



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

Over-exercising and pain?

Dr Nicole Andrews

RECOVER Injury Research Centre

#TooMuchPainNoGain

Outline

Overactivity in the context of chronic pain

- 1) Theoretical Background and Definitions
- 2) Evidence Supporting the Construct
- 3) Assessment Options
- 4) Treatment Options
- 5) Case Study

Theory



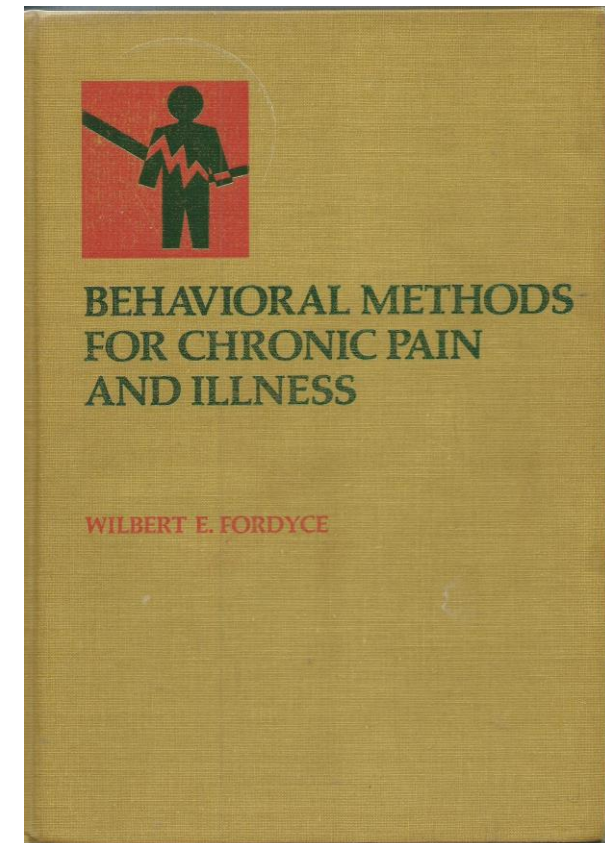
The Theorists

Fordyce (1976) – described a cohort who engage in high levels of physical activity which severely aggravates pain forcing the individual to rest

Phillips (1988) – used the term ‘overactivity’ to refer to individuals who habitually engage in excessive amounts of activity that is only halted by periods of severe pain and incapacity

‘Overactivity’ term continued to be used - **Hanson & Gerber (1990)**, **Birkholtz et al. (2004)**

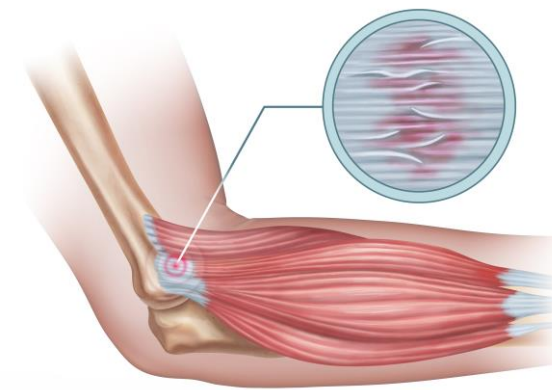
Still used in textbooks and patient education – ‘**Manage Your Pain**’ and ‘**The Pain Toolkit**’



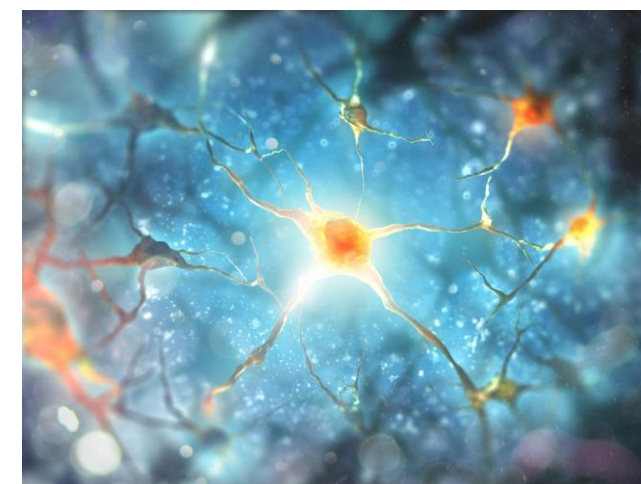
Overactivity versus Overuse

Overuse = an unfavorable load-recovery ratio during exercise/tasks that cause **microinjuries in the affected tissues** that does not healed before the subsequent activity bout

Overactivity = activity engagement that significantly exacerbates an individuals existing pain condition caused by a **sensitised nervous system**

