and influence the size of the aggregates formed.

Conclusions:

This study demonstrates that the size of the particles injected depends on the type of steroid and the time allowed between mixing and injecting. The results demonstrate that waiting longer than 5 minutes between mixing and injecting can predispose the formation of potentially harmful aggregates in triamcinolone and betamethasone samples. The presence of greater particle aggregates (> 500 μm) may occlude some important vessels and arteries with serious adverse results. Vigorous shaking of the injectable could prevent such events.

A Randomized Double-Blind Controlled Pilot Study Comparing Leucocyte-Rich Platelet-Rich Plasma and Corticosteroid in Caudal Epidural Injection for Complex Chronic Degenerative Spinal Pain

Ricardo Ruiz-Lopez, Yu-Chuan Tsai
Pain Pract. 2020 Jul;20(6):639-646.

Objectives:

To compare the efficacy and safety between leucocyte-rich platelet-rich plasma (LR-PRP) and corticosteroid in fluoroscopically guided caudal epidural injection for patients with complex chronic lumbar spinal pain.

Study Design:

A prospective randomized controlled double-blinded study.

Methods:

Fifty eligible patients with complex chronic degenerative spinal pain were randomly assigned with a 1:1 allocation ratio to receive caudal epidural injection of corticosteroid (triamcinolone acetonide, 60 mg) or LR-PRP (isolated from 60 mL autologous blood) under fluoroscopic guidance. Levels of low back pain, quality of life, and complications (or adverse effects) were evaluated at 1, 3, and 6 months after treatment. Pain levels and quality of life were assessed using the VAS and Short Form 36-Item Health Survey (SF-36), respectively.

Results:

No significant difference was shown at baseline between the 2 groups. Compared with the pretreatment values, there were significant reductions in the VAS score in both groups. A significantly lower VAS score at 1-month follow-up was detected in patients who received corticosteroid injection. However, the scores were lower in the LR-PRP group at 3- and 6-month follow-up. SF-36 responses at 6 months showed significant improvement in all domains in the LR-PRP group. There were no complications or adverse effects related to treatment at 6-month follow-up in either group.

Conclusions:

Both autologous LR-PRP and corticosteroid for caudal epidural injections under fluoroscopic guidance are equally safe and therapeutically effective in patients with complex chronic lumbar spinal pain. However, LR-PRP is superior to corticosteroid for a longer pain-relieving effect and improvement in quality of life.

Remote rehabilitation for patients with covid-19

Tomoko Sakai, Chisato Hoshino, Reiko Yamaguchi, Masanobu Hirao, Rui Nakahara, Atsushi Okawa,
Journal of Rehabilitation Medicine, Sept. 2020;52(9):jrm00096

Objective:

To describe the effectiveness and risk management of remote rehabilitation for coronavirus disease (COVID-19) patients in general wards.

Design:

Single-centre, retrospective, observational study.

Patients:

COVID-19 patients undergoing rehabilitation (24 April to 24 May 2020).

Methods:

All COVID-19 in patients undergoing rehabilitation in the general ward of Tokyo Medical and Dental University were assessed. Data were collected on age, sex, physical ability, rehabilitation modality (remote/direct), need for intubation or extracorporeal membrane oxygenation, degree of pneumonia, oxygen therapy from the start of rehabilitation, D-dimer and C-reactive protein levels, and rehabilitation-related complications. Activities of daily living were measured using the Barthel Index.

Results:

Out of a total of 43 patients, 14 were initially provided with remote rehabilitation and 29 with direct (hands-on) rehabilitation. Four patients were switched from direct to remote rehabilitation during the study, thus at the end of the study there were 18 in the remote rehabilitation group and 25 in the direct rehabilitation group. Patients in remote rehabilitation were significantly younger than those in direct rehabilitation. Of 12 patients who required intubation, 3 were given remote rehabilitation. One extracorporeal membrane oxygenation survivor underwent direct rehabilitation. All patients on remote rehabilitation were discharged home or to a hotel. Twelve out of 29 patients on direct rehabilitation were transferred to a rehabilitation hospital due to delayed recovery of activities of daily living. No serious adverse events occurred.

Conclusion:

Effective and safe remote rehabilitation was performed in 41.9% of COVID-19 patients in this study, which resulted in which facilitated rehabilitation in COVID-19 specialized general wards.

Outcomes of amputation due to long-standing therapy-resistant complex regional pain syndrome type I

Jan H.B. Geertzen, Jelmer Scheper, Ernst Schrier, Pieter U. Dijkstra
Journal of Rehabilitation Medicine August. 2020; 52(8): jrm00087

Objective:

To assess long-term outcomes of amputation in patients with long-standing therapy resistant Complex regional pain syndrome type I (CRPS-I).

Design:

Partly cross-sectional, partly longitudinal study.

Subjects:

Patients who had amputation of a limb due to long-standing, therapy-resistant CRPS-I, at the University Medical Centre Groningen, The Netherlands, between May 2000 and September 2015 (n = 53) were invited to participate.

Methods:

Participants were interviewed in a semi structured way regarding mobility, pain, recurrence of CRPS-I, quality of life, and prosthesis use. Those who reported recurrence of CRPS-I underwent physical examination.

Results:

A total of 47 patients (median age at time of amputation, 41.0 years; 40 women) participated. Longitudinal evaluation was possible in 17 participants. Thirty-seven participants (77%) reported an important improvement in mobility (95% confidence interval (95% CI) 63; 87%). An important reduction in pain was reported by 35 participants (73%; 95% CI 59; 83%). CRPS-I recurred in 4 of 47 participants (9%; 95% CI 3; 20%), once in the residual limb and 3 times in another limb. At the end of the study of the 35 participants fitted with a lower limb prosthesis, 24 were still using the prosthesis. Longitudinal evaluation showed no significant deteriorations.

Conclusion:

Amputation can be considered as a treatment for patients with long-standing, therapy resistant CRPS-I. Amputation can increase mobility and reduce pain, thereby improving the quality of patients' lives. However, approximately one-quarter of participants reported deteriorations in intimacy and self-confidence after the amputation.

Health-related quality of life and cardiac rehabilitation: does body mass index matter?

Iris Den Uijl, Nienke Ter Hoeve, Madoka Sunamura, Henk J. Stam, Mattie J. Lenzen, Victor J. Van Den Berg, Eric Boersma, and Rita J. G. Van Den Berg-Emons
Journal of rehabilitation medicine july. 2020; 52(7): jrm00083

Objective:

To investigate the relation between body mass index class and changes in health-related quality of life in patients participating in cardiac rehabilitation.

