



## HRRI & NISAN SYMPOSIUM 2021

December 1<sup>st</sup>, 2021

10 AM- 1:30 PM NZST

Zoom link: <https://aut.zoom.us/j/99624109090?pwd=ZXJlU3RBR0dzM2g3UjBjaEtML0ExUT09>

Meeting ID: 996 2410 9090      Passcode: 576112

Committee Chair: Shikha Chaudhary

Organising Committee: Nusratnaaz Shaikh, Prue Susan Molyneux, Geena Stanley

### PROGRAMME

10 AM	Welcome, <b>Prof. Denise Taylor</b>
10:15 AM	<b>Julie Collis</b> , HRRI <i>An evaluation of wrist movement during purposeful activities and range of movement exercises after surgical repair of distal radius fracture: A randomised crossover study</i>
10:30 AM	<b>Anjali Bhatia</b> , NISAN <i>Experiences of stroke during COVID-19 pandemic</i>
10:45 AM	<b>Tone Panassollo</b> , HRRI, <i>The effect of a blunted heart rate response on aerobic capacity in people with Parkinson's disease</i>
11:00 AM	<b>Marianne Carroll</b> , HRRI <i>The effects of gluteus medius trigger points on hip passive range of movement and muscle strength in people with chronic non-specific low-back pain</i>
11:15- 11:30 AM	Break/ Networking
11:45 AM	<b>Caroline Holder</b> , NISAN <i>Exploring facilitators and barriers to long-term behaviour change following Health Wellness Coaching for stroke prevention</i>
12:00 PM	<b>Preet Kamal Kaur</b> , HRRI, <i>The importance of piloting an RCT intervention on imperceptible noisy galvanic vestibular stimulation (nGVS)</i>
12:15 PM	<b>Kate Charlesworth</b> , HRRI <i>Device and programme requirements for effective upper-limb robotic rehabilitation following stroke: A systematic review and meta-analysis.</i>
12:30 PM	<b>Shabnam Jill</b> , NISAN <i>PERsonalised Knowledge to reduce the risk of Stroke (PERKS-International)</i>
12:45- 1:15 PM	<b>Invited Speaker, Richard Ellis</b> <i>"Gone fishing!... maintaining and building momentum as an emerging researcher"</i>
1:15	<b>Awards and Closing- Prof. Denise Taylor</b>

## ABSTRACTS

### *1. An evaluation of wrist movement during purposeful activities and range of movement exercises after surgical repair of distal radius fracture: A randomised crossover study*

**Julie Collis**

**Purpose:** Following a surgically repaired distal radius fracture, wrist stiffness, sensorimotor impairments, and functional loss can persist. Range of Movement (ROM) exercise is the primary approach used for restoring movement after surgery. Specified purposeful activities can also be used but is underutilised, and movement produced by purposeful activity not well-understood. The study aimed to compare movement during purposeful activity and ROM exercises. **Methods:** A randomised crossover study was conducted on the same day in the participant's home. Adults with a surgically repaired distal radius fracture took part in two interventions: self-selected Purposeful Activity (PA) and Active ROM Exercises (AE), in a random order. Movement parameters, measured by electrogoniometry, included Time-Accumulated joint Position (TAP), a global metric of joint position and amount, maximum end-range, excursions >75% of active ROM, movement repetitions, and active time. Data were analysed using linear mixed and generalised linear mixed regression models. **Results:** Purposeful activities selected by participants included household, food preparation or personal care. Purposeful activity and ROM exercises both elicited large volumes of wrist and forearm movement, but the parameters of movement were demonstrably different. ROM exercises produced greater TAP, illustrating that movement was slower and more sustained. Purposeful activity produced significantly greater excursions >75% of active ROM, movement repetitions, and active time, illustrating that movement was more constant, with frequently changing speed and variable end ROM. Maximum active wrist end range movement did not differ significantly between the interventions. **Conclusions:** Purposeful activities, selected for importance and challenge, produced greater amounts and ranges of movement, than previously understood. Movement produced by purposeful activity may be an untapped source of therapeutic movement. The study challenges therapists to integrate the use of purposeful activities into early rehabilitation programmes following a surgically repaired distal radius fracture.

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### *2. Experiences of stroke during COVID-19 pandemic*

**Anjali Bhatia**

An unprecedented shift in seeking medical care has been demonstrated due to the coronavirus pandemic. We conducted a qualitative descriptive study to explore the experiences of having a stroke during the COVID-19 pandemic lockdown of 2020 in Auckland, New Zealand. Ten people of varied ethnicities were purposefully sampled from a population-based stroke study (ARCOS), who were followed up month post stroke. Telephonic semi-structured interviews were conducted, audio taped and transcribed verbatim. Participants were asked about their experiences of seeking medical care during lockdown period of the pandemic. For some participants, the accessibility and timely action was swift, whereas some experienced delays due to limited GP accessibility, and ambulance availability. Participants expressed frustration and fear/isolation due limited and/or no visitors but having access to family via mobile phones helped to cope. Post stroke, follow-up from the hospital was either online or via home visit depending on the alert levels. Difficulty in online physiotherapy sessions were expressed due to technological challenges. These findings suggest that while there was no major impact of lockdowns on stroke care, patients faced challenges during hospitalisation due to isolation, and technological

challenges during follow-up. However, having access to technology (mobile phones/tablets) helped to cope.

