

### The evidence base for the SPINEDATA low back pain questionnaires

This document summarises the evidence for the selection of items in the low back pain questionnaires. There are many levels of evidence available, from clinical observation through to meta-analysis of the results of randomized controlled trials. There are also many types of validity, from face validity through to the demonstration of improved patient outcomes. This document draws on two types of high-quality published evidence, both of which are central to therapeutic decision-making in the care of low back pain (LBP): (1) evidence that the presence of a clinical finding indicates a better response to a particular treatment relative to a credible comparison treatment (therapeutic studies), and (2) evidence of the association between a clinical finding and an increased risk of chronicity/poor-outcome (prognostic studies). Some items were carried over from the previous baseline assessment procedure (COBRA) that had been used in this setting, as there was a clinical tradition of using these items based on their face validity.

Question	Evidence
<b>Patient questionnaire</b>	
<i>Contextual (environmental and personal) factors</i>	
What is your height? What is your weight?	Greater body mass index - associated with poor outcome in 3 prognostic studies <sup>1-3</sup> .
Do you smoke cigarettes?	Smoking - associated with poor outcome in 2 prognostic studies <sup>3,4</sup> .
Is the hand that you use most often, your right or left hand?	Handedness is used to determine which elbow to access as a screening test for systemic hypermobility. In a study at the Spine Centre of Southern Denmark (n=4062 patients), this screening test had an overall accuracy of 94% when compared with the nine Beighton Hypermobility Criteria (unpublished data).
Have you ever had a back operation?	Previous low back surgery - carried over from COBRA.
Do you have or have you had any heart disease?	Screening for co-morbidities - associated with poor outcome in 2 prognostic studies <sup>5,6</sup> .
Do you have or have you had any serious lung disease?	
Do you have any allergies (including allergies to any medicines)?	
If you have any other important diseases or health conditions, please list:	
Please list any other medications that you are taking for any health condition:	
Do you have or have you had cancer?	History of lung, prostate or breast cancer - associated with an increased risk of cancer-related LBP <sup>7</sup> .
Have you experienced any unexpected weight loss?	Recent weight loss - associated with an increased risk of cancer-related LBP <sup>8</sup> .

Do you have morning stiffness in your back for more than 1 hour?	Morning stiffness - part of a symptom complex indicating increased probability of inflammatory spinal conditions <sup>9</sup> .
Have you taken corticosteroid medication for more than 3 months?	Use of corticosteroids - associated with an increased risk of fracture-related LBP <sup>10</sup> .
Was the onset of your low back pain associated with a recent or current pregnancy?	Pregnancy - LBP has a high prevalence during pregnancy and this may represent a subgroup with a different clinical course from other nonspecific LBP.
What is the intensity of the physical activity in your recreational activities?	Level of recreational physical activity - associated with poor outcome in 4 prognostic studies <sup>11-15</sup> .
Do you take any type of pain-killer (analgesic)? If Yes, which pain killers are you taking? (name/dose)	Analgesic use - carried over from COBRA.
Have you applied for a pension either because of back pain or some other reason?	2 categories of having applied for pension LBP - carried over from COBRA.
Are you making a back pain-related insurance claim - employer or patient or compensation or complaint?	Compensable condition - associated with poor outcome in 7 prognostic studies <sup>2,16-22</sup> .
How do you get along with your workmates?	Workplace relationships - carried over from COBRA
<i>Physical impairment</i>	
Since the onset of this pain, have you experienced any pins and needles or numbness in your legs or feet?	Sensory loss - symptom associated with nerve root compression and used in the Fritz/Delitto subgrouping method (Traction category) <sup>23</sup> .
Since the onset of this pain, have you experienced any weakness of your legs or feet?	Paraesthesia - symptom associated with nerve root compression and used in the Fritz/Delitto subgrouping method (Traction category) <sup>23</sup> .
Since the onset of this pain, have you experienced any change in your bladder or bowel control?	Change of bladder or bowel control - symptom associated with cauda equina compression - identification of a specific LBP pathology.
<i>Pain</i>	
Approximately when was the onset of pain?	Longer pain duration associated with poor outcome in 8 prognostic studies <sup>2,3,11,20,24-27</sup> . Pain < 16 days duration a component in the Childs 2004 manipulation clinical prediction rule <sup>24,28</sup> . Duration > 3 months part of symptom complex indicating increased probability of ankylosing spondylitis <sup>9,29</sup> .
How did the pain start?	Sudden onset - associated with poor outcome in 2 prognostic studies <sup>11,25,26</sup> .