Design:

Prospective cohort study.

Patients:

A total of 503 patients with acute coronary syndrome.

Methods:

Data from the OPTICARE trial were used, in which health-related quality of life was measured with the MacNew Heart Disease HRQOL Instrument at the start, directly after, and 9 months after completion of cardiac rehabilitation. Patients were classed as normal weight, overweight, or obese.

Results:

During cardiac rehabilitation, global health related quality of life improved in patients in all classes of body mass index. Patients classed as overweight had a significantly greater improvement in social participation than those classed as normal weight (5.51–6.02 compared with 5.73–5.93, respectively; difference in change 0.30, $p = 0.025$). After completion of cardiac rehabilitation, health-related quality of life continued to improve similarly in patients in all classes of body mass index.

Conclusion:

Health-related quality of life improved during cardiac rehabilitation in patients of all classes of body mass index. Patients classed as overweight showed the greatest improvement. The beneficial effects were maintained during extended follow-up after completion of cardiac rehabilitation.

Glycogen Utilization during Running: Intensity, Sex, and Muscle-Specific Responses

Impey, Samuel G.; Jevons, Emily; Mees, George
Medicine & Science in Sports & Exercise. September 2020;52(9):1966-1975

Purpose:

This study aimed to quantify net glycogen utilization in the vastus lateralis (VL) and gastrocnemius (G) of male (n = 11) and female (n = 10) recreationally active runners during three outdoor training sessions.

Methods:

After 2-d standardization of carbohydrate intakes (6 g•kg□1 body mass per day), glycogen was assessed before and after 1) a 10-mile road run (10-mile) at lactate threshold, 2) 8 x 800-mtrack intervals (8 x 800m) at velocity at V□ O2max, and 3) 3 x10-min track intervals (3 x 10 min) at lactate turn point.

Results:

Resting glycogen concentration was lower in the G of female compared with males (P < 0.001) runners, although no sex differences were apparent in the VL (P = 0.40).Within the G and VL of male runners, net glycogen utilization differed between training sessions where 10miles was greater than both track sessions (all comparisons, P < 0.05). In contrast, net glycogen utilization in female runners was not different between training sessions in either muscle (all comparisons, P > 0.05). Net glycogen utilization was greater in male than in female runners in both VL (P = 0.02) and G (P = 0.07) during the 10-mile road run. With the exception of male runners during the 3 10-min protocol (P = 0.28), greater absolute glycogen utilization was observed in the G versus the VL muscle in both male and female runners and during all training protocols (all comparisons, P < 0.05).

Conclusion:

Data demonstrate that 1) prolonged steady-state running necessitates a greater glycogen requirement than shorter but higher-intensity track running sessions, 2) female participants display evidence of reduced resting muscle glycogen concentration and net muscle glycogen utilization when compared with male participants, and 3) net glycogen utilization is higher in the G muscle compared with the VL.

Sitting-induced endothelial dysfunction is prevented in endurance-trained Individuals

Morishima, Takuma; Tsuchiya, Yosuke; Ueda, Hisashi
Medicine & Science in Sports & Exercise., August 2020;, 52(8):1770-1775.

Purpose:

Prolonged sitting impairs leg endothelial function, which seems to be mediated by a sustained reduction in blood flow-induced shear stress. However, whether regular endurance training is effective in preventing sitting-induced leg endothelial dysfunction remains largely unknown. Herein, we tested the hypothesis that sitting induced leg endothelial dysfunction is prevented in high endurance-trained individuals.

Methods:

The endurance-trained group comprised 10 male collegiate cyclists, and the untrained group comprised nine men with no regular endurance training. Peak oxygen uptake (V O2peak) was initially determined in all participants using incremental exercise test (37.9 ± 4.7 mL min 1 kg 1 in the untrained group versus 60.8 ± 3.6 mL min 1 kg 1 in the endurance-trained group). At second visit, the popliteal artery flow-mediated dilation (%FMD) was assessed before and after a 3-h sitting period. During the sitting period, the popliteal artery diameter and blood velocity were measured every hour.

Results:

The popliteal artery blood flow and shear rate were significantly and similarly reduced during the sitting period in both groups ($P < 0.001$). In a 3-h sitting, a significant impairment in popliteal artery %FMD was observed in the untrained group ($P = 0.003$), but it was prevented in the endurance-trained group ($P < 0.196$).

Conclusions:

The present study revealed that sitting-induced leg endothelial dysfunction is preventable in endurance-trained individuals.

Ultrasonography of Lumbar Multifidus Muscle in University American Football Players

Schryver, Alexa; Rivaz, Hassan; Rizk, Amanda;
Medicine & Science in Sports & Exercise. July 2020; 52(7):1495-1501.

Purpose:

The primary objective of this Study was to examine and compare lumbar multifidus (LM) muscle size, asymmetry, and function in university football playerswith and without low back pain (LBP). A secondary objective was to examine the relationship between LM characteristics and body composition in football players.

Methods:

Ultrasound assessments of the LM muscle were performed in 41 university football players during the preseason. LM muscle cross-sectional area, echo intensity (e.g., indicator of fatty infiltration and connective tissue), thickness at rest, and thickness during submaximal contraction (e.g., contralateral arm lift) measurements in prone and standing positions were obtained bilaterally at the L5–S1 level. Body composition measures were acquired using dual-energy x-ray absorptiometry. A self-administered questionnaire was used to obtain LBP history data.

Results:

The LM muscle thickness at rest in prone and in standing was significantly smaller in football players who reported the presence of LBP in the previous 3 months. The LM cross-sectional area in prone was significantly and positively correlated with weight, height, lean body mass, total fat mass, and total percent body fat. LM echo intensity was strongly correlated with total percent body fat and total fat mass and negatively correlated with the percent thickness change during contraction.

Conclusion:

The results of this study provide novel information on LM muscle morphology and activation in football players in prone and standing and suggest that players with LBP in the previous 3 months had smaller LM muscle thickness. LM morphology was strongly correlated with body composition measurements.

Factors associated with mobility apprehension in persons with lower limb amputation

Shannon L Mathis
Prosthet Orthot Int. 2020 Aug;44(4):208-214.

Background:

Factors that are related to mobility apprehension were measured in a sample of persons with lower-limb amputation.

Objectives:

The purpose was to determine whether intensity, interference, or catastrophizing are associated with mobility apprehension.

Study Design:

Cross-sectional study.