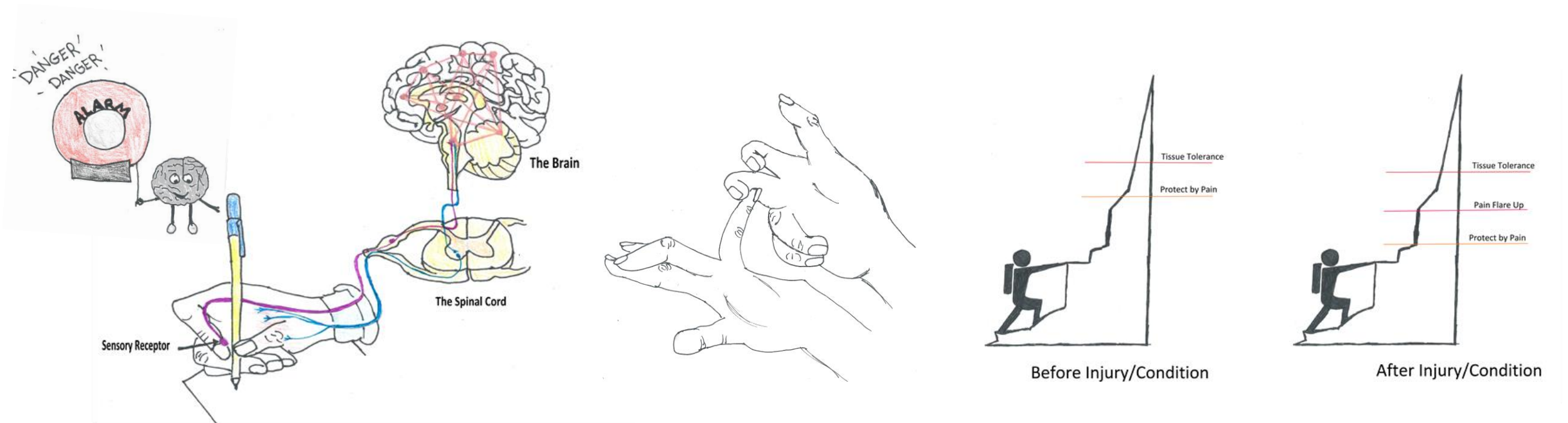


VS

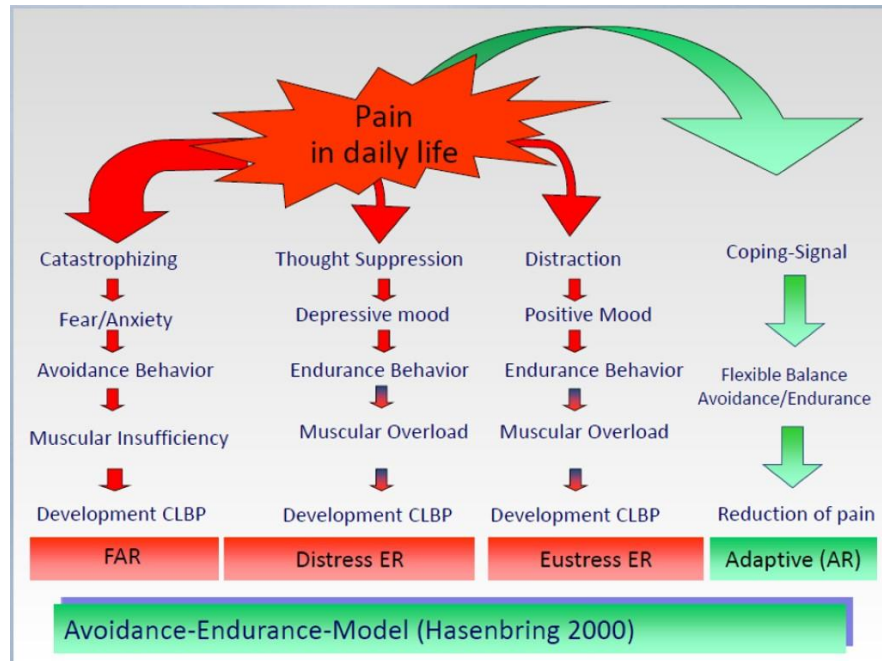


Explaining Overactivity to Patients

- 1) Pain is a danger signal produced by the brain
- 2) The relationship between activity and pain – metaphor
- 3) The relationship between activity and pain – protect by pain diagram



Overactivity versus Endurance



Endurance/Task Persistence = Persisting with activities in spite of pain. Precursor to overactivity.

Overactivity = Persisting with activities to the point of severely aggravating pain

Evidence support the construct



Qualitative evidence

Flare ups:

- 1) Last from hours to weeks
- 2) Negative impact on function, emotions, cognitions
- 3) Associated with spasms, paraesthesia, motor/bladder control
- 4) Physical activities (bending, lifting) most common triggers
- 5) Spending too long in a sustained spinal position also a trigger



Original experimental

What constitutes back pain flare? A cross sectional survey of individuals with low back pain



Jenny Setchell^{a,*}, Nathalia Costa^a, Manuela Ferreira^{a,b}, Joanna Makovey^{a,b}, Mandy Nielsen^a, Paul W. Hodges^a

^a The University of Queensland, School of Health and Rehabilitation Sciences, Brisbane, Australia

^b Institute of Bone and Joint Research/The Kolling Institute, Sydney Medical School, The University of Sydney, Sydney, Australia

ORIGINAL ARTICLE

Prevalence and Characteristics of Flare-ups of Chronic Nonspecific Back Pain in Primary Care
A Telephone Survey

Pradeep Suri, MD, MS,*†‡§ Kathleen W. Saunders, JD,|| and Michael Von Korf, ScD||

Qualitative Evidence

Research Paper

PAIN

“It’s very hard to change yourself”: an exploration of overactivity in people with chronic pain using interpretative phenomenological analysis

Nicole Emma Andrews^{a,b,c,*}, Jenny Strong^a, Pamela Joy Meredith^a, Kellie Gordon^c, Karl Singh Bagraith^{a,b,d}

Quantitative evidence – activity & pain lagged relationship

Study	Pain Population	Physical activity measure	Relationship with Pain
Geisser et al. (1995)	Chronic back pain	Self-reported activity	Significant 30min lag relationship (high activity -> more pain)
Liszka-Hackzell & Martin (2004)	Acute low back pain	Wrist accelerometer	Significant 30min lag relationship (high activity -> more pain)
Liszka-Hackzell & Martin (2004)	Chronic low back pain	Wrist accelerometer	No relationship
Schepens et al. (2012)	Adults with OA	Lab based tasks (sweeping, grocery shopping walking)	No relationship
Rabbitts et al. (2014)	Adolescents with chronic pain	Wrist accelerometer	Significant lag relationship (high activity -> less end of day pain)

Reflections

Did the methodology account for the complexities of the relationship between activity and pain?

- Same type of activity can affect individuals differently
 - > Need to consider objective activities levels and diary data
- Individuals have different activity tolerances
 - > Need a with-in person perspective i.e. what is high activity for this person?