Was there a reason or cause for the onset?	Mechanism of injury - associated with poor outcome in 2 prognostic studies <sup>30,31</sup> .
Did the onset of your low back pain follow physical trauma?	Onset post trauma - symptom used in the Fritz/Delitto subgrouping method <sup>23,32</sup> .
On average, how many days of the week do you have this pain?	Pain frequency - associated with poor outcome in 1 prognostic study <sup>11</sup> .
At what time of the day is the pain worst?	Diurnal variation - carried over from COBRA.
Your back pain now? (0-10)	Greater pain intensity associated with poor outcome in 14 prognostic studies <sup>12,21,22,27,31,33-42</sup> .
The most severe back pain that you have had in the last 14 days? (0-10)	
Your average back pain in the last 14 days? (0-10)	
Your leg pain now? (0-10)	Leg pain associated with poor outcome in 12 prognostic studies <sup>1,2,11,12,15,22,24,39,43-46</sup> . Leg pain > LBP associated with nerve root compression (sensitivity 82%, specificity 54%).
The most severe leg pain that you have had in the last 14 days? (0-10)	
Your average leg pain in the last 14 days? (0-10)	
Do some movements of your back increase the pain?	Movement-related pain - associated with poor outcome in 1 prognostic study <sup>16</sup> .
Have you had previous episodes of low back pain?	Prior episodes - associated with poor outcome in 10 prognostic studies <sup>11,20,21,27,31,33,41,44,46,47</sup> .
Do you experience episodes of low back pain that are triggered by very minor activity?	Recurrences with minor activity- symptom used in the Fritz/Delitto subgrouping method <sup>23,32</sup> .
Pain chart	Pain distribution: Leg pain associated with poor outcome in 12 prognostic studies <sup>1,2,11,12,15,22,24,39,43-46</sup> . Widespread pain associated with poor outcome in 2 prognostic studies <sup>2,46</sup> .
Pain drawing regions	46 body regions coded to indicate areas of pain.
<i>Activity limitation</i>	
I stay at home most of the time because of my back problem or leg pain (sciatica) (RMDQ1), I change positions frequently to try and get my back or leg comfortable (RMDQ2), I walk more slowly than usual because of my back problem or leg pain (sciatica) (RMDQ3), Because of my back problem or leg pain (sciatica), I am not doing any of the jobs that I usually do around the house (RMDQ4),Because of my back problem or leg pain (sciatica), I use a handrail to get upstairs (RMDQ5),Because of my back problem or leg pain	High activity initial limitation - associated with poor outcome in 10 prognostic studies <sup>12,17,18,36,37,40,47</sup> . RMDQ = Roland Morris Disability Questionnaire. Item 15 (night pain) is also a red flag.

