

Evidence of disconnect between functional and perceived disability specific to lower back pain

## A comparison of anatomical pain sites from a tertiary care sample

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## Background

- Today we know pain involves
  - Sensory components
  - Cognitive, affective, behavioral, and social components
- Fear-anxiety-avoidance model(s) of chronic pain
  - Pain can lead to fear, which can lead to avoidance, which leads to disuse, disability, and depression

## Background

- Longer than three months
  - Pain persisting beyond the three-month duration typically required for healing of tissue damage is defined as **chronic pain**
  - **Chronic pain** is a complex, subjective, perceptual phenomenon involving intensity, quality, time course and personal meaning
  - Often associated with anxiety and depression

## Background

- Chronic musculoskeletal pain (CMP) is a pervasive, costly, debilitating global health care concern
  - Gatchel, 2004; Sjogren et al., 2009; Strassels, 2006
- Fear-anxiety-avoidance models suggest that for most people pain is unpleasant but not perceived as catastrophic (e.g., predicating permanent disability)
- As healing progresses, adaptive confrontation of pain and pain-related anxiety facilitates graduated increases in activity and reductions in pain

## Background

- For a significant minority, pain is perceived as catastrophic and results in maladaptive avoidance behaviours and promotes disabling CMP
  - 7% of the population has experienced disabling CMP in the past 12 months
    - McWilliams, Cox, & Enns, 2003

## Background



- Substantial heterogeneity has been identified within samples of patients having disabling CMP
  - Senlof et al., 2009; Turk and Rudy, 1988
- Differences have been found in coping strategies or comorbid psychopathology
  - Asmundson et al., 1997; Hardt et al., 2000; McCracken et al., 1999; McWilliams et al., 2003

## Background



- Samples have included
  - A single anatomical site
    - Only lower back, (Woods and Asmundson, 2008); shoulder, (Andersson and Haldrup, 2003)
  - Several anatomical sites
    - Lower back, shoulder, or leg pain (Lundberg and Styf, 2008; Senlof et al., 2009)
- But none have compared pain sites

## Background



- Patients with chronic lower back pain (CLBP) may differ from those with chronic upper or lower extremity pain (ULEP) in presentation, recovery trajectory, and pain-related anxiety
- Currently there is a paucity of even indirect comparisons of anatomical pain site groups
  - Wijnhoven et al., 2006

## Purpose



- Assess for systematic differences between CLBP and ULEP patients participating in a six-week multidisciplinary reconditioning (i.e., graded exposure) third-party-payer program

## Hypotheses



1. Reductions for both groups in pain-related anxiety, catastrophizing, fear of (re)injury, depression, perceived disability, and functional deficit, but not necessarily reductions in reported pain severity
2. The CLBP group would report relatively higher levels of pain-related anxiety, catastrophizing, fear of (re)injury, and depression
3. The CLBP group would report greater perceived disability and demonstrate higher levels of functional deficit

## Participants



- Participants were 51 patients who had been injured in workplace accidents
  - 31% women; ages 24 to 60 years, M age=43.9, SD=9.7
- Enrolled in a six-week third-party sponsored multi-disciplinary reconditioning program

## Participants



- 78% employed prior to their injury
- $M=42.9$  ( $SD=10.5$ ) hours per week
- $M=\$16.19$  per hour ( $SD=6.31$ )
- Reported job stress  $M=49/100$  ( $SD=26$ )
- Reported job satisfaction  $M=76/100$  ( $SD=25$ )
- No significant demographic differences (all  $p>.05$ ) between men and women

## Participants



- Half of the patients lower back as their primary pain location (CLBP;  $n=23$ ; 35% women)
- The other half reported an extremity (e.g., arm, shoulder, leg, knee) as their primary pain location (ULEP;  $n=28$ ; 29% women).

## Measures



- Patients were assessed at intake, three weeks, and six weeks (program completion)
- Assessment included several self-report questionnaires and an objective measure of functional capacity

## Measures



- Anxiety Sensitivity Index
  - ASI; Peterson and Reiss, 1992
- Pain Anxiety Symptoms Scale-20
  - PASS-20; McCracken and Dhingra, 2002
- Pain Catastrophizing Scale
  - PCS; Sullivan et al., 1995
- Illness/Injury Sensitivity Index-Revised
  - ISI-R; Carleton et al., 2006
- Center for Epidemiologic Studies-Depression Scale
  - CES-D; Radloff, 1977
- The Visual Analogue Scale
  - VAS; Melzack and Perry, 1975
- Index of Perceived Disability
  - IPD; Author Measure
- Functional Ability Percent Deficit
  - FAPD; Author Measure

## Measures



- Anxiety Sensitivity Index-3 (ASI-3)
  - Three factorially distinct components
    - 1) Fear of somatic sensations; 'somatic'
      - "It scares me when my heart beats rapidly."
    - 2) Fear of cognitive dyscontrol; 'cognitive'
      - "When I cannot keep my mind on a task, I worry that I may be going crazy."
    - 3) Fear of socially observable anxiety reactions; 'social'
      - "It is important to me not to appear nervous."