A new approach

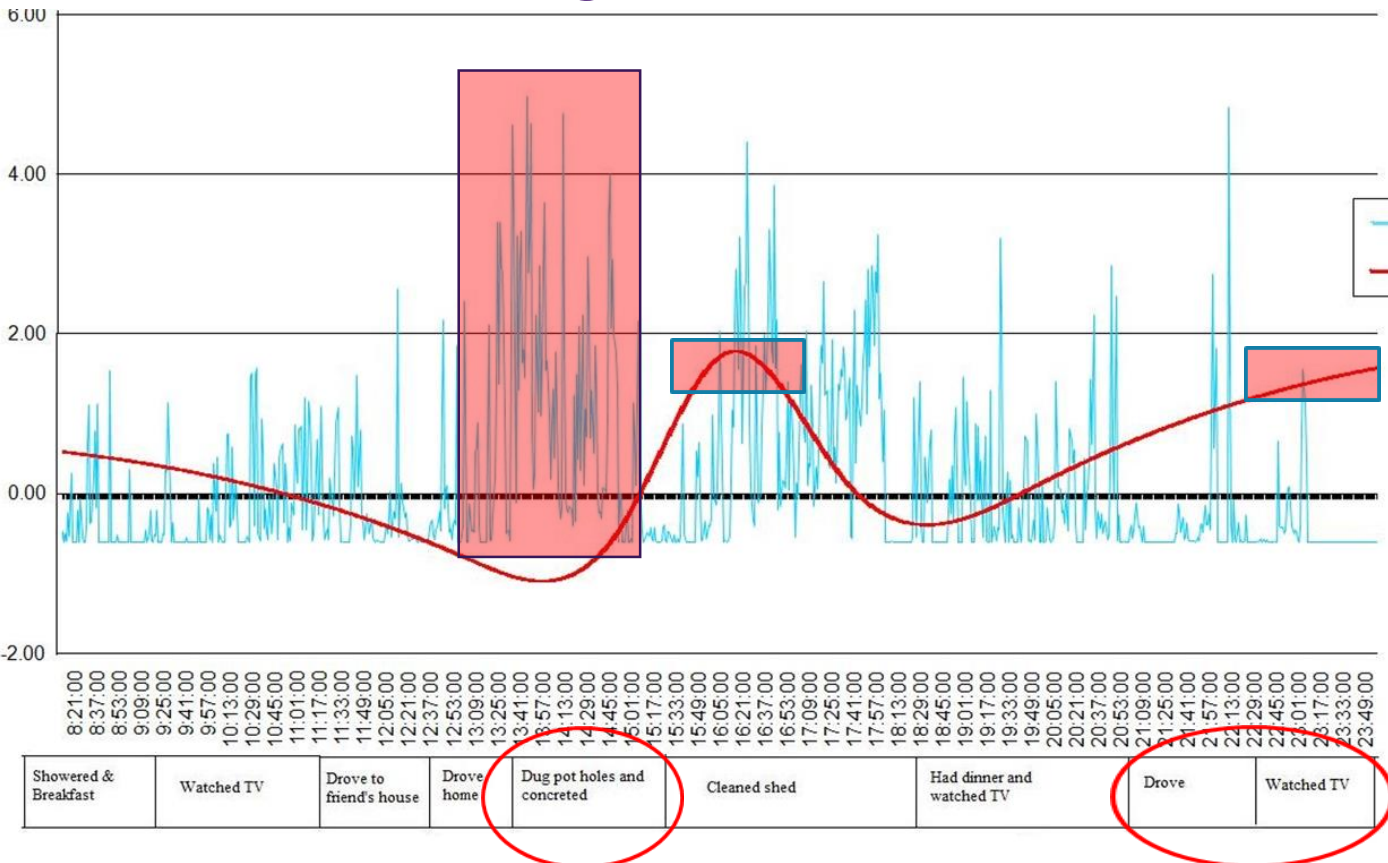
Research Paper

PAIN

Overactivity in chronic pain: is it a valid construct?

Nicole Emma Andrews^{a,b,c,*}, Jenny Strong^a, Pamela Joy Meredith^a

Determining when someone has “overdone it”



1) Severe pain aggravations
 = z score > 1.645 (top 5% pain values)

Does the pain aggravation directly follow:

1) High levels of objective activity
 = mean z score > 1.645
 = mean z score > 1.28 for time periods > 1 hr