Methods:

Persons with amputation of a lower limb who were attending a national limb loss conference were recruited to complete a survey. Subjects were administered the Tampa Scale for Kinesiophobia to measure mobility apprehension. The Brief Pain Inventory was administered to quantify the affect of pain on general activity, walking ability, and enjoyment of life. The Pain Catastrophizing Scale was administered to assess the tendency to ruminate and magnify pain sensations. A multivariable linear regression was performed to determine factors associated with mobility apprehension.

Results:

Fifty-three people with lower-limb amputation participated in the study. The mean (standard deviation) score for mobility apprehension was 34.2 (6.0). Mean (standard deviation) pain intensity and interference scores were 1.6 (1.7) and 2.5 (2.6), respectively. The mean (standard deviation) pain catastrophizing score was 9.1 (10). Pain catastrophizing was the only variable associated with higher mobility apprehension (β=0.31, $p<0.001$, $R2$=0.32). Results suggest that for every one-point increase in the pain catastrophizing score, mobility apprehension will increase by 0.3 of a point.

Conclusion:

These preliminary results suggest that pain catastrophizing was related to mobility apprehension in this cohort of persons with lower-limb amputation. This relationship indicates that the exploration of avoidance behaviours, such as pain catastrophizing, may be useful when developing a program for physical rehabilitation.

Clinical Relevance:

Pain catastrophizing, an avoidance behaviour, may be associated with higher levels of mobility apprehension in persons with major lower-limb amputation. Understanding the impact of fear-avoidance behaviour will allow clinicians to identify individuals at risk for poor outcomes following amputation surgery and to develop psychological strategies to complement treatment.

The Discrepancy Between Cognitive Complaints and Neuropsychological Test Findings in Persons With Traumatic Brain Injury

Vos, Leia; Williams, Michael W.; Poritz, Julia M. P.; Ngan, Esther; Leon-Novelo, Luis; Sherer, Mark
Journal of Head Trauma Rehabilitation. 2020 July/August;35(4):E382-E392.

Objective:

To better identify variables related to discrepancies between subjective cognitive complaints and objective neuropsychological findings in persons with traumatic brain injury (TBI).

Setting:

Three rehabilitation centers in the United States.

Participants:

In total, 504 community-dwelling adult survivors of TBI following discharge from inpatient rehabilitation.

Design:

Prospective cohort observation study.

Main Measures:

Wechsler Adult Intelligence Scale, Fourth Edition, Digit Span; Rey Auditory Verbal Learning Test; Trail Making Test, Part B; Word Memory Test; Patient Health Questionnaire-9; Neurobehavioral Symptom Inventory; TBI-Quality of Life item bank.

Results:

Statistical analyses revealed multiple factors associated with subjective-objective discrepancies in attention, memory, and executive functions. Depression was consistently associated with underestimation of cognitive abilities. However, subjective-objective discrepancies varied by cognitive domains in regard to other factors related to underestimation and overestimation of abilities.

Conclusions:

Reconciling and interpreting subjective-objective discrepancies regarding cognitive functions following TBI are important tasks for case conceptualization and treatment planning. Depression is an important patient characteristic to consider when discrepancy patterns indicate underestimation of cognitive abilities. This study highlights the importance of assessing mood, a modifiable patient characteristic, with self-report symptom inventories. Future studies are needed to connect these findings with TBI outcomes.

Daily Morning Blue Light Therapy Improves Daytime Sleepiness, Sleep Quality, and Quality of Life Following a Mild Traumatic Brain Injury

Raikes, Adam C.; Dailey, Natalie S.; Shane, Bradley R.; Forbeck, Brittany; Alkozei, Anna; Killgore, William D. S.
Journal of Head Trauma Rehabilitation. 2020 September/October;35(5):E405-E42.

Objective:

Identify the treatment effects of 6 weeks of daily 30-minute sessions of morning blue light therapy compared with placebo amber light therapy in the treatment of sleep disruption following mild traumatic brain injury.

Design:

Placebo-controlled randomized trial.

Participants:

Adults aged 18 to 45 years with a mild traumatic brain injury within the past 18 months (n = 35).

Main Outcome Measures:

Epworth Sleepiness Scale, Pittsburgh Sleep Quality Index, Beck Depression Inventory II, Rivermead Post-concussion Symptom Questionnaire, Functional Outcomes of Sleep Questionnaire, and actigraphy-derived sleep measures.

Results:

Following treatment, moderate to large improvements were observed with individuals in the blue light therapy group reporting lower Epworth Sleepiness Scale (Hedges' g = 0.882), Beck Depression Inventory II (g = 0.684), Rivermead Post-concussion Symptom Questionnaire chronic (g = 0.611), and somatic (g = 0.597) symptoms, and experiencing lower normalized wake after sleep onset (g = 0.667) than those in the amber light therapy group. In addition, individuals in the blue light therapy group experienced greater total sleep time (g = 0.529) and reported improved Functional Outcomes of Sleep Questionnaire scores (g = 0.929) than those in the amber light therapy group.

Conclusion:

Daytime sleepiness, fatigue, and sleep disruption are common following a mild traumatic brain injury. These findings further substantiate blue light therapy as a promising nonpharmacological approach to improve these sleep-related complaints with the added benefit of improved postconcussion symptoms and depression severity.

Mainstream technology to support basic communication and leisure in people with neurological disorders, motor impairment and lack of speech

Lancioni GE, Singh NN, O'Reilly MF, Sigafoos J, D'Amico F, Buonocunto F, Lanzilotti C, Alberti G, Navarro J.
Brain Injury. 2020 May 24:1-7.

Objective:

To assess a simple technology solution to support basic communication and leisure in people with neurological disorders, extensive motor impairment, and absence of speech.

Design:

The design was a non-concurrent multiple baseline across participants.

Methods:

The study included eight participants and assessed a technology setup including a Samsung Galaxy Tab S2 LTE tablet and a Samsung Galaxy A3 smartphone. The smartphone, automated via MacroDroid, presented the participant with leisure, messages, and caregiver options. Choosing leisure or messages (by activating the smartphone's proximity sensor) led the smartphone to present the alternatives available for that option and eventually verbalize the alternative selected. This verbalization triggered the tablet's Google Assistant and led the tablet to present a leisure event or start a message exchange. Choosing the caregiver led the smartphone to invite the caregiver to interact with the participant.

Results:

During baseline (i.e., when a standard smartphone was available), the participants did not activate any of the options. During intervention and post-intervention (i.e., with the technology described above), participants activated all options and spent most of the session time positively engaged with them.

Conclusions:

The aforementioned technology seems to be a useful tool for individuals like those involved in this study.

