Treatment and subclassification of chronic low back pain

Plan for the presentation

1. Low Back Pain
2. Multidimensional classification
3. Evidence for MDC

60-70% recurrence within 6 months
50% settle within 4-8 weeks
60-65% lifetime prevalence low back pain
5-10% severely disabled
Mild disability 45-55%

Leboeuf-Yde et al 1996
Deyo 2002
Freburger et al 2009
Hestbaek et al 2003
Careme 1994

Kjartan Vibe Fersum
Why has a biomedical approach failed?
What underlies the disorder?

Current evidence for management of NSCLBP

- Spinal manipulative therapy  
  Rubinstein et al 2011 Cochrane review
- No intervention is superior  
  Minimal change in pain
- Cognitive behavioural treatment  
  Henschke et al 2010 Cochrane review

Predictors of future LBP in student nurses


Slump sitting  
BME

Physical activity

Repositioning accuracy

History LBP

Stress

Un-accounted

5% 11% 9% 6%

9%

5%

9%

5%
Predictors of disability levels in CLBP

Woby et al 2007

Cognitive factors

Pain intensity

Age

27%

32%

Unaccounted

Vicious cycle of pain

Treatment must be:

- Multidimensional
- Identifying maladaptive behaviours
- Person centered
- Tailored
- Directed to the modifiable underlying pain mechanisms and behaviours

Woby et al 2007

2

Multidimensional classification

Specific LBP

• Degenerative disease
• Disc prolapse +
• Radiculopathy
• Degenerative disc +
• Vertebral changes
• Pyogenic and systemic disease

Chronic LBP

• "Red Flags"
- Cancer
- Infection
- Inflammatory conditions
- Fractures

85-90%
Chronic LBP
- Spondylolisthesis
- Disc prolapse + radicular pain
- Degenerative disc + modic changes
- Foraminal and central stenosis

Centrally mediated pain

Non-specific chronic LBP

Peripherally mediated pain

Central impairment

Movement impairment

"Red Flags"
- Cancer
- Infection
- Inflammatory conditions
- Fractures

Pelvic girdle pain

Decreased "force closure"

Increased "force closure"


Peripherally mediated pain

+/- lifestyle / cognitive / psycho-social factors contributing to disorder

Directional subgroups

Neurophysiological factors

Centrally mediated pain

Peripherally mediated pain

Kvåle et al 2001

specific LBP

Quebec CS

Non-specific chronic LBP

Neurophysiological

Kvåle et al 2001
Pain location

Pelvic girdle

Low back


Low back

Chronic LBP

- Degenerative disc +
- Modic changes +
- Foraminal and central stenosis

Non-specific chronic LBP

Centrally mediated pain

Peripheral mediated pain

Specific LBP

- Degenerative disc +
- Modic changes +
- Foraminal and central stenosis
- Red Flags*
  - Cancer
- Infection
- Inflammatory conditions
- Fractures

Maladaptive movement behaviour

- Usual Sitting
- Flexion
- Extension
- Sacral angle

Dankaerts et al. Spine 2006

- No-LBP
- Painful Position
- Active Extension

Maladaptive movement behaviour

- Increased “force closure”
- Decreased “force closure”

Directional subgroups

Usual Sitting

Sacral angle

Dankaerts et al. Spine 2006

Usual Sitting

Sacral angle
Forward Bending Kinematics

Statistical Classification Model could accurately classify and discriminate (96.4%) Dankaerts et al Spine 2009

Chronic LBP

Psychosocial factors (Linton 2000) Influences pain and maladaptive behaviors....