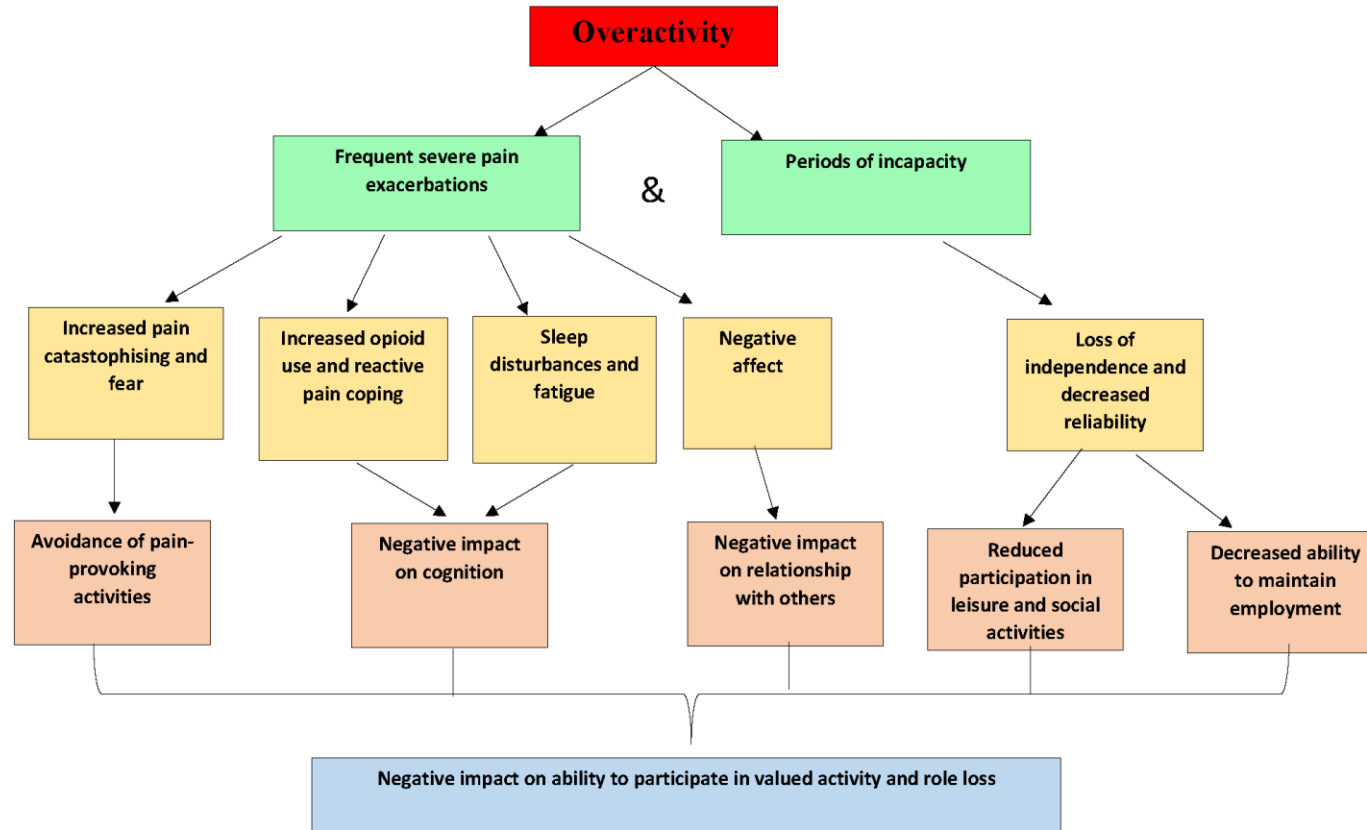
OR

2) prolonged engagement in sedentary activity
 (diary activities over one hour)

Why should we care about this?

Is overactivity that bad?

The Impact of Overactivity on Daily Function



Hasenbring, Andrews & Ebenbichler (In Press)

Overactivity and Engagement with Physiotherapy

Based on Clinical Observations:

- 1) Poor attendance in group based physiotherapy classes – hydrotherapy and exercise classes
- 2) Bad past experiences with community physiotherapy
- 3) Poor compliance with home exercise programs

?Area for future research

Assessment



The Confronting Scale of the PARQ

For each item circle a rating from 0 (never) to 5 (always).

1. When my pain decreases I try to be as active as possible
2. I push myself to get things done despite my level of pain
3. When my pain reduces I push to catch up on what I missed
4. I do what I need to do regardless of the pain I feel
5. I alternate between doing nothing and pushing too hard
6. Considering, my pain problem I do more than I should
7. I spend too much time on some activities and experience increased pain later

The Overdoing Scale of the POAM-P

Circle the number between 0 and 4 that best describes how you usually do your daily activities.

1. When I'm doing an activity I don't stop until it is finished.
2. I take on extra tasks when I am having a good pain day.
3. I make the most of my good pain days by doing more things.
4. I keep doing what I'm doing until my pain is so bad that I have to stop.
5. Once I start an activity I keep going until it is done.
6. I just ignore my pain and keep doing what I'm doing as long as I can.
7. I keep going until I can't stand the pain anymore.
8. I do extra on days when my pain is less.
9. When I do an activity I do the whole thing all at once.
10. Some days I do a lot, other days I don't do much.

Excessive Persistence Scale of APS

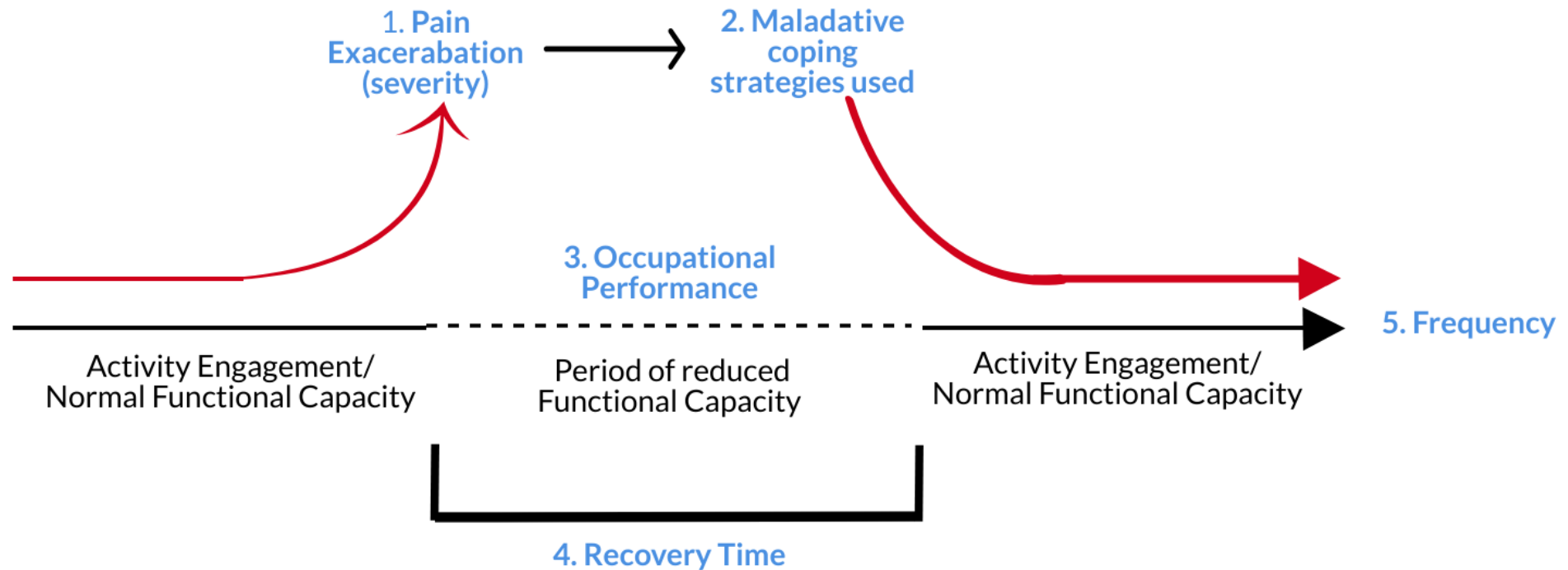
To what extent do the following statements apply to you? 0 (not at all) to 4 (always).