Factors associated with tracheostomy decannulation in patients with severe traumatic brain injury

Jenkins R, Badjatia N, Haac B, Van Besien R, Biedlingmaier JF, Stein DM, Chang WT, Schwartzbauer G, Parikh G, Morris NA. Brain Injury. 2020 Jul;34(8):1106-11.

Objective:

To assess variables associated with decannulation in patients with traumatic brain injury (TBI).

Participants:

79 patients with TBI requiring tracheostomy and ICU admission from January 1st to December 31st, 2014.

Design:

Retrospective analysis.

Measures:

Patients decannulated prior to 90 days were compared with patients who remained cannulated. Two Cox Proportional Hazards models were used to predict decannulation using variables prior to tracheostomy and throughout hospitalization.

Results:

Median time to decannulation was 37 days (Interquartile Range [IQR] 29–67). Variables prior to tracheostomy associated with decannulation included diabetes (HR, 0.15; 95% CI, 0.03–0.84; p =.03), craniotomy (HR, 0.25; 95% CI, 0.06–1.02; p =.05) and acute kidney injury (AKI) (HR, 0.06; 95% CI, 0.01–0.48; p =.01). Variables present throughout hospitalization included age (HR, 1.12; 95% CI, 1.01–1.21; p =.03), ventilator days (HR, 0.74; 95% CI, 0.57–0.95; p =.02), reintubation (HR, 0.07; 95% CI, 0.01–0.64; p =.02), aspiration (HR, 0.01; 95% CI, 0.0–0.29, p =.01), craniotomy (HR, 0.004; 95% CI, 0.0–0.39; p =.02) and AKI (HR, 0.0; 95% CI, 0.0–0.21; p =.01).

Conclusion:

The presence of diabetes, craniotomy and acute kidney injury may inform the conversation surrounding chances for decannulation prior to tracheostomy.

Visual profile of acquired brain injury in Indian cohort: a retrospective study

Ambika S, Atiya A, Ravi A, Mani R, Bhattacharya B, Praveen S, Hussaindeen JR.
Brain injury. 2020 Jul 28;34(9):1168-74.

Objective:

With the increasing global prevalence of acquired brain injury (ABI), the burden of visual problems as a sequelae to ABI is on the rise. This study reports the visual profile of patients with ABI seen in Neuro-Optometry Clinic (NOC) at a tertiary eye-care center in Southern India.

Methods:

A retrospective study was carried out between January 2014 and December 2015. Medical records of patients diagnosed with ABI referred by Neuro-Ophthalmologists to the NOC were reviewed. The detailed history, clinical findings of neuro assessment and management details were recorded.

Results:

Of the 241 patients with ABI, 208 had Traumatic Brain Injury (TBI) and 33 had Cerebro-Vascular Accident (CVA). The mean (SD) age of patients with TBI was 35 ± 14 years and CVA was 52 ± 16 years. Binocular diplopia (61%) was seen predominantly in TBI due to vertical deviation (31%). Cranial nerve palsy was most common in TBI (55%) than CVA (36%) and visual field defects were most frequently seen in CVA (27%).

Conclusion:

Cranial nerve paresis and restrictive strabismus with diplopia were the most common presentations in TBI and visual field defects in CVA. A neuro-optometric evaluation is recommended to identify visual dysfunctions and provide appropriate management options.

Persistence of post-concussion symptoms in patients with mild traumatic brain injury and no psychiatric history in the emergency department

Mehrolhassani N, Movahedi M, Nazemi-Rafi M, Mirafzal A.
Brain injury. 2020 Aug 10:1-8.

Purpose:

To elucidate the predictive factors for persistent post-concussion symptoms at 1 and 3 months following minor traumatic brain injuries (mTBIs) in patients with no psychiatric history.

Methods:

This was an observational study in an academic trauma centre including adult patients with a history of mTBI and no psychiatric history. Exclusion criteria were missing the follow-up phone calls, radiologic abnormalities, simultaneous injuries and refusal to participate. Outcomes were post-concussion syndrome according to the international classification of diseases (ICD)-10 (ICD-PCS) and persistence of more than one mTBI related symptoms at 1 and 3 months post-injury.

Results:

From 364 enrolled patients, 16 (4.4%) developed ICD-PCS, whereas 28 (7.6%) and 8(2.1%) reported more than one symptom at one and three months, respectively. Multivariable analysis showed associations between ICD-PCS with more than one initial symptom in the emergency department (ED) and the non-motor vehicle collision (non-MVC) impact mechanism with area under curve of 0.77. The former variable was associated with the persistence of more than one post-concussion symptom at one and three months.

Conclusion:

More than one symptom in the ED and the mechanism of injury not related to MVCs (sports, violence or fall injuries) may predict symptom persistence. Early treatment and follow-up strategies may be beneficial for vulnerable patients.

Excessive daytime sleepiness after traumatic brain injury

Crichton T, Singh R, Abosi-Appeadu K, Dennis G.
Brain injury. 2020 Aug 25:1-7.

Study Objectives:

To identify the prevalence of excessive daytime sleepiness (EDS) in a prospectively recruited patient population with traumatic brain injury (TBI) of mixed severity. Furthermore, the study aimed to assess the relationship between patient factors and EDS.

Method:

One-hundred and eighteen patients with TBI were assessed in a neurorehabilitation clinic after discharge from the emergency department. Enrolled participants were evaluated using several TBI-related outcome measures, 6–8 weeks after injury.

Results:

EDS (defined using the Epworth Sleepiness Scale ◘10) occurred in 48 of 118 (41.7%) patients in this study. Anxiety; depression; change in ability to work; employment status; global outcome (GOSE); social and functional outcome (RHFUQ); and symptom severity (RPCS) were associated with EDS in a univariate analysis. Anxiety was the only factor associated with EDS in the multivariate analysis (OR: 0.28 [95% CI: 0.09–0.90], P = .032).

Conclusion:

EDS is common after TBI in a community setting and is associated with several factors, which likely interact to contribute toward worse outcome. Anxiety is a factor that, if routinely assessed and considered during patient care choices, may assist in favorable sleep-related outcome during and after post-TBI recovery.

Task-Specific Versus Impairment-Based Training on Locomotor Performance in Individuals With Chronic Spinal Cord Injury: A Randomized Crossover Study

Lotter JK, Henderson CE, Plawecki A, Holthus ME, Lucas EH, Ardestani MM, Schmit BD, Hornby TG.
Neurorehabil Neural Repair. 2020 Jul; 34(7): 627–639.

Background:

Many research studies attempting to improve locomotor function following motor incomplete spinal cord injury (iSCI) focus on providing stepping practice. However, observational studies of physical therapy strategies suggest the amount of stepping practice during clinical rehabilitation is limited; rather, many interventions focus on mitigating impairments underlying walking dysfunction.