<p>(sciatica), I have to hold on to something to get out of an easy chair (RMDQ6), I get dressed more slowly than usual because of my back problem or leg pain (sciatica) (RMDQ7), I only stand for short periods of time because of my back problem or leg pain (sciatica) (RMDQ8), Because of my back problem or leg pain (sciatica), I try not to bend or kneel down (RMDQ9), I find it difficult to get out of a chair because of my back problem or leg pain (sciatica) (RMDQ10), My back or leg is painful almost all the time (RMDQ11), I find it difficult to turn over in bed because of my back problem or leg pain (sciatica) (RMDQ12), I have trouble putting on my socks or stockings because of the pain in my back or leg (RMDQ13), I only walk short distances because of my back or leg pain (sciatica) (RMDQ14), I sleep less well because of my back problem or leg pain (sciatica) (RMDQ15), I avoid heavy jobs around the house because of my back problem or leg pain (sciatica) (RMDQ16), Because of my back problem or leg pain (sciatica), I am more irritable and bad tempered with people than usual (RMDQ17), Because of my back problem or leg pain (sciatica), I go upstairs more slowly than usual (RMDQ18), I stay in bed most of the time because of my back problem or leg pain (sciatica) (RMDQ19), Because of my back problem or leg pain (sciatica), my sexual activity is decreased (RMDQ20), I keep rubbing or holding areas of my body that hurt or are uncomfortable (RMDQ21), Because of my back problem or leg pain (sciatica), I am doing less of the daily work around the house than I would usually do (RMDQ22), I often express concern to other people over what might be happening to my health (RMDQ23).</p>	
<i>Participation restriction</i>	
Are you either currently employed or currently studying?	Assists in differentiation of people who have taken time off paid work from those performing unpaid work. Component of the Orebro screening questions <sup>48</sup> .
What job or type of study?	Employment type - carried over from COBRA.
Are you unemployed?	Unemployed - carried over from COBRA.
Have you taken sick leave for back pain in the last 3 months?	Sick leave assessment - carried over from COBRA.
If you have taken sick leave for back pain in the last 3 months - how many days sick leave?	Longer time off work - associated with poor outcome in 6 prognostic studies <sup>4,11,15,20,38,49</sup> .

Are you still on sick leave for back pain or for another reason?	2 categories of sick leave. Longer time off work - associated with poor outcome in 6 prognostic studies <sup>4,11,15,20,38,49</sup> .
Are you on restricted work hours because of back pain or because of another health problem?	2 categories of restricted hours- carried over from COBRA.
Do you have a flexjob?	Flexjob - carried over from COBRA.
Are you undertaking rehabilitation?	Undertaking rehabilitation - carried over from COBRA.
<i>Psychological</i>	
Age	Older age associated with poor outcome in 12 prognostic studies <sup>11-14,30,38-41,44,46,50,51</sup> . Age >65 associated with spinal stenosis (sensitivity 77%, specificity 69%) <sup>9</sup> , age >50 associated with increased risk of fractures <sup>52</sup> .
Gender	Gender - associated with poor outcome in 8 prognostic studies <sup>3,17,18,25,26,30,39,45,46,50</sup> .
Are you receiving a pension either because of back pain or some other reason?	2 categories of receiving pension- carried over from COBRA.
In your job, are you or were you exposed to vibration for more than 2 hours a day (for example: (a) driving a bus or truck or similar, or (b) not simply using light hand tools but also using large shaking machinery)?	Exposure to vibration - carried over from COBRA.
Is your work/domestic activity monotonous?	Job variety – a component of the Orebro screening questions <sup>48</sup> .
How physically strenuous do you consider your work to be?	Physically demanding activity - associated with poor outcome in 7 prognostic studies <sup>1,4,11,12,30,44,47</sup> .
In 6 weeks time, how difficult do you think it will be to sit or stand long enough to perform your usual work?	Self-perceived risk of poor outcome - component of the Orebro screening questions <sup>48</sup> .
If you are in paid employment and you take into consideration your work routines, management, salary, promotion possibilities and work mates, how satisfied are you with your job?	Job satisfaction - associated with poor outcome in 7 prognostic studies <sup>2,12,16,38,39,42,46</sup> .
If you are in paid employment, in your estimation what are the chances that you will be working in 6 months?	Expectations of recovery - associated with poor outcome in 2 prognostic studies <sup>37,47</sup> .
Health-related quality of life	From the EQ-5D <sup>53</sup> , as poor general health was associated with poor outcome in 7 prognostic studies <sup>1-3,12,37,39,46</sup> .
Do you feel socially isolated?	Social isolation - associated with poor outcome in 3 prognostic studies <sup>1,12,46</sup> . In a study at the Spine Center of 179 patients, this screening question had an