1. I have tried to do too much and felt even worse as a result
2. I find myself rushing to get everything done before I crash
3. I have overdone things, then needed to rest up for a while

Psychometric properties

Measure	Internal Consistency	Pearson Correlation				
		Pacing	Avoidance	Pain Severity	Negative affect	Physical functioning
PARQ- Confronting	.79	.08	-.13*	-	-	-.01
POAM-P - Overdoing	.90	-.48**	-.31**	-	.32**	-.18**
APS – Excessive Persistence	.69	-.08	-.08	.08	.31**	.22*

Deconstructing Overactivity

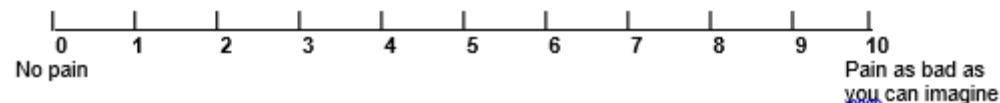


Andrews et al. (manuscript under review)

Overactivity in Persistent Pain Assessment (OPPA)

1. Please rate your pain by circling the one number that best describes the following:

Average pain rating over the past week



2. Do you ever do too much or spend too much time on some activities and experience increased pain later? Yes (Please complete the remainder of the questionnaire)

No (You do not need to complete the rest of the questions)

3. How often do you aggravate (e.g. worsen) your pain by doing too much?

Less than once a month

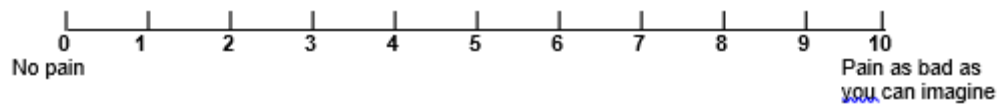
Once a month

A couple of times a month

At least once a week

A couple of times a week

4. Please rate typically how much pain you are in after you have done too much?



5. What are you normally like after you have done too much (please select only one response)?

I find it is a bit more difficult to complete my everyday activities but I am able to push through and do them the same way I normally do

I find it is a lot harder to complete my everyday activities and I need to change the way I do some activities

I can't do all my daily activities but I can do some easy activities or easier parts of the activities

I find it difficult to even do easy activities and need to rest either in an armchair or in bed

I find it extremely difficult to move and need assistance with basic activities such as going to the toilet and showering

6. How long does it normally take you to recover after you have done too much?

An hour or less

A couple of hours

A day

Two days

Three or more days

7. Please indicate if you ever do any of the following after you have done too much?

Take more of my prescribed pain medication

Use other drugs to cope with my pain including alcohol

Present to the emergency department

Andrews et al. (manuscript under review)

Psychometric properties

- PCA suggests items are best represented by one construct
- Acceptable internal consistency: 0.78
- Good test-retest reliability: 0.83
- Significant positive correlations with existing overactivity measures (PARQ-Confronting $r = .22$; POAM-P Overdoing $r = .18$)
- Was the only overactivity measure to significantly predict pain severity, pain interference, activity participation

<https://smof.dk/moving-on-with-pain>

Dependent Variable	Model/Step	Variables	β	R ²	R ² change	F change	
WHYMPI Pain Severity	All Models: Step 1	PARQ Avoidance	0.39**	0.16	0.16	11.77**	
		Gender	-0.06				
		Age	-0.05				
	Model 1: Step 2	OPPA Total	0.40**	0.30	0.15	39.75**	
		PARQ Avoidance	0.32**				
		Gender	-0.12				
	Model 2: Step 2	Age	0.01				
		PARQ Confronting	0.08	0.16	0.01	1.39	
		PARQ Avoidance	0.40**				
	Model 3: Step 2	Gender	-0.07				
		Age	-0.05				
		POAM-P Overdoing	0.09	0.16	0.01	1.81	
	WHYMPI Interference	All Models: Step 1	PARQ Avoidance	0.21**	0.05	0.05	3.12*
			Gender	0.01			
			Age	0.04			
Model 1: Step 2		OPPA Total	0.30**	0.13	0.08	18.03**	
		PARQ Avoidance	0.16*				
		Gender	-0.04				
Model 2: Step 2		Age	-0.01				
		PARQ Confronting	0.12	0.06	0.01	2.55	
		PARQ Avoidance	0.22**				
Model 3: Step 3		Gender	-0.02				
		Age	-0.04				
		POAM-P Overdoing	0.08	0.06	0.01	1.31	
WHYMPI General Activity		All Models: Step 1	PARQ Avoidance	-0.25**	0.07	0.07	5.04**
			Gender	-0.10			
			Age	0.03			
	Model 1: Step 2	OPPA Total	-0.17*	0.10	0.03	5.26*	
		PARQ Avoidance	-0.22**				
		Gender	-0.08				
	Model 2: Step 2	Age	-0.05				
		PARQ Confronting	0.12	0.09	0.01	2.80	
		PARQ Avoidance	-0.24**				
	Model 3: Step 2	Gender	-0.12				
		Age	-0.03				
		POAM-P Overdoing	0.09	0.07	0.01	1.56	
		PARQ Avoidance	-0.23**				
		Gender	-0.10				
		Age	-0.03				