## Measures



- Pain Anxiety Symptoms Scale-20 (PASS-20)
  - Four factorially distinct components
    - 1) Cognitive anxiety
      - "I can't think straight when in pain"
    - 2) Pain-related fear
      - "Pain sensations are terrifying"
    - 3) Escape and avoidance
      - "I try to avoid activities that cause pain"
    - 4) Physiological anxiety
      - "Pain makes me nauseous"

## Measures



- Pain Catastrophizing Scale (PCS)
  - Unitary
    - "I worry all the time about whether the pain will end"
- Illness/Injury Sensitivity Index-Revised (ISI-R)
  - Two factorially distinct components
    - 1) Fear of Illness
      - "I get scared if I think I am coming down with an illness."
    - 2) Fear of Injury
      - "I am frightened of being injured."

## Measures



- Center for Epidemiologic Studies-Depression Scale (CES-D)
  - Unitary
    - "I felt depressed"
- The Visual Analogue Scale (VAS)
  - A single 100 mm line representing a continuum between "no pain" (0) and "worst pain imaginable" (100)

## Measures



- Index of Perceived Disability (IPD)
  - Each patient completed a site-specific measure of perceived disability and the scores were then standardized
    - Grooming your hair; getting into or out of the bath; squatting
- Functional Ability Percent Deficit (FAPD)

$$\text{FAPD} = \frac{\text{Current demonstrated capacity}}{\text{Pre-injury work setting physical demands}}$$

## Treatment Protocol



- Individually tailored graded activity by an independent multidisciplinary team
- Attended 6.5 hours per day of work-hardening, general conditioning, and biomechanical treatment
- Group education classes on pain, the process of tissue healing

## Treatment Protocol



- One hour per week of supportive psychological counselling from the team psychologist
- No cognitive behavioural treatment to reduce pain-related anxiety or fear
- One hour of relaxation-based pain management techniques along with psychoeducation that "hurt" does not necessarily equal "harm"

## Analyses



- Correlations between the dependent variables and demographics
- Independent *t*-tests and chi-square analyses compared the two pain groups (CLBP vs. ULEP)
- A repeated measures analysis of variance (ANOVA) was used to assess longitudinal changes from intake, to three weeks, to six weeks and compare the two pain groups

### Results: Correlations

- At intake
  - Work stress and PASS cognitive ( $r=.52; p<.05$ )
  - Work stress and PASS fear ( $r=.46; p<.05$ )
  - Work stress and PASS physiological ( $r=.59; p<.05$ )
  - Work stress and ASI somatic ( $r=.50; p<.05$ )
- At three weeks
  - Work stress and PASS physiological ( $r=.45; p<.05$ )
- At six weeks
  - Work stress and PASS cognitive ( $r=.49; p<.05$ )
  - Work stress and ISI-R injury ( $r=.47; p<.05$ )
  - Work stress and PCS ( $r=.46; p<.05$ )
  - Work stress and hours of work per week ( $r=.44; p<.05$ )

### Results: Correlations

- None of the correlations between the FAPD and both the IPD and the VAS were significant (all  $r_s < .10$ ; all  $p_s > .10$ )
- None of the correlations between pain duration and any of the dependent variables were significant for patients in either the CLBP or ULEP groups (all  $r_s < .10$ ; all  $p_s > .10$ )

### Results: Comparisons

- There were no noted systematic differences in program attendance or adherence based on demographic variables or pain location
- No significant differences between groups (CLBP vs. ULEP) on any of the demographic measures or on sex
  - $\chi^2(1) = .24, p > .10, phi = .07$
- No significant differences between groups and post-program outcomes (returned to work, returned to modified work, or did not return to work)
  - $\chi^2(2) = .98, p > .10, phi = .14$

### Results: Repeated Measures ANOVA

- Significant linear effects were found for most measures, including an improvement in functional capacity for both groups
- VAS scores (i.e., reported pain intensity) actually *increased* over the course of the program for both groups
- Relative to ULEP, CLBP reported lower pain-related fear, fear of physiological reactions, fear of injury and illness, and pain catastrophizing over the course of the program
- Most of the interaction effects were not significant; except a between-group interaction ( $p < .01$ ) on perceived disability