	overall accuracy of 86% when compared to the Friendship Scale <sup>54</sup> .
“When I feel pain, it’s terrible and I feel it’s never going to get any better”	Catastrophization - associated with poor outcome in 3 prognostic studies <sup>12,21,43</sup> . In a study at the Spine Center of 353 patients, this screening question had an overall accuracy of 93% when compared to the catastrophization subscale of the Coping Strategies Questionnaire <sup>54</sup> .
“When I feel pain, I feel I can’t stand it anymore”	
In your view, how large is the risk that your current pain may become persistent?	Expectations of recovery - associated with poor outcome in 2 prognostic studies <sup>37,47</sup> . A component of the Orebro screening questions <sup>48</sup> .
Do you feel anxious?	Anxiety - associated with poor outcome in 4 prognostic studies <sup>1,15,37,39</sup> . In a study at the Spine Center of 179 patients, this screening question had an overall accuracy of 78% when compared to the Friendship Scale <sup>54</sup> .
During the past month, have you often been bothered by feeling down, depressed or hopeless?	Depression - associated with poor outcome in 6 prognostic studies <sup>1,4,20,37,39,55</sup> . These two screening questions were devised in the PRIME-1000 study <sup>56</sup> and in a study at the Spine Center of 382 patients, had an overall accuracy of 86% when compared to the Beck Depression Inventory <sup>54</sup> .
During the past month, have you often been bothered by little interest or pleasure in doing things?	
“Physical activity might harm my back”	Items from the Fear-Avoidance Beliefs Questionnaire (physical activity subscale) <sup>57</sup> . A FABQ physical activity subscale score < 9 points is a component of the Delitto subgrouping method (stabilization exercises group) <sup>58</sup> . High FABQ scores associated with poor outcome in 5 prognostic studies <sup>22,24,35,50,59</sup> . In a study at the Spine Center of 353 patients, these two fear-avoidance beliefs screening questions had an overall accuracy of 88% when compared to the whole Fear-Avoidance Beliefs Questionnaire (physical subscale) <sup>54</sup> .
“I should not do physical activities which (might) make my pain worse”	
<i>Quality of life and health utility outcome measure</i>	
Mobility, Self-care, Usual activities (e.g. work, study, housework, family or leisure activities), Pain/discomfort, Anxiety/depression, EUROQOL Quality of life thermometer	EuroQOL <sup>53</sup> = 6 question quality of life and health utility outcome measure
<b>Clinician questionnaire</b>	
<i>Physical impairment</i>	
Pain caused by active movement in particular directions (flexion, extension, lateral flexion, rotation) and the areas of the body in which pain is	The notion that pain in particular movement directions has diagnostic and therapeutic implications remains a lively debate, but the scientific evidence is inconclusive <sup>10,60-64</sup> . The research literature contains contradictory findings

experienced during these movements.	<p>regarding which directions of pain are associated with a positive response to diagnostic injections and the use of diagnostic injections as a reference standard also remains controversial. However, pain on movement is commonly used by clinicians to subgroup patients, to assess severity and to monitor progress.</p> <p>Flexion pain associated with poor outcome in 1 prognostic study<sup>25,26</sup>.</p> <p>The directions of movement that are affected by pain are easier to assess than the amount of associated movement limitation. It is difficult to measure movement limitation accurately without the use of goniometry apparatus and this is often not practical in routine care.</p>
Directional preference (McKenzie) in the most clinically-relevant direction. Which movement direction displayed this directional preference?	Centralization and peripheralization - signs used in the McKenzie subgrouping method <sup>65-67</sup> and the Fritz/Delitto subgrouping method (specific exercise category) <sup>23</sup> . Non-centralization associated with poor outcome in 2 prognostic studies <sup>22,59</sup> .
Lateral shift	Lateral shift - sign used in the Fritz/Delitto subgrouping method <sup>23</sup> .
Aberrant movement	Aberrant movement - sign used in the Fritz/Delitto subgrouping method (stabilization exercise category) <sup>58</sup> . Mid-ROM catch pain - symptom used in the Fritz/Delitto subgrouping method <sup>23,32</sup> .
Left and right Straight Leg Raise Test - degrees of range of motion	Straight leg raise (SLR) - sign associated with nerve root compression (sensitivity 80%, specificity 40%), associated with poor outcome in 5 prognostic studies <sup>4,11,25,26,43,49</sup> .
Left and right Straight Leg Raise Test - dorsiflexion of ankle	SLR ankle dorsiflexion - carried over from COBRA.
Left and right Straight Leg Raise Test - hamstring tightness	SLR hamstring tightness only - carried over from COBRA.
Crossed Straight Leg Raise Test - degrees of range of motion	Crossed SLR - sign associated with nerve root compression (sensitivity 25%, specificity 90%) <sup>9</sup> .
Muscle strength: left and right hip flexion, knee extension, knee flexion, ankle dorsiflexion, ankle eversion, ankle inversion, Extensor Hallicus Longus, Extensor Digitorum Longus, Flexor Hallicus Longus, Flexor Digitorum Longus	22 areas of potential muscle weakness. Muscle weakness can be a sign of nerve root compression. <sup>9,68</sup> .
Sensation - (left and right) lumbar dermatomes, L4 dermatome, L5 dermatome, S1 dermatome, altered sensation but non-dermatomal	10 areas of altered sensation. Altered sensation can be a sign of nerve root compression <sup>68</sup> .
Deep tendon reflex testing: (left and right) patella, hamstring, archilles	Hyporeflexia can be a sign of nerve root compression, hyperflexia a sign of