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### ***3. The effect of a blunted heart rate response on aerobic capacity in people with Parkinson's disease***

**Tone Panassollo**

Inactivity leads to deconditioning and poor aerobic capacity. Decreased aerobic capacity in people with Parkinson's disease (PwPD) is associated with inactivity and chronotropic incompetence (CI), which is an inadequate increase in heart rate to exercise demand as intensity increases. Recent studies report 40-50% of PwPD present with a blunted heart rate response to exercise. Despite the importance of chronotropic incompetence, our understanding of its effect on aerobic capacity in PwPD is poor. This cross-sectional study examined maximal and submaximal physiological responses during aerobic exercise for PwPD with and without CI, and in age-matched controls.

**Method:** Preliminary data from nine PwPD met the criteria for CI, and nine without, and all presented with mild to moderate disease, determined by Hoehn and Yahr Scale. Twelve controls participated. Aerobic capacity was tested using a standardized ramp-incremental cardiorespiratory exercise test protocol on a stationary bike. **Main outcomes measures:** Heart rate (HR) and oxygen consumption (VO<sub>2</sub>) at rest, first ventilatory threshold, and at peak exercise (VO<sub>2peak</sub>).

**Results:** PwPD+CI presented with lower HR compared with PwPD and control subjects at peak exercise (HR 124.11±10.05 vs HR 150.89±9.62 vs HR 157.73±10.74). Oxygen consumption was also lower in people with CI at the first ventilatory threshold (13.77±2.34mL·kg·min vs 17.22±2.99mL·kg·min vs 17.67 ±4.73mL·kg·min), and at VO<sub>2peak</sub> (23.33±7.05mL·kg·min vs 29.67±6.74mL·kg·min vs 30.53 ±7.13mL·kg·min). There were no significant differences between outcomes for PwPD without CI and controls, or for resting HR for all groups.

**Conclusion:** Chronotropic incompetence influences aerobic capacity in PwPD. This under-recognised phenomenon is likely to impact on the trainability of PwPD participating in aerobic training protocols of different intensities

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### ***4. The effects of gluteus medius trigger points on hip passive range of movement and muscle strength in people with chronic non-specific low-back pain***

**Marianne Carroll**

The prevalence of TrPs in people with CNSLBP is high; especially in the gluteus medius (GMed) muscles. CNSLBP is a complex and costly condition; with which treatment is not always successful. In this population, decreased hip ROM and hip muscle weakness are common findings. This study investigated if the presence of active TrPs was associated with these deficits in the hips, when compared with participants with latent TrPs and zero TrPs. Forty-two participants with CNSLBP underwent hip passive ROM and hip muscle strength testing; with palpation of their GMed muscles to identify the presence and type of TrPs. Analysis showed varying results regarding hip ROM and TrP status. There was an association between hip strength and TrP status. Participants with zero TrPs were the strongest and those with TrPs were weaker. In general, those with latent TrPs were the weakest. This study adds knowledge to the role that TrPs play in muscle strength and the characteristics of TrPs. This is significant for the treatment of CNSLBP and the development of more effective treatment of this multi-factorial condition.

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### *5. Exploring facilitators and barriers to long-term behaviour change following Health Wellness Coaching for stroke prevention*

**Caroline Holder**

**Background:** Health Wellness Coaching (HWC) has grown in popularity as a means of empowering individuals to take responsibility for their health behaviour and make lifestyle changes to reduce their risk of stroke. Understanding the facilitators and barriers to long-term behaviour change is key if preventive strategies such as HWC are to be robust and effective. **Aims:** This study aimed to explore the experiences of people at risk of stroke after HWC for stroke prevention, specifically the facilitators and barriers to long-term behaviour change from the perspective of study participants. **Methods:** All participants had received HWC as part of a RCT three years earlier. Semi-structured telephone interviews were conducted with eight participants from the trial sample. Interviews were audio-recorded and transcribed verbatim. Reflexive thematic analysis was used to identify key concepts and themes. **Results:** Three over-arching themes were identified: An ‘awakening of the mind’ captured the importance of seeing the bigger picture, perception of personal risk and the development of new skills in long-term behaviour change. ‘It’s not just about health behaviour’ conveyed the importance of being responsive to individual need and addressing emotional well-being alongside physical health goals. ‘Social connectedness’ encapsulated the significance of community engagement, accountability and paying it forward. **Conclusions:** Enhancing awareness of personal risk and being responsive to the needs of the person and their contextual demands is important. Timing, accountability, happiness, life satisfaction and emotional well-being are important and several potential modifications are suggested to support the maintenance of healthy behaviours post intervention.

