EVALUATION OF A THEORY-DRIVEN PHYSICAL ACTIVITY INTERVENTION FOR INDIVIDUALS WITH WHIPLASH ASSOCIATED DISORDERS USING A SINGLE CASE EXPERIMENTAL DESIGN

Recover Injury Research Centre, University of Queensland (UQ); ²NHMRC Centre for Research Excellence in Recovery after Road Traffic Injury, UQ, ³School of Allied Health Sciences, Griffith University; ⁴School of Human Movement and Nutrition Sciences UQ, ⁵University of Sydney, ⁶School of Psychology UQ

Background

whiplash associated disorder Individuals with (WAD) experience considerable variations in physical impairment, psychological distress, social dysfunction and recovery. In addition, individuals with WAD are frequently insufficiently active for good health, increasing their risk of morbidity, and compounding the effects of the whiplash injury. To date, interventions have focussed on impairment or remediation in a rehabilitation setting with the aim of improving pain and disability. Trial results are equivocal and optimal treatment continues to be a challenge.

The aim of this study was to evaluate the effect of a community-located intervention using evidence-based behaviour change strategies on participation in physical activity and perceived interference of neck pain on daily activity.

Step 1: Pre-Participation Activities

- Pre-Participation Assessment
- Stage of Change (SOC) Assessment
- Information Sharing: shared understanding of physical activity and exercise

Step 2: Implementation of Stage-Matched Individualised Behaviour Change Strategies

SOC 1 or 2 Strategies	SOC 3
 Information sharing 	 Support self-efficacy
 Motivational Interviewing (Value Card 	 Foster social support
Sort Activity, Importance and Confidence	 Personal time audit
Rulers, Decisional Balance Sheet)	 Physical activity monitoring
 Build self-efficacy 	 Barrier identification and resolution
 Build social support 	 Identify activities of interest
Modelling	 Foster enjoyment
 Personal time audit 	 Goal setting
 Physical activity monitoring 	 Reward systems
 Identify activities of interest 	 Prompting/ reminders

Barrier identification and resolution

Step 3: Develop Structured Exercise and/or Lifestyle Physical Activity Progra

Exercise to improve one or more components of physical fitness (e.g., resistance training exercises, targeted aerobic activities)

Lifestyle physical activity to accumulate at least 30 minutes of self-selected activit each day including all leisure, occupational, household or sport related activities

Step 4: Tailored Relapse-Prevention Strategies

Develop strategies to optimise ongoing participation and planning for high risk situation

Figure 1: The 4-step Adapted Physical Activity Program (APAP).

RECOVER Injury Research Centre

Carrie Ritchie^{1,2}, Kelly Clanchy³, Michele Sterling^{1,2}, Robyn Tate⁵, Esther Smits¹, Melissa Day⁶, Jane Nikles^{1,2}, Jenna Liimataninen^{1,4} & Sean Tweedy⁴

Methods

- Single-case, multiple-baseline design across participants with replication.
- \succ 6 individuals with chronic WAD were randomised to 1 of 2 groups and then to 1 of 3 baseline periods (e.g. tiers: usual physical activity for 5, 8 or 11 week) (**Table 1**).
- Adapted physical activity program (APAP) intervention (Figure 1):
 - 12 sessions with an exercise physiologist in the home/work/community over 16-weeks.
 - tailored to the individual's knowledge, beliefs, values, perceived ability, and motivational readiness for regular PA.