	upper motor neuron lesions <sup>68</sup> .
Muscle atrophy (left or right) quadriceps, calf, Ext. Dig Brevis, Gluteals	Muscle atrophy can be a sign of nerve root compression <sup>68</sup> .
Is there paraspinal tenderness on only one side (unilateral)?	Localised unilateral LBP - symptom used in the Fritz/Delitto subgrouping method <sup>23,32</sup> .
If there is tenderness with the Springing Test – is there pain referral?	Pain referral during the Springing Test - carried over from COBRA
SIJ pain with maximum flexion of hip - thigh and knee (left and right)	SIJ pain assessment - carried over from COBRA.
Tenderness with direct palpation of SIJ ligaments (left and right)	
SIJ pain with maximum flexion of hip - "P4" Posterior Pelvic Pain Provocation (left and right)	
Prone Knee Bend Test (left and right)	Prone Knee Bend Test - sign used in the Fritz/Delitto subgrouping method (extension/mobilisation category) <sup>23,32</sup> .
Were peri-anal sensation or tone or reflex tested? If peri-anal sensation or tone or reflex were tested, was any abnormality detected?	Anal sphincter testing - carried over from COBRA.
Hyperextension elbow joint (dominant side) > 10 degrees	In a study at the Spine Center of 4062 patients, this test had an overall accuracy of 93.9% when compared with the 9 Beighton Hypermobility Criteria (unpublished data). Ligamentous laxity - sign used in the Fritz/Delitto subgrouping method (immobilisation category) <sup>23,32</sup> .
Straight Leg Raise Test - regions of pain radiation (left and right leg)	22 low back and lower limb regions coded to indicate areas of pain referral during SLR.
Tenderness: Springing Test T10, T11, T12, L1, L2, L3, L4, L5, S1	9 level Springing Test - Localised tenderness – the sign most believed by clinicians (25%) to differentiate subgroups <sup>69</sup> .
Were there any other clinical findings that you consider to be important in this case? (optional)	Capacity for clinicians to add any other clinical findings that are relevant to this patient.
<b>Pathoanatomy</b>	
MRI imaging findings	The MRI images from sub-set of patients have been quantitatively coded using a detailed research protocol <sup>70</sup> .
MRI imaging findings - Narrative report (from radiologist)	These are not routinely entered into the database but a complete narrative report from a radiologist can be obtained for each patient who underwent an MRI.