Objective:

The purpose of this blinded-assessor randomized trial was to evaluate the effects of task-specific versus impairment-based interventions on walking outcomes in individuals with iSCI.

Methods:

Using a crossover design, ambulatory participants with iSCI >1-year duration performed either task-specific (upright stepping) or impairment-based training for up to 20 sessions over ◘6 weeks, with interventions alternated after >4 weeks delay. Both strategies focused on achieving higher cardiovascular intensities, with training specificity manipulated by practicing only stepping practice in variable contexts or practicing tasks targeting impairments underlying locomotor dysfunction (strengthening, balance tasks, and recumbent stepping).

Results:

Significantly greater increases in fastest overground and treadmill walking speeds were observed following task-specific versus impairment-based training, with moderate associations between differences in amount of practice and outcomes. Gains in balance confidence were also observed following task-specific vs impairment-based training, although incidence of falls was also increased with the former protocol. Limited gains were observed with impairment-based training except for peak power during recumbent stepping tests.

Conclusion:

The present study reinforces work from other patient populations that the specificity of task practice is a critical determinant of locomotor outcomes and suggest impairment-based exercises may not translate to improvements in functional tasks.

Acute Traumatic and Ischemic Spinal Cord Injuries Have a Comparable Course of Recovery

Scivoletto G, Torre M, Mammone A, Maier DD, Weidner N, Schubert M, Rupp R, Abel R, Yorck-Bernhard K, Jiri K, Curt A. Neurorehabilitation and Neural Repair. 2020 Aug;34(8):723-32.

Background:

The relative rarity of ischemic compared with traumatic spinal cord injury (SCI) has limited a comparison of the outcomes of these conditions.

Objective:

To investigate the neurological and functional recovery of ischemic compared with traumatic acute SCI.

Methods:

Data were derived from the European Multicenter Study Spinal Cord Injury database. Patients with ischemic (iSCI) or traumatic SCI (tSCI), aged 18 years or older were evaluated at different time points from incidence: at about 1 month, 3 months, and 6 months. The neurological status was assessed at each time point by the International Standards for Neurological Classification of Spinal Cord Injury and the functional status by the Spinal Cord Independence Measure. Walking ability was evaluated by Walking Index for Spinal Cord Injury, 10-Meter Walk Test, and 6-Minute Walk Test. Because of the imbalances of the 2 groups in respect to size and lesion severity, a matching procedure according to age, neurological level, and severity of injury was performed. Outcomes evaluation was performed by means of a 2-way repeated-measures ANOVA.

Results:

The matching procedure resulted in 191 pairs. Both groups significantly improved from about 15 days after the lesion to 6 months. No differences were found in the course of neurological and functional recovery of iSCI compared with tSCI.

Conclusions:

This analysis from a representative cohort of participants revealed that from 15 days following the cord damage onward, the outcomes after iSCI and tSCI are comparable. This finding supports the potential enrolment of patients with acute iSCI into clinical trials from that point in time after the event and an evaluation up to 6 months afterward.

Distinct Effects of Motor Training on Resting-State Functional Networks of the Brain in Parkinson's Disease

Droby A, Maidan I, Jacob Y, Giladi N, Hausdorff JM, Mirelman A.
Neurorehabilitation and Neural Repair. 2020 September 34(9):795-803.

Background:

Nigrostriatal dopaminergic loss is a hallmark of Parkinson's disease (PD) pathophysiology, leading to motor Parkinsonism. Different intervention protocols have shown that motor and cognitive functions improvement in PD occur via the modulation of distinct motor and cognitive pathways.

Objective:

To investigate the effects of two motor training programs on the brains' functional networks in PD patients.

Methods:

Thirty-seven PD patients were prospectively studied. All enrolled patients underwent either treadmill training (TT) (n = 19) or treadmill with virtual reality (TT + VR) (n = 18) for 6 weeks. Magnetic resonance imaging (MRI) scans (3 T) acquiring 3-dimensional T1-weighted and resting-state functional MRI (rs-fMRI) data sets were performed at baseline and after 6 weeks. Independent component analysis (ICA) was conducted, and functional connectivity (FC) changes within large-scale functional brain networks were examined.

Results:

In both groups, significant post-training FC decrease in striatal, limbic, and parietal regions within the basal ganglia network, executive control network, and frontal-striatal network, and significant FC increase in the caudate, and cingulate within the sensorimotor network (SMN) were observed. Moreover, a significant time × group interaction was detected where TT + VR training had greater effects on FC levels in the supplementary motor area (SMA) and right precentral gyrus within the SMN, and in the right middle frontal gyrus (MFG) within the cerebellar network. These FC alterations were associated with improved usual and dual-task walking performance.

Conclusions:

These results suggest that TT with-and-without the addition of a VR component affects distinct neural pathways, highlighting the potential for beneficial neural plasticity in PD. Such distinctive task-specific pathways may foster the facilitation of interventions tailored to the individual needs of PD patients.

Cognitive training in an everyday-like virtual reality enhances visual-spatial memory capacities in stroke survivors with visual field defects

Dehn LB, Piefke M, Toepper M, Kohsik A, Rogalewski A, Dyck E, Botsch M, Schäbitz WR.
Topics in Stroke Rehabilitation. 2020 Aug;27:442-452.

Objectives:

Visual field defects due to hemi- or quadrantanopia after stroke represent an under-recognized neurological symptom with inefficient instruments for neurorehabilitation to date. We here examined the effects of training in a virtual reality (VR) supermarket on cognitive functions, depressive symptoms, and subjective cognitive complaints in patients with hemianopia/quadrantanopia and healthy controls.

Methods:

During a 14-day rehabilitation program, 20 patients and 20 healthy controls accomplished a real-life-like shopping task in a VR supermarket. A comparison between pre- and post-training standard neuropsychological measures, depressive symptoms, and subjective memory complaints allowed us to assess a putative transfer of rehabilitation effects from the training tasks to specific cognitive functions.

Results:

The results indicate that VR training may improve performance not only in the trained task but also in specific neuropsychological functions. After the training, both patients and controls showed improved performances in visual scanning, mental rotation, visuoconstruction, and cognitive flexibility. Moreover, depressive symptoms were attenuated in both groups. In the patient group compared to the control group, the training particularly resulted in improved visual memory retrieval and reduced memory complaints.

Conclusions:

The results of the current study suggest that VR training can improve particularly visual-spatial skills in patients with hemianopia or quadrantanopia. Our study thus introduces an interesting novel treatment approach to improve cognitive functions relevant to daily life in stroke patients with visual field defects.