Interview based assessment questions

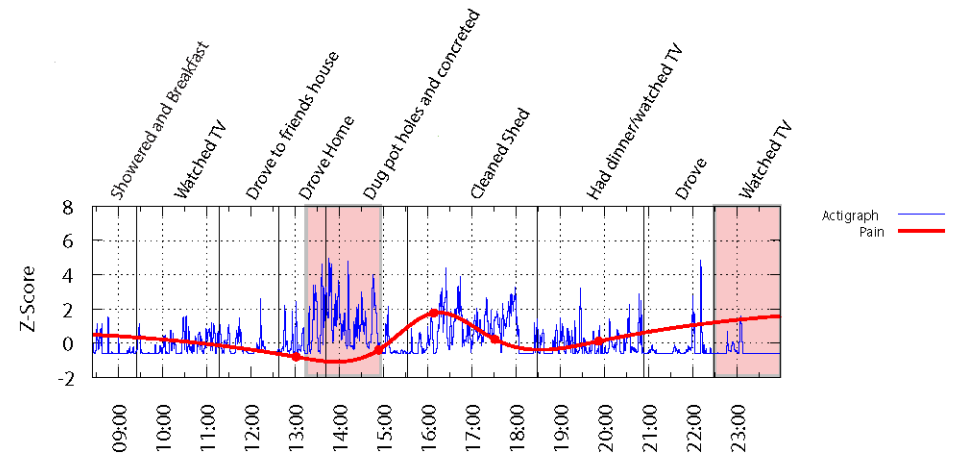
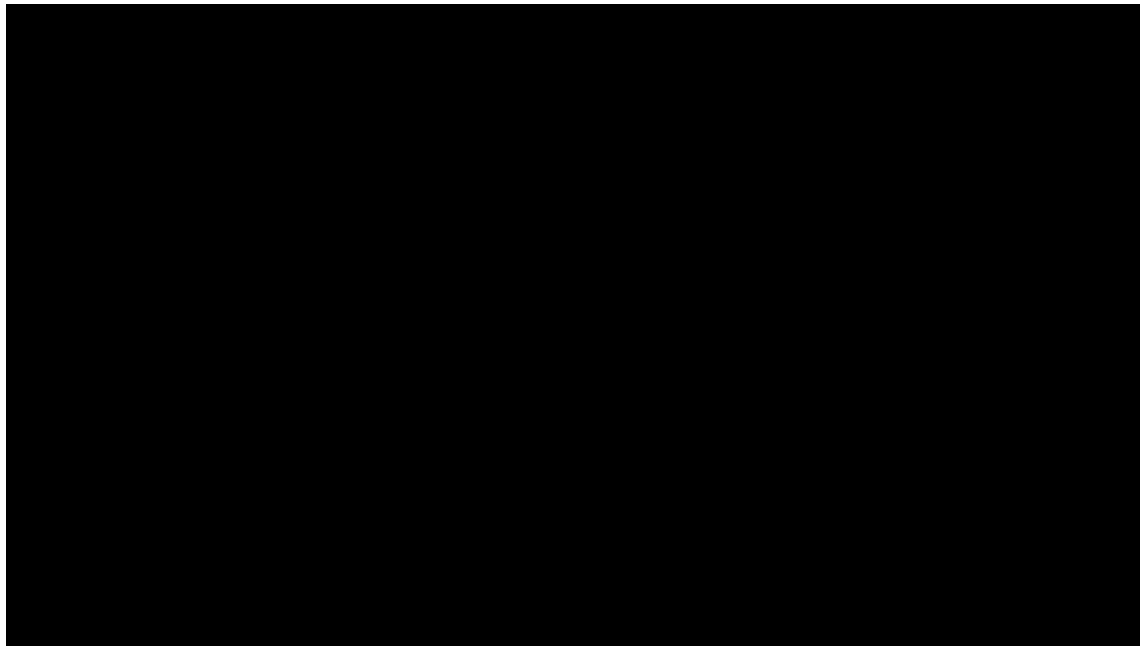
- 1) Do you ever do too much or spend too long on some activities and severely aggravate or worsen your pain?
- 2) How often do you do too much?
- 3) What is the intensity of your pain when you have done too much?
- 4) How does this pain flare up affect your ability to do your daily activities?
- 5) How long does it take you to recover?
- 6) Do you take more of your prescribed pain medication after you have done too much?
- 7) Do you take any other substances to cope with the pain exacerbation?
- 8) Have you ever presented to the emergency department because of a pain flare up? Could you tell me more about this?
- 9) Why do you think you do too much?
- 10) Does doing too much negatively affect your life?
- 11) Is this something you want to change?
- 11) What are the barriers to changing?

Monitoring

Monday Morning

Time	What I did	My pain level	Did I "overdo it"?
12.00am 12.15am 12.30am 12.45am			
1.00am 1.15am 1.30am 1.45am			
2.00am 2.15am 2.30am 2.45am			
3.00am 3.15am 3.30am 3.45am			
4.00am 4.15am 4.30am 4.45am			
5.00am 5.15am 5.30am 5.45am			
6.00am 6.15am 6.30am 6.45am			
7.00am 7.15am 7.30am 7.45am			
8.00am 8.15am 8.30am 8.45am			
9.00am 9.15am 9.30am 9.45am			
10.00am 10.15am 10.30am 10.45am			
11.00am 11.15am 11.30am 11.45am			

Pain ROADMAP



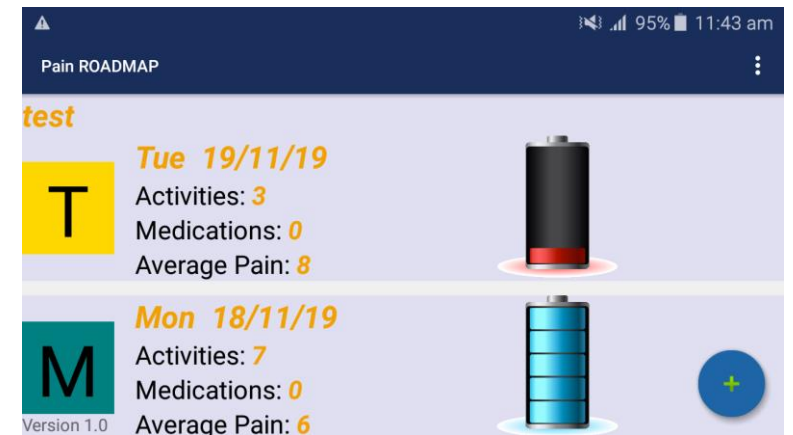
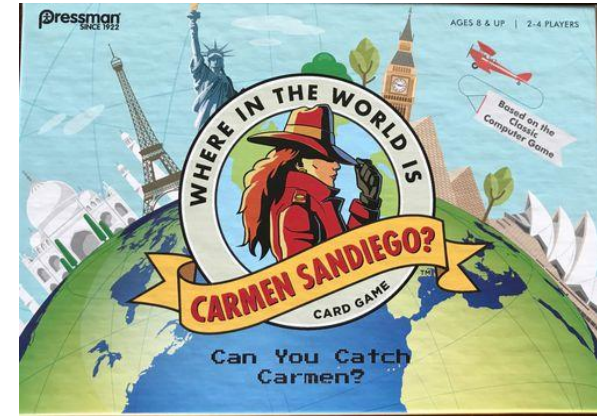
Research Paper

PAIN

Overactivity in chronic pain: is it a valid construct?