## Bibliography:

1. Fransen M, Woodward M, Norton R, Coggan C, Dawe M, Sheridan N. Risk factors associated with the transition from acute to chronic occupational back pain. *Spine*. 2002;27(1):92-98.
2. Macfarlane GJ, Thomas E, Croft PR, Papageorgiou AC, Jayson MI, Silman AJ. Predictors of early improvement in low back pain amongst consulters to general practice: The influence of pre-morbid and episode-related factors. *Pain*. 1999;80(1-2):113-119.
3. Oleske D, Andersson G, Lavender S, Hahn J. Association between recovery outcomes for work-related low back disorders and personal, family and work factors. *Spine*. 2000;25(10):1259-1265.
4. Lanier DC, Stockton P. Clinical predictors of outcome of acute episodes of low back pain. *Journal of Family Practice*. 1988;27(5):483-489.
5. McIntosh G, Frank J, Hogg-Johnson S, Bombardier C, Hall H. Prognostic factors for time receiving worker's compensation benefits in a cohort of patients with low back pain. *Spine*. 2000;25(2):147-157.
6. McIntosh G, Hall H, Boyle C. Contribution of nonspinal comorbidity to low back pain outcomes. *Clinical Journal of Pain*. 2006;22(9):765-769.
7. Deyo RA, Diehl AK. Cancer as a cause of back pain: frequency, clinical presentation, and diagnostic strategies. *Journal of General Internal Medicine*. 1988;1:328-338.
8. Slipman CW, Patel RK, Botwin K, et al. Epidemiology of spine tumors presenting to musculoskeletal physiatrists. *Arch Phys Med Rehabil*. 2003;84(4):402-495.
9. Deyo R, Rainville J, Kent D. What can the history and physical examination tell us about low back pain? *Journal of the American Medical Association*. 1992;268(6):760-765.
10. Bogduk N. Evidence-based guidelines for the management of acute low back pain. 2000(17 April 2000). <http://www.nhmrc.gov.au/publications/synopses/cp94syn.htm>.
11. Burton AK, Tillotson KM. Prediction of the clinical course of low-back trouble using multivariable models. *Spine*. 1991;16(1):7-14.
12. Van der Weide WE, Verbeek JH, Salle HJ, Van Dijk FJ. Prognostic factors for chronic disability from acute low-back pain in occupational health care. *Scand J Work, Environ Health*. 1999;25(1):50-56.
13. Indahl A. Good prognosis for low back pain when left untampered: A randomized clinical trial. *Spine*. 1995;20(4):473-477.
14. Indahl A, Kaigle A, Reikerås O, Holm S. Five-year follow-up study of a controlled clinical trial using light mobilization and an informative approach to low back pain. *Spine*. 1998;23(23):2625-2630.
15. Valat JP, Goupille P, Rozenberg S, Urbinelli R, Allaert F. Acute low back pain: Predictive index of chronicity from a cohort of 2487 subjects. *Joint Bone Spine*. 2000;67(5):456-461.
16. Coste J, Delecoeuillerie G, Cohen de Lara A, Le Parc JM, Paolaggi JB. Clinical course and prognostic factors in acute low back pain: an inception cohort study in primary care practice. *British Medical Journal*. 1994;308(6928):577-580.
17. Gatchel RJ, Polatin PB, Kinney RK. Predicting outcome of chronic back pain using clinical predictors of psychopathology: a prospective analysis. *Health Psychology*. 1995;14(5):415-420.
18. Gatchel RJ, Polatin PB, Mayer TG. The dominant role of psychosocial risk factors in the development of chronic low back pain disability. *Spine*. 1995;20(24):2702-2709.
19. Lehmann TR, Spratt KF, Lehmann KK. Predicting long-term disability in low back injured workers presenting to a spine consultant. *Spine*. 1993;18(8):1103-1112.
20. Reis S, Hermoni D, Borkan JM, Biderman A, Tabenkin C, Porat A. A new look at low back complaints in primary care: A RAMBAM Israeli Family Practice Network study. *Journal of Family Practice*. 1999;48(4):299-303.