Locomotor training intensity after stroke: Effects of interval type and mode

Boyne P, Scholl V, Doren S, Carl D, Billinger SA, Reisman DS, Gerson M, Kissela B, Vannest J, Dunning K.
Topics in Stroke Rehabilitation. 2020 Sept;27:483-493.

Background and Objectives:

High-intensity interval training (HIIT) is a promising strategy for improving gait and fitness after stroke, but optimal parameters remain unknown. We tested the effects of short vs long interval type and over-ground vs treadmill mode on training intensity.

Methods:

Using a repeated measures design, 10 participants with chronic hemiparesis performed 12 HIIT sessions over 4 weeks, alternating between short and long-interval HIIT sessions. Both protocols included 10 minutes of over-ground HIIT, 20 minutes of treadmill HIIT and another 10 minutes over-ground. Short-interval HIIT involved 30 second bursts at maximum safe speed and 30–60 second rest periods. Long-interval HIIT involved 4-minute bursts at ~90% of peak heart rate (HRpeak) and 3-minute recovery periods at ~70% HRpeak.

Results:

Compared with long-interval HIIT, short-interval HIIT had significantly faster mean overground speeds (0.75 vs 0.67 m/s) and treadmill speeds (0.90 vs 0.51 m/s), with similar mean treadmill HR (82.9 vs 81.8%HRpeak) and session perceived exertion (16.3 vs 16.3), but lower overground HR (78.4 vs 81.1%HRpeak) and session step counts (1481 vs 1672). For short-interval HIIT, training speeds and HR were significantly higher on the treadmill vs. overground. For long-interval HIIT, the treadmill elicited HR similar to overground training at significantly slower speeds.

Conclusions:

Both short and long-interval HIIT elicit high intensities but emphasize different dosing parameters. From these preliminary findings and previous studies, we hypothesize that overground and treadmill short-interval HIIT could be optimal for improving gait speed and overground long-interval HIIT could be optimal for improving gait endurance.

The development of a consensus statement for the prescription of powered wheelchair standing devices in Duchenne muscular dystrophy

C. Schofield, K. Evans, H. Young et al.
Disabil Rehabil, Sept 2020. DOI: 10.1080/09638288.2020.1810786

ABSTRACT

Background:

To develop a consensus statement for the prescription of a Powered Wheelchair Standing Device (PWSD) in young people with Duchenne muscular dystrophy (DMD).

Methods:

An international multidisciplinary panel comprising clinicians and users (young people with DMD) along with their parents was consulted. A literature review was undertaken and a Delphi method was utilised to generate consensus statements. To supplement limited literature, round one of the Delphi process comprised questions consistent with the International Classification of Functioning, Disability and Health model of disability to generate items based on expert opinion and was completed by 38 clinicians and nine users. Thirty-seven participants completed two further rounds rating the importance of each item with a five-point scale. Agreement of 70% or more participants for items indicated consensus.

Results:

Consensus was reached for 47 of 80 items. Tolerance and comfort in supported standing for at least 10 min, ankle contracture less than 10 degrees and user goals reflecting motivation to use the stand- ing function were agreed as necessary in guiding the decision to trial a PWSD. Evidence of family, therap- ist and servicing support were also considered critical in enabling continuity of PWSD use.

Conclusions:

PWSD is a mobility option that offers choice, control and opportunity for independence. This consensus statement can assist clinicians with decision-making around factors influencing successful implementation and optimisation of PWSD for young people with DMD.

Implications for Rehabilitation:

- Tolerance and comfort in supported standing for at least 10□minutes, ankle contracture limited to less than 10 degrees and the child's goals reflecting motivation to use the standing position were agreed to be necessary considerations in guiding the decision to trial a PWSD.
- Trialling a PWSD when the child is predicted to lose the ability to walk within a one to two year period was recommended although a PWSD could be suitable for a child who was unable to walk.
- Evidence of family, therapist and servicing support was considered critical in enabling continuity of PWSD use.

Action Observation Treatment in a tele-rehabilitation setting: a pilot study in children with cerebral palsy

Anna Molinaro, Serena Micheletti, Federica Pagani, et al.
Disabil Rehabil, Aug 2020. DOI:10.1080/09638288.2020.1793009

ABSTRACT

Background:

Action Observation Treatment is a novel rehabilitation approach exploiting a neurophysio- logical mechanism that allows one to recruit the neural structures sub-serving action execution during the mere observation of those same actions. Action Observation Treatment is effective in the rehabilita- tion of several neurological diseases. In this pilot study, we used Action Observation Treatment in a tele- rehabilitation setting in children with Cerebral Palsy.

Methods:

Ten children with Cerebral Palsy, aged 5–12 years, entered the study. They fol- lowed the Action Observation Treatment rehabilitation program at home with remote supervision by a child neurologist located at the hospital. Outcome measures were the scores at the Melbourne Assessment of Unilateral Upper Limb Function Scale and the Assisting Hand Assessment.

Results:

Scores obtained after treatment and at a two months' follow-up significantly differed from base- line and overlapped those obtained in randomized controlled studies carried out in a conventional setting.

Conclusions:

Action Observation Treatment is therefore a promising approach that can be used on a large scale in a telerehabilitation setting.

Implications for rehabilitation:

- Tele-rehabilitation has the potential to enhance early intervention service provision for children with Cerebral Palsy.
- Action Observation Treatment has the potential to become a routine approach in a telerehabilitation setting.

The utility of short-term goal achievement as an early indicator of discharge destination in people admitted to neurological rehabilitation with severe functional deficits

Jenna K. Lang, Susan J. Black, David D. Murphy et al.
Disabil Rehabil, Jul 2020. DOI.10.1080/09638288.2020.1793225

Purpose:

This study investigates whether short-term goal achievement in the early phase of neurological rehabilitation is an accurate indicator of discharge destination in patients with severe disability in comparison to change in scores in the motor domain of the Functional Independence Measure (FIM motor).

Method:

A prospective observational cohort study.

Participants:

A consecutive sample of 53 patients admitted to rehabilitation with a neurological diagnosis and FIM motor score below 47.

Measures:

Short-term goal achievement and FIM motor change in the first 2 weeks following admission and discharge destination.

Results:

Short-term goal achievement showed good prognostic utility [area under the curve (AUC) of 0.75; 95% confidence intervals (CI) 0.6, 0.89] for discharge destination, dichotomized as home or semi-independent living versus nursing home care, similar to that demonstrated by change in FIM motor scores (AUC of 0.69; 95% CI 0.55, 0.84), p□=□0.55. A cut-off was established for short-term goal achievement at more than half of goals achieved, with an AUC of 0.73 (95% CI 0.58, 0.87); sensitivity 71.4% and specificity 74.4%.