Specific LBP Chronic LBP Red Flags

Psychosocial and lifestyle behaviours Ørebro Screening Questionnaire


Centrally mediated pain Peripherally mediated pain

- Pelvis girdle pain
- LBP

Non-specific chronic LBP

Directional subgroups

Cognitive: hyper-vigilance, catastrophizing, negative beliefs, LOC
Emotional: stress, fear, anxiety, depression, anger
Behavioural: avoidance & pain behaviour, poor coping & pacing
Social factors: socio-economic status, family functioning, cultural
Work related factors: level of support, satisfaction, compensation
Lifestyle – physical activity

Intensity of activity

Risk of back pain

High

Low

Inactivity

Vigorous

Bjorck-Van Dijken et al 2001

Patient 1

Clinical reasoning process patient 1

1. Non-specific chronic LBP

2. Peripherally mediated pain disorder

3. Low back pain

4. Movement impairment

5. Diminished range of motion

6. Overload and degeneration, psychosocial factors, Fear, Catastrophizing

Patient 1

Increased back load

Back pain+++

Bending back strain

Anxiety

Fear

↑ Sensitisation, inability to relax motor system

↑ Stress, anxiety

↑ Focus on pain

Belief that back was damaged and unstable

Fear / -ve thoughts

Avoidance of flexion and bending

Muscle guarding + stabilisation ex's

Stress, anxiety

↑ Focus on pain
28.03.12

Back pain+++
Muscle guarding + stabilisation ex’s
Bending back strain
Stress, anxiety ↑
Focus on pain ↑
Sensitisation, inability to relax motor system
Belief that back was damaged and unstable
Fear / -ve thoughts
Avoidance of flexion and bending
Increased back load

Classification based
Cognitive functional therapy (CB-CFT)

Patient 1

Non-specific chronic LBP
Low back pain

Clinical reasoning process patient 2
Increased anxiety / depression
Disability
Lack of awareness of pain mechanism (mindfulness)
Provocative movement patterns
Provocative activities work and home
Poor pacing

Back strain/pain
Muscle guarding – back and abdominals
Avoidance of physical activity
De-conditioning
Loss of spinal control (tissue strain)

Increased anxiety / depression
Disability
Lack of awareness of pain mechanism (mindfulness)
Avoidance of physical activity
De-conditioning
Loss of spinal control (tissue strain)

Classification based cognitive functional therapy (CB-CFT)

Patient 2

3
Evidence for MDC
Study aims paper I

- Review the literature of non-specific chronic low back pain (NSCLBP)
- Level of integration of sub-classification in RCTs
- Summarize effect of studies using classification and targeted treatment

Sub-classification in RCTs

- 762 RCT
- 68 RCT

Paper I

Fersum K, Dankaerts W, O’ Sullivan P, Maes J, Skouen JS, Bjordal JM, Kvale A.

Integration of sub-classification strategies in RCTs evaluating manual therapy treatment and exercise therapy for non-specific chronic low back pain (NSCLBP): a systematic review.

## Studies utilising sub-classification

<table>
<thead>
<tr>
<th>Author</th>
<th>Description</th>
<th>Biopsych model</th>
<th>Validated NSCLBP</th>
<th>Reliable Intervention matched</th>
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<tbody>
<tr>
<td>Gudavalli M.R. et al. 2006 (N=235)</td>
<td>Severity Stage</td>
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<tr>
<td>Riipinen M. et al. 2005 (N=204)</td>
<td>Multidimensional Pain Inventory</td>
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<td>✓</td>
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<tr>
<td>Vollenbroek-Hutten M.M.R. et al. 2004 (N=142)</td>
<td>Multidimensional Pain Inventory</td>
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<tr>
<td>Petersen T. et al. 2002 (N=260)</td>
<td>McKenzie based</td>
<td></td>
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<tr>
<td>Snook et al. 1998 (N=85)</td>
<td>Age Gender Pain location Playch</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

## Outcome pain at follow-up 36-52 weeks

### Outcome disability at follow-up 36-52 weeks

### Summary paper I

- Limited to non-existing classification system approaches
- Suggest use of valid and reliable classification systems within a biopsychosocial construct
Paper II
Fersum K, O’Sullivan P, Kvåle A, Skouen JS.
The inter-examiner reliability of a classification system for patients with non-specific low back pain.