21. Schiottz-Christensen B, Nielsen GL, Hansen TS, Sorensen HT, Olesen F. Long-term prognosis of acute low back pain in patients seen in general practice: A 1-year prospective follow-up study. *Family Practice*. 1999;16(3):223-232.
22. Werneke M, Hart DL. Centralization phenomenon as a prognostic factor for chronic low back pain and disability. *Spine*. 2001;26(7):758-765.
23. Fritz JM, Delitto A, Erhard RE. Comparison of classification-based physical therapy with therapy based on clinical practice guidelines for patients with acute low back pain a randomized clinical trial. *Spine*. 2003;28(13):1363-1372.
24. Flynn T, Fritz JW, Whitman M, et al. A clinical prediction rule for classifying patients with low back pain who demonstrate short-term improvement with spinal manipulation. *Spine*. 2002;27(24):2835-2843.
25. Roland M, Morris R. A study of the natural history of back pain. Part I: Development of a reliable and sensitive measure of disability in low- back pain. *Spine*. 1983;8(2):141-144.
26. Roland M, Morris R. A study of the natural history of low-back pain. Part II: Development of guidelines for trials of treatment in primary care. *Spine*. 1983;8(2):145-150.
27. Singer J, Gilbert JR, Hutton T, Taylor DW. Predicting outcome in acute low-back pain. *Canadian Family Physician*. 1987;33:655-659.
28. Childs JD, Fritz JM, Flynn TW, et al. A clinical prediction rule to identify patients with low back pain most likely to benefit from spinal manipulation: A validation study. *Ann Intern Med*. 2004;141(12):920-928.
29. Gran JT. An epidemiological survey of the signs and symptoms of ankylosing spondylitis. *Clinical Rheumatology*. 1985;4(2):161-169.
30. Nordin M, Hiebert R, Pietrek M, Alexander M, Crane M, Lewis S. Association of comorbidity and outcome in episodes of nonspecific low back pain in occupational populations. *Journal of Occupational & Environmental Medicine*. 2002;44(7):677-684.
31. Tate R, Yassi A, Cooper J. Predictors of Time Loss After Back Injury in Nurses. *SPINE*. 1999;24:1930.
32. Fritz JM, George S. The use of a classification approach to identify subgroups of patients with acute low back pain. *Spine*. 2000;25(1):106-114.
33. Dasinger LK. Physical workplace factors and return to work after compensated low back injury: a disability phase-specific analysis. *Journal of Occupational and Environmental Medicine*. 2000;42(3):323-333.
34. Fritz J, George S. Identifying psychosocial variables in patients with acute work-related low back pain: the importance of fear-avoidance beliefs. *Physical Therapy*. 2002;82(10):973-984.
35. Fritz JM, George SZ, Delitto A. The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status. *Pain*. 2001;94(1):7-15.
36. Hunt D, Zuberbier OA, Kowloski A, et al. Are components of a comprehensive medical assessment predictive of work disability after an episode of occupational low back trouble? *Spine*. 2002;27(23):2715-2719.
37. Schultz IZ. Psychosocial factors predictive of occupational low back disability: Towards development of a return-to-work model. *Pain*. 2004;107(1-2):77-85.
38. Seferlis T, Nemeth G, Carlsson AM. Prediction of functional disability, recurrences, and chronicity after 1 year in 180 patients who required sick leave for acute low-back pain. *Journal of Spinal Disorders*. 2000;13(6):470-477.
39. Cherkin DC, Deyo RA, Street JH, Barlow W. Predicting poor outcomes for back pain seen in primary care using patients' own criteria. *Spine*. 1996;21(24):2900-2907.
40. Epping-Jordan J, Wahlgren D, Williams R, et al. Transition to chronic pain in men with low-back pain: Predictive relationships among pain intensity, disability and depressive symptoms. *Health Psychology*. 1998;17:421-427.
41. Sieben JM, Vlaeyen JW, Portegijs PJ, et al. A longitudinal study on the predictive validity of the fear-avoidance model in low back pain. *Pain*. 2005;117(1-2):162-170.
42. Williams RA, Pruitt SD, Doctor JN, et al. The contribution of job satisfaction to the transition from acute to chronic low back pain. *Archives of Physical Medicine and Rehabilitation*. 1998;79(4):366-374.
43. Burton AK, Tillotson KM, Main CJ, Hollis S. Psychosocial predictors of outcome in acute and subchronic low back trouble. *Spine*. 1995;20(6):722-728.