Conclusions:

Short-term goal achievement in the early phase post-admission is a good indicator of the person's potential to return home.

Implications for Rehabilitation:

- Short-term goal setting should be a key practice feature of neurological rehabilitation.
- Goal achievement is an indicator of a person's potential to return home or to semi-independent living in people with severe neurological deficits.
- Evaluation of short-term goal achievement may inform the ongoing rehabilitation program and discharge planning.

Re-identifying yourself": a qualitative study of veteran views on implantable Brain Computer Interface for mobility and communication in ALS

Erika Versalovic, Melissa Diamond & Eran Klein
Disabil Rehabil Assist Technol, Sept 2020. DOI:10.1080/17483107.2020.1817991

Objectives:

Brain-computer interface (BCI) technology to assist with mobility and communication is an active area of research in amyotrophic lateral sclerosis (ALS). Implantable BCI offers promise for individuals with severe disease, such as locked-in syndrome, but also raises important ethical issues. We undertook in-depth qualitative interviews with ALS patients from a Veterans Administration hospital ALS multi-disciplinary clinic and explored their perspectives on issues of identity, privacy, enhancement, informed consent, and responsibility related to implantable BCI.

Methods:

Semi-structured interviews were conducted with sixteen (n = 16) individuals, and transcripts were analysed using a modified grounded theory approach.

Results:

Emergent themes included: (1) attitudes towards BCI were characterised by fear, hope, and hesitation about adoption of BCI technology; (2) analogies to other technologies were a useful tool in understanding and communicating opinions about ethical issues in BCI; (3) concerns about potentially socially stigmatising effects of BCI and the burden of adjustment to new therapeutic devices were important considerations to be weighed against the potential functional benefit of BCI use; (4) therapeutic decision-making in ALS often intimately involves loved ones; and (5) prospective decision-making about BCI was significantly affected by weighing the timing of the intervention with the progression of illness.

Conclusion:

The interest in BCI and views on ethical issues raised by BCI is moderated by the experience of living with ALS. The findings from this study can help guide the development of implantable BCI technology for persons with ALS.

Implications for rehabilitation:

- Loved ones will play crucial roles in helping patients think through the possible benefits and burdens of getting a BCI device.
- Providers should consider how the ideal timing for getting an implantable BCI device will vary based on the priorities of persons with ALS and their disease stage.
- Concerns about social stigma, burden of adjustment, and the desire to maximise time left with loved ones may outweigh the potential functional benefits of BCI devices for some persons with ALS.

First experiences of communication with mechanically ventilated patients in the intensive care unit using eye-tracking technology

Christopher Ull, Christina Weckwerth, Thomas Armin Schildhauer, et al.
Disabil Rehabil Assist Technol, Sept 2020. DOI: 10.1080/17483107.2020.1821106

Introduction:

Eye-tracking (ET) may be a novel tool for communication with intubated and mechanically ventilated critically ill patients. We hypothesized that ET could be learned fast and be used successfully by intensive care unit (ICU) and intermediate care (IMC) patients with artificial airways for communication. Methods: Including all patients with mechanical ventilation via oral intubation or tracheostomy, who were at least 18 years of age with a score of 1 to þ1 points on the Richmond agitation-sedation scale and a history of ventilation for more than 48 h. A commercially available ET was used. The investigations were performed by a physician with the support of a psychologist following a standardized study protocol.

Results:

During a 4-week period a total of 11 patients completed all of the five steps of our study proto- col. The time to complete our study protocol was 64±23.8min (range 43–125min) with a mean of 1.5±0.9 sessions (range 1–4 sessions). Seven patients (63.6 %) could run through all of the five steps within their first session. All patients (100%) preferred the gaze fixation technique to control the ET to the wink control.

Conclusion:

Mechanically ventilated ICU and IMC patients are able to use ET in a very short time for communication to indicate their basic needs, answer rating scales and pain scores as well as questionnaires about quality of life and self-esteem.

Implications for rehabilitation:

- COMFORT - The novel communication device improves the patients' ability to communicate with the attending physicians, physiotherapists and nurses in order to provide a tailored rehabilitation approach.
- COMPLIANCE - The use of the eye-tracking technology enables the patients to communicate special needs and fears during the course of the rehabilitation.
- COMPLICATIONS - The eye-tracking technology enables the attending rehabilitation team to earlier detect complications (e.g. pain, depression) during the course of the rehabilitation.

Raised illness mastering – a phenomenological hermeneutic study of chronic obstructive pulmonary disease patients' experiences while participating in a long- term telerehabilitation programme

Charlotte Simony, Ingrid Charlotte Andersen, Uffe Bodtger, et al.
Disabil Rehabil Assist Technol, Aug 2020. DOI: 10.1080/17483107.2020.1804630

Purpose:

To investigate COPD patients' experience on the mastering of their illness during participation in a long-term interprofessional and cross-sectoral telerehabilitation programme called > COPD-Life.

Materials and Methods:

A phenomenological-hermeneutic study design with combined participant observations and individual interviews formed a continuous data generation among fifteen patients while they participated in the programme. Data underwent a three-levelled interpretation inspired by the theory of the French philosopher Paul Ricoeur.

Results:

During participation in >COPD-Life patients experienced an improvement in how to master their living with COPD. They felt invigorated by an interprofessional rehabilitation team to raise how to deal with physical, mental, social and relational challenges. Programme participation was experienced as surprisingly easy by the patients.

Conclusions:

The telerehabilitation solution >COPD-Life provides benefits for COPD patients who report improved illness-mastering, attendance and outcome of rehabilitation, as well as enhanced physical and social activity. As an assistive technology intervention, > COPD-Life appears to be a valuable addition to existing rehabilitation programmes. However, more knowledge is required to further understand the full-range capacity and impact of tele-based pulmonary rehabilitation.

Implications for rehabilitation:

- New models of rehabilitation to patients with Chronic Obstructive Pulmonary Disease (COPD) is imperative for the development of more suitable health care support to these patients.
- > COPD-Life is a twenty-six-long telerehabilitation intervention program for COPD patients, delivered by an interdisciplinary team collaborating between hospital and the municipality health care service.
- This paper aims to explore COPD patients' experiences on the mastering of their illness while participating in > COPD-Life.
- Patients report improved illness-mastering, attendance, and outcome of rehabilitation, as well as enhanced physical and social activity by participating in the program.
- As an assistive technology solution, >COPD-Life is shown to provide the potential to expand equally assessable support in improving independence, functioning, and well-being to COPD patients.