### Results: Repeated Measures ANOVA

Descriptive Statistics and Group Comparisons across Time

	Intake			3 Weeks			6 Weeks		
	Extremity Pain	Lower Back Pain	r <sup>2</sup>	Extremity Pain	Lower Back Pain	r <sup>2</sup>	Extremity Pain	Lower Back Pain	r <sup>2</sup>
PASS-Cognitive†	11.29 (6.61)	7.43 (5.66)	.09	10.00 (6.22)	8.83 (8.12)	-	8.82 (5.70)	5.70 (4.79)	.08
PASS-Esc/Avoid†	11.50 (5.90)	7.09 (5.23)*	.14	9.25 (5.71)	8.74 (8.55)	-	8.14 (5.63)	4.78 (4.65)	.10
PASS-Fear	7.36 (5.46)	3.00 (3.92)*	.19	6.36 (6.22)	3.43 (5.03)	.06	5.43 (6.17)	2.26 (2.80)	.13
PASS-Physiology	7.00 (6.10)	3.39 (3.13)*	.15	6.86 (6.29)	3.87 (3.77)	.09	5.89 (6.08)	2.87 (3.68)	.08
ASI-Somatic	9.14 (8.04)	5.17 (4.20)	.11	8.89 (7.21)	5.65 (7.67)	.05	8.68 (7.37)	3.13 (3.44)*	.24
ASI-Cognitive	2.29 (2.81)	1.52 (2.15)	.02	2.86 (2.98)	1.87 (2.58)	.03	2.39 (2.69)	1.00 (1.60)	.10
ASI-Social†	6.29 (3.60)	3.78 (2.88)	-.	6.32 (3.16)	5.96 (2.90)	-	5.30 (2.56)	4.74 (2.99)	.02
ISI-R Injury	6.64 (4.48)	3.52 (3.44)*	.13	7.50 (7.91)	3.91 (3.70)	.08	5.86 (4.99)	2.39 (2.37)*	.23
ISI-R Illness	6.18 (5.62)	2.65 (2.59)*	.18	6.71 (6.25)	4.30 (7.67)	.03	5.96 (5.43)	1.91 (2.11)*	.27
PCS	17.89 (12.59)	9.87 (8.92)*	.13	14.79 (14.79)	10.83 (9.98)	.02	14.75 (12.87)	5.83 (5.08)*	.24
CES-D†	16.82 (10.36)	12.30 (7.09)	.06	18.86 (9.84)	14.39 (8.09)	.06	14.37 (9.39)	12.17 (6.26)	.02
VAS‡	41.20 (23.90)	31.30 (24.70)	.04	46.10 (25.80)	45.90 (26.70)	-	50.40 (39.40)	49.00 (34.90)	-
FAPD†	27.14 (25.29)	23.19 (27.31)	-	20.00 (23.10)	11.22 (19.62)	.04	7.18 (15.08)	11.70 (19.90)	.02
IPD†	50.00 (14.23)	56.47 (17.56)	.04	43.70 (14.75)	56.88 (20.31)*	.13	39.69 (17.27)	64.64 (19.26)*	.33

† Significant Linear Reduction  
‡ Significant Linear Increase

### Results: Repeated Measures ANOVA

IPD – Index of Perceived Disability  
FAPD – Functional Ability Percent Deficit

## Discussion



1. Reductions for both groups in psychological measures ✓, perceived disability ✗, and functional deficit ✓, but not reductions in pain severity ✓
  - Reductions in pain-related anxiety, catastrophizing, depression, and functional deficit across both groups
  - Increase in reported pain severity across both groups
  - No reductions in anxiety sensitivity or fear of (re)injury
  - Reduction in perceived disability for ULEP, but not CLBP

## Discussion



2. The CLBP group would report relatively higher levels of pain-related anxiety, catastrophizing, fear of (re)injury, and depression ✗
  - Comparable levels of depression at intake, three weeks, and six weeks
  - ULEP group reported more pain-related anxiety, more catastrophic thoughts, and more fearful cognitions than the CLBP group throughout

## Discussion



3. The CLBP group would report greater perceived disability ✓ and demonstrate higher levels of functional deficit ✗
  - Comparable levels of pain, perceived disability, and functional deficit at intake
  - Comparable on levels of pain and functional deficit at three and six weeks
  - No significant correlations between functional deficit, perceived levels of disability, and/or pain

## Discussion



3. The CLBP group would report greater perceived disability ✓ and demonstrate higher levels of functional deficit ✗

## Summary



- CLBP and ULEP reported **reductions** in fear-anxiety-avoidance variables
- CLBP demonstrated **reduced** disability but paradoxically reported an **increase** in reported perceived disability and **no change** in pain-related and somatic fear
- ULEP demonstrated **reduced** disability, **reduced** perceived disability, and **reduced** pain-related and somatic fear

## Implications



- CLBP may be qualitatively distinct from extremity pain
- Psychological interventions targeting catastrophizing and pain-related anxiety may improve the effectiveness of interventions for ULEP patients; however...
- CLBP patients may require even more comprehensive or individually tailored multidisciplinary interventions

## Limitations & Future Directions



- No follow-up data and no measure of how the perceived disability impacted the patient
- No comparisons between upper and lower extremities
- Small sample size
- Patients receiving compensation

Questions?

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