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### *6. The importance of piloting an RCT intervention on imperceptible noisy galvanic vestibular stimulation (nGVS)*

**Preet Kamal Kaur**

**Background:** Loss of balance leads to increase risk of falls, reduced mobility, and loss of independence. Around one-third of the population over the age of 65 years will experience a fall. Falls have personal, societal, and economic costs. There are many exercise-based programmes which enhance balance, reduce the rate of falls, promote quality of life, and preserve independence. These programmes have been shown to reduce the risk of falling by about a third, however, other approaches are needed to further reduce the rate of falls. With technology advancement, several non-invasive vestibular stimulation approaches are being investigated and have been shown to enhance balance and gait in different populations. One of these approaches, noisy galvanic vestibular stimulation (nGVS), uses sub-sensory stimulation to enhance weak sensory input signals to the vestibular system. nGVS has shown promising effects on postural control in the previous studies. The main aim of this study was to synthesise evidence from RCTs that have investigated the effect of nGVS on balance in healthy people. **Methods:** A systematic review was conducted to evaluate the efficacy of nGVS on balance in healthy adults. Inclusion criteria were healthy adults (younger and older), nGVS as an intervention, both RCT and non-RCT trials, any quantitative balance outcome measures, and trials published in the English language. Five electronic databases were searched. The identified RCTs were analysed descriptively for their research methodology, stimulation parameters, number of sessions and results. **Results:** There were 21 eligible studies that were identified for the full study. There were 6 RCTs among the 21 studies.

In this presentation the results of the RCTs will be reported. Four out of six RCTs showed nGVS enhanced balance outcomes (Centre of pressure (COP) sway path and mean velocities) in healthy adults. Overall, data indicated that a single session of nGVS can ameliorate balance in both young and older healthy adults. **Conclusion:** nGVS may be a potential therapy for the physiotherapists treating patients with balance and vestibular disorders in future.

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### ***7. Device and programme requirements for effective upper-limb robotic rehabilitation following stroke: A systematic review and meta-analysis.***

**Kate Charlesworth**

For people who have had a stroke, upper limb impairment is common and frequently limits the ability to perform everyday life activities. Constrained resources for rehabilitation mean that the amount of therapy currently being delivered is insufficient to elicit functional change. There is growing interest in the development and implementation of robotic devices to augment rehabilitation for the upper limb following stroke. However, there is limited knowledge about what a robotic device needs to entail to deliver efficacious rehabilitation outcomes, or the delivery methods which might support or hinder their implementation in clinical practice. We conducted a systematic review and meta-analysis to review the effects of robotic rehabilitation for upper limb stroke rehabilitation on outcomes of activities of daily living (ADL) and upper limb capacity, in comparison with conventional rehabilitation in dose-matched trials. We also applied subgroup analyses regarding robotic device features and intervention parameters to determine whether these had an effect on outcomes. Relevant RCT's were identified in electronic searches, where 41 studies met the inclusion criteria.

The preliminary analysis of results suggests that there are no significant differences in outcomes of ADL and upper limb capacity in robotic rehabilitation compared with conventional rehabilitation. Results from the subgroup analyses showed that mean age of participants has a statistically significant relationship with study outcomes. Subgroups pertaining to the joints which devices moved, and the type of assistance provided by the device also had a statistically significant relationship with study outcomes.

Further analysis will continue in order to interpret these findings, which will be used by engineers, designers, and therapists to inform the future design and implementation of robotic devices for upper limb stroke rehabilitation.

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### ***8. PERSONALISED Knowledge to reduce the risk of Stroke (PERKS-International)***

**Shabnam Jillli**

Theoretically majority of strokes could be prevented through the management of modifiable risk factors. The Stroke Riskometer™ mobile phone application (hereon 'The App') uses an individual's data to provide personalised information on their risk of stroke and advice to modify risk. **Aim:** To determine the effect of The App on a combined cardiovascular risk score (Life's Simple 7®, LS7) of modifiable risk factors at 6 months post-randomisation. **Methods:** PERKS-International is a Phase III, multicentre, prospective, pragmatic, open-label, single-blinded endpoint, 2-arm randomised controlled trial. Inclusion criteria are ages 35-≤75 years; ≥2 LS7 risk factors; own a smartphone; no history of stroke/myocardial infarction/cognitive impairment/terminal illness. The intervention group (IG) will be provided with The App and the usual care group (UCG) is provided with a summary of risk factors, but will not be informed about The App. Blinded assessments will be conducted face-to-face at baseline and 6 months, and online at 3 and 12 months. A formative evaluation will be conducted

after the first 40 participants have completed 6-month assessments. **Study outcomes:** The primary outcome is a difference in the mean change in LS7 (blood pressure, cholesterol, blood glucose, BMI, smoking, physical activity and diet) from baseline to 6 months post-randomisation with intention-to-treat analysis. Secondary outcomes include change in individual LS7 components at 6 and 12 months; quality of life; stroke awareness, adverse events; use of health services; and costs at 12 months. Based on pilot data, 790 participants from Australia and New Zealand (395 IG, 395 UCG) will be required to provide 80% power (two-sided  $\alpha=0.05$ ) to detect a mean difference in the LS7 of  $\geq 0.40$  (SD1.61) in IG compared to 0.01 (SD1.44) in the UCG at 6-months post-randomisation.

**Discussion:** This study will be the first to provide evidence of the effectiveness of a mobile app to reduce stroke risk.

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