Nicole Emma Andrews^{a,b,c,*}, Jenny Strong^a, Pamela Joy Meredith^a

Pain ROADMAP Gamification



Pain ROADMAP Gamification Trial

Randomisation



OR



Outcomes



&



Analysis



X



Treatment



Adapting Pain Provoking Activities

- 1) Activity Pacing i.e. breaking up and rescheduling the task
- 2) Task simplification or assistive device prescription
- 3) Ceasing activity – values clarification and delegation



Activity Pacing Strategies

1) Taking regular short breaks



2) Changing posture during a task



3) Alternating between hard and easy tasks



Task Simplification/Assistive devices



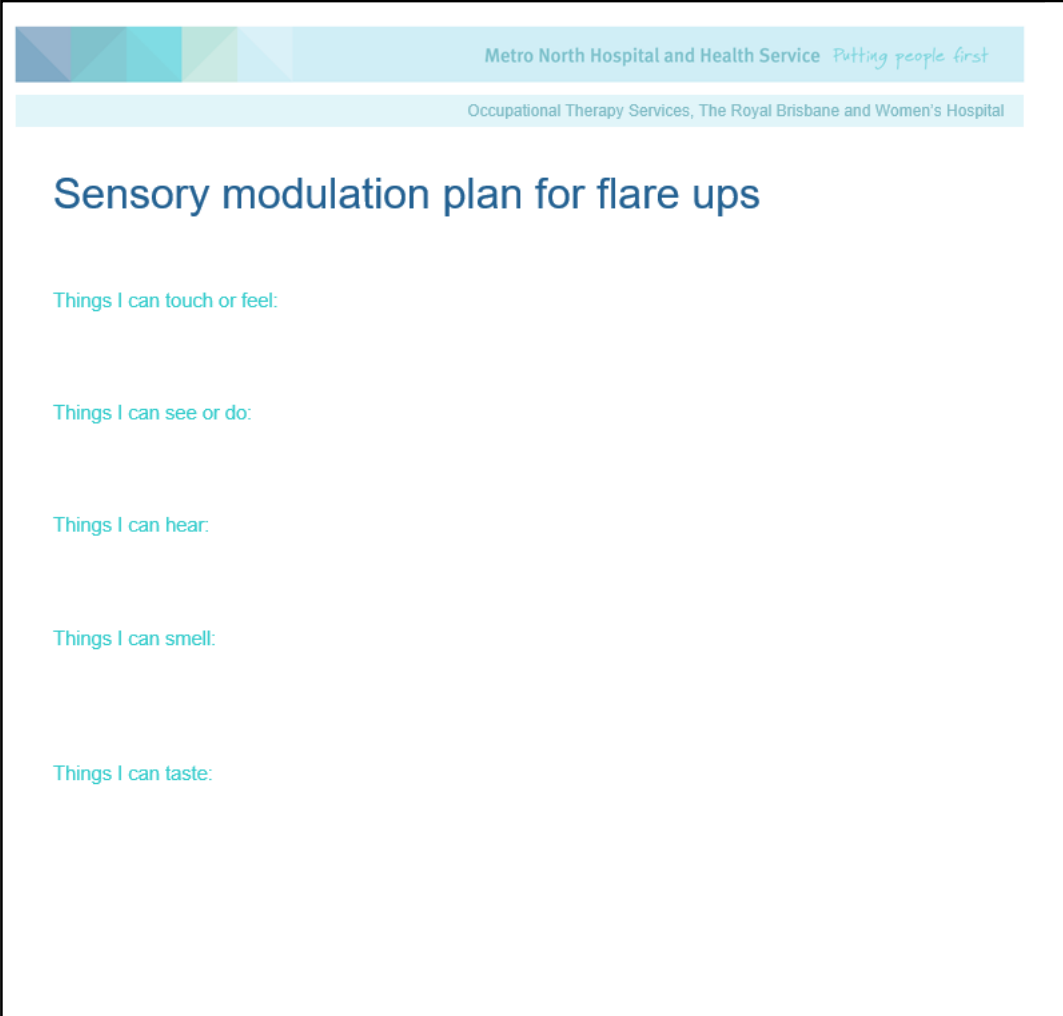
Values clarification

Do your children prefer the house to be spotless
or do they want to spend some quality time with
you?

Flare up management plan

Main Message

Resting and catastrophising about pain during a flare up will prolong and intensify the flare up



Metro North Hospital and Health Service *Putting people first*

Occupational Therapy Services, The Royal Brisbane and Women's Hospital

Sensory modulation plan for flare ups

Things I can touch or feel:

Things I can see or do:

Things I can hear:

Things I can smell:

Things I can taste:

Goal setting

Metro North Hospital and Health Service *Putting people first*

Occupational Therapy Services, The Royal Brisbane and Women's Hospital

Valued Living Questionnaire

Below are areas of life that are valued by some people. We are concerned with your quality of life in each of these areas. One aspect of quality of life involves the importance one puts on different areas of living. Rate the importance of each area (by circling a number) on a scale of 1-10. 1 means that area is not at all important. 10 means that area is extremely important. Not everyone will value all of these areas, or value all areas the same. Rate each area according to **your own personal sense of importance**.

<u>Area</u>	<u>Not at all Important</u>										<u>Extremely Important</u>									
1. Family (other than marriage or parenting)	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Marriage/couples/intimate relations	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Parenting	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Friends/social life	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Work	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
6. Education/training	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
7. Recreation/fun	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
8. Spirituality	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
9. Citizenship/Community Life	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
10. Physical <u>self care</u> (diet, exercise, sleep)	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

In this section, we would like you to give a rating of how successful you have been in each of these life domains. We are **not** asking about your ideal in each area. We are also **not** asking what others think of you. Everyone does better in some areas than others. People also do better at certain points in time than at others. **We want to know how you think you have been doing during the past week.** Rate each area (by circling a number) on a scale of 1-10. 1 means that you feel as though you have been completely unsuccessful in this life area. 10 means that you feel as though you have been extremely successful in this area of your life.