A novel ergonomic wheelchair reduces bacterial hand contamination

Billie C. Savvas Slater, Stephen B. Porter, Aaron S. DeVries et al.
Disabil Rehabil Assist Technol, July 2020. DOI: 10.1080/17483107.2020.1786735

Objective:

To determine whether bacterial contamination of rider's hands is less with a novel ergonomic wheelchair (EW) than a standard wheelchair (SW).

Experimental design:

After wheelchair hand rims were disinfected, volunteers wearing nitrile gloves propelled each wheelchair through a standardised "run" in hospital. Post-run cultures were obtained from riders' gloved hands. Bacterial hand counts were compared between runs matched by rider (same rider, different chairs) or time (different riders in each chair, running concurrently), and overall.

Setting:

Minneapolis Veterans Affairs Health Care System (MVAHCS), a large tertiary care facility.

Participants:

Eleven employee volunteers.

Intervention:

EW, as compared with SW. With SW, co-location of hand rims and tyres potentially exposes the user's hands to tyres, which risks contaminating the user's hands with ground-source bacteria. Our novel ergonomic wheelchair (EW) separates drive wheel and hand rims, potentially reducing hand contamination.

Main outcome Measure:

Bacterial hand counts.

Results:

Post-run bacterial hand counts were over 10-fold lower with the EW than the SW. This was true (i) when the same rider tested both chairs sequentially (n1□48 pairs) (median counts, 40 vs. 1030; p1 40.008), (ii) when different riders tested the two chairs concurrently (n1 49 pairs) (median counts, 40 vs. 660; p1 40.004), and (iii) overall (median counts, 40 [n 1 4 9 runs] vs. 550 [n 1 4 10 runs]; p < 0.001).

Conclusion:

Separation of wheelchair hand rims from tyres significantly reduces bacterial hand contamination. Reduced hand contamination could decrease bacterial infections and dissemination of resistant bacteria, warranting further study.

Implications for rehabilitation:

- The novel design of the ergonomic wheelchair, removing the push rim from proximity to the wheelchair tyre, keeps the hands of wheelchair users cleaner.
- The re-design of the standard manual wheelchair was implemented initially to improve shoulder ergonomics during manual wheelchair propulsion and has the added benefit of reduction in the transfer of bacteria from floors to hands for manual wheelchair users.
- Since the ergonomic wheelchair has the potential to decrease rates of bacterial infection in manual wheelchair users, further testing is warranted.

In Spasticity,

℞ Antispastic

Baclof

Baclofen 10/25 mg Tab

Scored tablet

Flexibility for dosage titration

Backing Possibilities

In Cerebral Palsy,

℞ Flexi-dosing antispastic

Baclof

Baclofen 5 mg / 5 ml *Liquid*

Backing Possibilities

Supports patients initiatives programs

MAKE A MOVE AFTER STROKE

CREATING POSSIBILITIES IN CEREBRAL PALSY

Abridged Prescribing Information (BACLOF)
Active Ingredient: each tablet of BACLOF contains: baclofen 10, 25 mg, BACLOF liquid contains baclofen 5mg/5ml, 100 ml bottle. **Indication:** treatment of spasticity resulting from multiple sclerosis, particularly for the relief of flexor spasms and concomitant pain, clonus, and muscular rigidity. **Dosage:** Tablets: Initiate with a low dosage, preferably in divided doses, administered orally. Increase gradually based on clinical response and tolerability. The maximum dosage is 80 mg daily (20 mg four times a day). When discontinuing, reduce the dosage slowly. Liquid: adults: One 5ml spoonful (5mg) 3 times a day for 3 days; Two 5ml spoonfuls (10mg) 3 times a day for 3 days; Three 5ml spoonfuls (15mg) 3 times a day for 3 days; Four 5ml spoonfuls (20mg) 3 times a day for 3 days. Elderly: Small doses should be used at the start of treatment, the dose being titrated gradually against the response, under careful supervision. Paediatric population (0 to <18 years): A dosage of 0.75-2mg/kg body weight should be used. In children over ten years of age, however a maximum daily dosage of 2.5mg/kg body weight may be given. Treatment is usually started with half a 5ml spoonful (2.5mg) given 4 times daily. The recommended daily dosages for maintenance therapy are as: 12 months – 2 years: Two to four 5ml spoonfuls (10-20mg), 2 years – 6 years: Four to six 5ml spoonfuls (20-30mg); 6 years – 10 years: Six to twelve 5ml spoonfuls (30-60mg). **Contraindications:** hypersensitivity to baclofen or any component of this product. **Warning and precautions:** Abrupt discontinuation of baclofen has resulted in serious adverse reactions including death; therefore, reduce the dosage slowly when baclofen is discontinued. Neonatal withdrawal symptoms can occur; gradually reduce the dosage and discontinue baclofen before delivery. Baclofen can cause drowsiness and sedation. Patients should avoid the operation of automobiles or other dangerous machinery until they know how the drug affects them. Advise patients that the central nervous system effects of baclofen may be additive to those of alcohol and other CNS depressants. Baclofen can cause exacerbation of the following: psychotic disorders, schizophrenia, or confusional states; autonomic dysreflexia; epilepsy. Use with caution in patients with these condition. **Pregnancy & Lactation:** Pregnancy: Based on animal data, may cause fetal harm. At recommended oral doses, baclofen is present in human milk. There are no human data on the effects of baclofen on milk production and on breastfed infant. **Interaction:** CNS depressants like benzodiazepines, antihistamine, antipsychotic, and alcohol etc., may cause increased sedative effects. Morphine (epidural) may cause hypotension and dyspnea. Laboratory Test Interactions may cause false elevation of AST (aspartate aminotransferase), alkaline phosphatase, or blood glucose. **Adverse reactions:** most common drowsiness, dizziness, and weakness. **Overdose:** Symptoms: Patients may present in coma or with progressive drowsiness, lightheadedness, dizziness, somnolence, accommodation disorders, respiratory depression, seizures, or hypotonia progressing to loss of consciousness. Treatment: includes gastric decontamination, maintaining an adequate airway and respirations. (Prepared on 23rd Feb 2020. It is recommended to refer full prescribing information before prescription. For further medical information, please write to: Intas Pharmaceuticals Ltd., Corporate House, Near Sola Bridge, SG highway, Thaltej, Ahmedabad-380054, Gujarat, India. productqueries@intaspharma.com.)

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