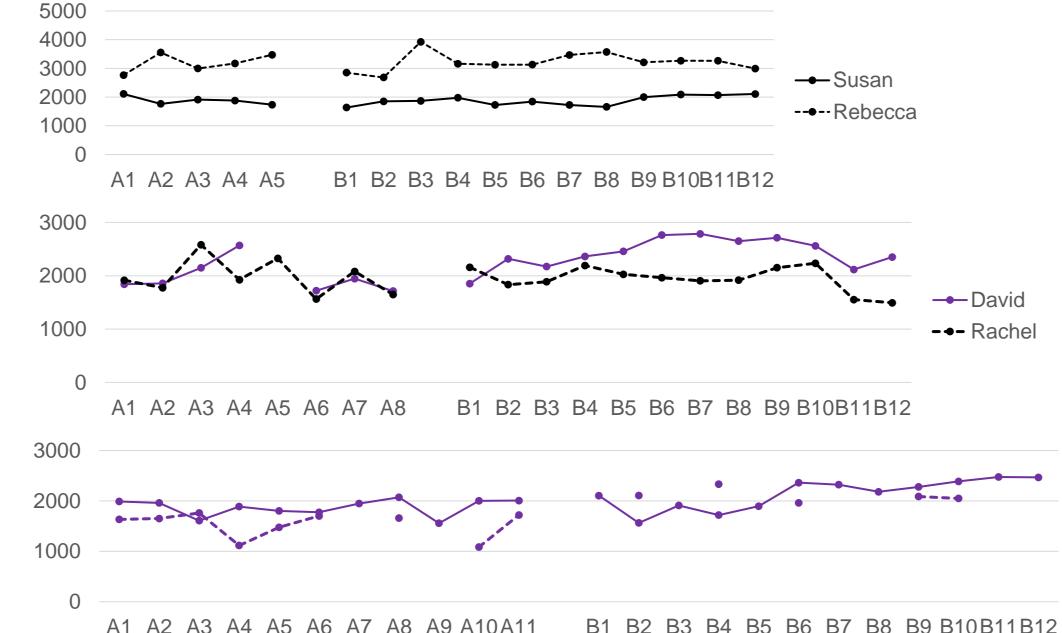


Figure 2: Mean counts/minute/week for participants in group 1 (solid) and 2 (dashed) with 5, 8, 11 week baseline phase (A). Purple indicates significant change at intervention phase (B).

	Group	Tier	Age	NRS		NDI (0-100)		SF12 Physical		SF12 Mental		PCS		PSE	
				Baseline	Post	Baseline	Post	Baseline	Post	Baseline	Post	Baseline	Post	Baseline	Post
Susan	1	5wk	53	2	2	32	16	49.4	52.2	48.0	56.5*	15	13	52	56
David	1	8wk	50	4	2	58	42	32.3	37.1*	45.9	63.4*	32	18*	11	30*
Michael	1	11wk	44	5	5	40	24	34.4	43.1*	42.0	50.6*	23	22	23	22
Rebecca	2	5wk	33	2	2	32	10	43.6	52.1*	43.8	56.8*	13	13	55	59
Rachel	2	8wk	32	5	4	32	36	38.9	40.8	27.7	29.7	16	15	40	49
Jill	2	11wk	60	5	5	68	58	28.4	40*	52.2	57.7*	37	21*	23	26
Table 1: Ba	•			Its for generalisa cally important d		es. NRS: <3 rec	overed; NDI: <	<10 recovered; S	F12: >50 heal	lthy, above popul	ation norms; l		evel of pain c	atastrophizing; E UNIVERS	PSE: >4 SITY
References: 1: Pool et al. 2007. Spine 32(260) 3047-51.					Acknowledgements: Funding for this project was provided by The Faculty			Contact: c.ritchie@uq.edu.au					_/	QUEENSLA TRALIA	AND
	2: Diaz-Arribaset al. 2017. Spine 42(24) 1908-16.			of Hea	alth and Behav	and Behavioural Sciences Research			•				CREAT	E CHANGE	

- 3: Suzuki et al. 2020. PlosOne15(3): ee0229228.

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Results

- > Target behaviours: measured weekly and analysed through a structured visual analysis supplemented with Tau-U statistical analyses:
- Physical activity (PA): wrist-worn accelerometer counts per minute of PA were significantly increased in 3 participants (David, Michael, Jill) with moderate to large effect sizes (ES) (>0.5). Weighted Tau-U across tiers was significant for Group 1 (z=2.43, p<0.02) (**Figure 2**).
- Pain interference: a total score from 3 of the PROMIS-Pain Interference Scale questions was significantly reduced for another participant (Susan) with very large ES (>0.7) and weighted Tau-U across tiers significant (z=-2.11, p<0.035).
- > Generalisation measures assessed at baseline and post-APAP included: Neck pain (*NRS*), neck disability index (*NDI*), quality of life (*SF12 physical*, SF12 mental), pain catastrophizing scale (PCS), pain self-efficacy (PSE). Minimal clinically important differences for NDI(>-20/100)¹; SF12 (>+4.0)²; PCS (>-7)³; PSE (>+7)³ are shown in **Table 1**.

Conclusion: A theory based intervention increased accelerometer measured PA for 2 participants, and significantly reduced the perception that day to day activities may be hindered by pain in 2 other participants. Clinically important improvements in quality of life were found in 5 of 6 Participants. Due to the heterogeneous nature of the WAD population, the use of a single case experimental design was advantageous because it enabled individual level analysis not possible with typical group level Designs. Further research is needed to verify these results.