<u>Area</u>	<u>Completely Unsuccessful</u>										<u>Extremely Successful</u>									
1. Family (other than marriage or parenting)	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Marriage/couples/intimate relations	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Parenting	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Friends/social life	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Work	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
6. Education/training	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
7. Recreation/fun	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
8. Spirituality	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
9. Citizenship/Community Life	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
10. Physical <u>self care</u> (diet, exercise, sleep)	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

Support lasting behavioural change

1) Activity scheduling/pre-planning pain provoking activities

2) Encourage reflection and independent problem solving

-> ***Did you do too much? What happened? Was it worth it? Is there a way you could change the way you do this activity next time?***

3) Challenge inaccurate negative perceptions and thoughts (CBT)

-> ***“I need to get this done now” to “If I have a couple of extra coffee breaks I won’t be stuck in bed tomorrow and will be able to get more done”***

4) Prompts

Pain ROADMAP treatment protocol

Time	Appointment Type	Treatment
Week 1	Set up for monitoring in clinic	- Administer self-report measures and set up for 1st monitoring period
Week 3	Feedback from monitoring in clinic	- Goal setting using interest and values - Written and verbal general pacing education - Targeted advice on how to alter activities that aggravated pain (i.e. overactivity periods) and overall routine - Development of an individual pain flare up plan
Week 5	Teleconsult	- Review of goal progression and “individualised pacing plan” - Problem solve difficulties and develop new goals/plan
Week 7	Set up for monitoring in clinic	- Administer self-report measures and set up for 2 nd monitoring period - Introduce activity scheduling and pre-planning for activities that may be pain provoking - Create rough schedule and goals for the week
Week 9	Feedback from monitoring in clinic	- Feedback on changes in objective physical activity levels, productivity levels, pain, opioid use, (i.e. Pain ROADMAP outcomes) and changes in the self-report measures - Feedback on activities that aggravated pain and encourage independent problem solving for pain provoking activity - Review goals and encourage independent planning and activity scheduling
Week 11	Teleconsult	- Review of goals and strategies - Encourage independent goal setting, problem solving and activity scheduling/planning
Week 13	Set up for monitoring in clinic	- Administer self-report measures and set up for 3 rd monitoring period - Review of goals/strategies and encourage independent goal setting, problem solving and activity scheduling/planning
Week 15	Feedback from monitoring in clinic	- Feedback on changes in Pain ROADMAP outcomes and activities that aggravated pain - Create A8 card with key strategies and lesson learnt

Case Study

- 44 year old female with a two year history of lower back and R) Radicular lower limb pain following a fall from work as a domestic cleaner
- MRI indicated a small disc prolapse at L4/5 and L5/S1
- Reporting unpredictable severe shock like pains down R) leg
- Single mother with one adult son and a 11 yr old daughter who both lived at home
- Lived on a property and looked after horses
- Was studying counselling to retrain
- Had previously received a nerve root injection and extensive physiotherapy and hydrotherapy
- Psychology assessment – ongoing depression, poor self-confidence and used exercise to manage mood
- Presented as extremely fatigued with flat affect

Case Study

First Pain ROADMAP monitoring

- Moderate scores on DASS for depression and anxiety
- Large variation in activity across days and was taking more medication than prescribed
- Two objective overactivity periods observed in the data – one after cleaning a horse paddock and one following cleaning the bathroom
- Pacing plan – break up the horse paddock clean into two and spread throughout day, buy a turbo brush
- Goals – do physio exercises after lunch at least three times a week and walk up hill on property

First telephone review

- Not doing physiotherapy exercises as much as would like – set phone alarm
- Flare up following spending too long in bath – set maximum time (10 mins) and use phone alarm
- Only adding one activity at a time to routine



Case Study

Set up second monitoring

- “I feel like the old me”
- Purchased Pilates machine – goal to start at 10mins

Feedback second monitoring

- Provided feedback on progress based on outcome measures – improvements in mood, decreased opioid use, more stable pain.
- Goal – Go back to the gym, increase meal prep at home (plan for how to break up during the day)

Second Telephone

- Everything well as home, achieved meal prep goal, problem solving and pre planning independently
- Reported pacing was becoming easier
- Over did it at gym; made goal to talk to physiotherapy to alter exercise baseline

Case Study

Final feedback session

- Normal results on DASS
- No overactivity periods observed in data and stable pain levels (SD 0.84 \rightarrow 0.25)
- Taken less medication than prescribed
- 40% increase in objective activity levels and 4.5 % increase in time spent on productive tasks
- 0.5 point decrease average pain

Case Study

- 1. Don't try to push yourself through everything**
- 2. Pacing is your friend**
- 3. It's ok to say no to people**
- 4. If you're not having a good day, it's ok, it is just one day**
- 5. Stop being so hard on yourself**

Summary results from Pain ROADMAP implementation

- 16 patients who completed the Pain ROADMAP treatment protocol (80% retention)

Primary outcome	Mean 1 st monitoring	Mean 3 rd monitoring	<i>p</i> value
Number of overactivity periods observed in the data	2.63	0.38	<.001
Pain variation (SD Pain intensity)	1.16	0.79	.001
OPPA Total Score	16.92	14.31	.05

Summary results from Pain ROADMAP implementation

Secondary outcome	Mean 1 st monitoring	Mean 3 rd monitoring	<i>p</i> value
% rest	60.59	58.61	.65
% leisure/social	11.32	10.33	.78
% Productive task	27.67	31.07	.12
oMEDD taken	60.01	49.64	.37
PRN medication taken	9	2	.17
Objective Activity	542.61	575.81	.53
Activity Avoidance	3.10	2.67	.15
Depression	20.88	16.69	.23
Anxiety	14.60	12.56	.43
Stress	20.25	18.37	.56
Average Pain	4.51	4.59	.80

49 mins/day

17% decrease

78% cessation



Acknowledgments



Prof Jenny Strong



Prof Pamela Meredith



Dr David Ireland



Michael Deen



Dr Marlien Varnfield



Dr Cate Sinclair



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

CREATE CHANGE

Thank you

Dr Nicole Andrews | Research Fellow
RECOVER Injury Research Centre
n.andrews@uq.edu.au



facebook.com/recoverinjuryresearch



twitter.com/RecoverResearch

twitter.com/Nic_Em_Andrews

#TooMuchPainNoGain