Method & Procedure

Sample characteristics paper II
• Number of patients 26
• Female/Male 11/15
• Mean age 32 years
• Mean pain intensity 6/10
• Mean pain duration 5 years
• Mean Oswestry (function) 21.2
• Mean HSCL (well being) 1.93

Non-specific chronic LBP
N=26 Agr=99%

Centrally mediated pain disorder
N=26 Agr=99%

Non–specific CLBP
N=26 Agr=99%

Low back pain "directional subgroups"
N=1 Agr=100%
N=24 Agr=99%

N=24 K = 0.82
(0.62-0.90)

N=8 K = 0.68
(0.57-0.82)
Summary paper II

- Physiotherapists can reliably classify a broader group of NSCLBP
- ↑ classification training = ↑ reliability
- Psycho-social factors can be reliably identified by physiotherapists
- ↑ clinical validation of the O’Sullivan Classification System (OCS)

Study aim paper III

- Assess efficacy of classification based cognitive functional therapy for NSCLBP compared to manual therapy and exercise

Paper III

Efficacy of classification based ‘cognitive functional physiotherapy’ in patients with Non Specific Chronic Low Back Pain (NSCLBP) – A randomised controlled trial

Kjartan Vibe Fersum, Peter O’Sullivan, Jan Sture Skouen, Anne Smith and Alice Kvåle

Submitted
Flowchart RCT study

Recruitment
Referral (inclusion)

Telephone screening

Testing/classification

Inclusion N=121

Randomisation

Inclusion N=121

Task failure

Inclusion N=112

Exclusion failure

Exclusion N=48

Cognitive Functional Therapy

• 2 manual therapists and 1 physiotherapist
• Cognitive behavioural principles
• CFT individualized according to classification
  1. Cognitive model
  2. Specific movement based exercise
  3. Functional integration
  4. Cardiovascular fitness
• Treatments (mean–SD): 7.7 (2.7)

Manual Therapy/Exercise

• 3 experienced manual therapists
• Cognitive behavioural principles
• Individualised treatment from the therapists clinical decision included:
  - 

Interventions RCT

Disability - Oswestry

<table>
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<th>Pre</th>
<th>Post</th>
<th>15 months post</th>
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<tr>
<td>P</td>
<td>0.164</td>
<td>0.000</td>
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Pain intensity

<table>
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<th>Pre</th>
<th>Post</th>
<th>15 months post</th>
</tr>
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<tbody>
<tr>
<td>P</td>
<td>0.417</td>
<td>&lt;0.000</td>
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</table>
Minimally Important Change – Disability at 15 months
(> 10 point change in function - ODI)

Minimally Important Change – Pain at 15 months
(> 1.5 on pain on VAS)

1. Cognitive model
   - Patho-anatomical factors
   - Neurophysiological factors
   - Psychological factors
   - Beliefs
   - Stress
   - Fear
   - Catastrophising
   - Mood
   - Activity
   - Sedentary
   - Coping
   - Work
   - Family
   - Friends

   • Individualised
   • Classification based

2. Functional training – Flexion pattern
   - Usual posture
   - Corrected posture
   - Corrected sit to stand
   - Usual bending
   - Corrected bending
2. Specific exercises – Active extension

Corrected posture

Usual posture

Corrected sit to stand

Usual sit to stand

Corrected bending

3. Functional integration

4. Cardiovascular exercise

Flexion pattern

Extension pattern

Vicious cycle

From Linton/ Vlaeyen 2005 / Shultze 2009

kjartan.ferusum@isf.uib.no

Provides promise for a change of practice
A RCT utilising classification and targeted management for NSCLBP

Laboratory validation

Intertester reliability for a broader group of NSCLBP

Systematic review of RCT for NSCLBP where Classification Systems have been utilised

Fersum et al
O’Sullivan & Beales, 2007a, 2007b
Fersum et al, 2010
Dankaerts et al.
O’Sullivan & Beales, 2011

Ability to discriminate distinct patterns
Dankaerts et al, 2006a, 2006b, 2009
Dankaerts et al, 2010
Beales & O’Sullivan, 2011

NSCLBP

Dankaerts & O’Sullivan 2006