44. Goertz MN. Prognostic indicators for acute low-back pain. *Spine*. 1990;15(12):1307-1310.
45. Mahmud MA, Webster BS, Courtney TK, Matz S, Tacci JA, Christiani DC. Clinical management and the duration of disability for work-related low back pain. *Journal of Occupational and Environmental Medicine*. 2000;42(12):1178-1187.
46. Thomas E, Silman AJ, Croft PR, Papageorgiou AC, Jayson MI, Macfarlane GJ. Predicting who develops chronic low back pain in primary care: a prospective study. *British Medical Journal*. 1999;318(7199):1662-1667.
47. Steenstra IA, Koopman FS, Knol DL, et al. Prognostic factors for duration of sick leave due to low-back pain in Dutch health care professionals. *J Occup Rehabil*. 2005;15(4):591-605.
48. Linton SJ, Hallden K. Can we screen for problematic back pain? A screening questionnaire for predicting outcome in acute and subacute back pain. *Clinical Journal of Pain*. 1998;14(3):209-215.
49. Pedersen PA. Prognostic indicators in low back pain. *Journal of the Royal College of General Practitioners*. 1981;31(225):209-216.
50. Faber E, Burdorf A, Bierma-Zeinstra SMA, Miedema HS, Koes BW. Determinants for improvement in different back pain measures and their influence on the duration of sickness absence. *Spine*. 2006;31(13):1477-1483.
51. Reid S, Haugh LD, Hazard RG, Tripathi M. Occupational low-back pain: Recovery curves and factors associated with disability. *J Occup Rehabil*. 1997;7(1):1-14.
52. Scavone JG, Latshaw RF, Rohrer V. Use of lumbar spine films: Statistical evaluation at a university teaching hospital. *Journal of the American Medical Association*. 1981;246:1105-1108.
53. *The Measurement and Valuation of Health Status Using EQ-5D: A European Perspective: Evidence from the EuroQol BIO MED Research Programme*. Rotterdam: Kluwer Academic Publishers; 2003.
54. Kent P, Mirkhil S, Keating J, Buchbinder R, Manniche C, Albert HB. The concurrent validity of brief screening questions for anxiety, depression, social isolation, catastrophization, and fear of movement in people with low back pain. *The Clinical journal of pain*. 2014;30(6):479-489.
55. De Gagne TA. The evolution of chronic pain: Adjustment status following treatment for acute low back pain. *Dissertation Abstracts International: Section B: the Sciences and Engineering*. 1999;60(3-B).
56. Spitzer RL, Williams JB, Kroenke K, et al. Utility of a new procedure for diagnosing mental disorders in primary care: The PRIME-MD 1000 study. *Jama*. 1994;272(22):1749-1756.
57. Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*. 1993;52(2):157-168.
58. Hicks GE, Fritz JM, Delitto A, McGill SM. Preliminary development of a clinical prediction rule for determining which patients with low back pain will respond to a stabilization exercise program. *Archives of Physical Medicine & Rehabilitation*. 2005;86(9):1753-1762.
59. Werneke MW, Hart DL. Categorizing patients with occupational low back pain by use of the Quebec Task Force Classification system versus pain pattern classification procedures: Discriminant and predictive validity. *Physical Therapy*. 2004;84(3):243-254.
60. Laslett M. *Diagnostic accuracy of the clinical examination compared to available referenve standards in chronic low back pain patients* [PhD]. Linköping, Sweden: Division of Physiotherapy, Linköpings Universitet; 2005.
61. Laslett M, Oberg B, Aprill CN, McDonald B. Zygapophysial joint blocks in chronic low back pain: A test of Revel's model as a screening test. *BMC Journal of Musculoskeletal Disorders*. 2004;5(1):43.
62. Schwarzer AC, Aprill CN, Derby R, Fortin J, Kine G, Bogduk N. Clinical features of patients with pain stemming from the lumbar zygapophysial joints. Is the lumbar facet syndrome a clinical entity? *Spine*. 1994;19(10):1132-1137.
63. Schwarzer AC, Aprill CN, Derby R, Fortin J, Kine G, Bogduk N. The false-positive rate of uncontrolled diagnostic blocks of the lumbar zygapophysial joints. *Pain*. 1994;58(2):195-200.
64. Schwarzer AC, Aprill CN, Derby R, Fortin J, Kine G, Bogduk N. The prevalence and clinical features of internal disc disruption in patients with chronic low back pain. *Spine*. 1995;20(17):1878-1883.

65. Donelson R. The McKenzie approach to evaluating and treating low back pain. *Orthop Rev.* 1990;19(8):681-686.
66. Long A, Donelson R, Fung T. Does it matter which exercise? A randomized control trial of exercise for low back pain. *Spine.* 2004;29(23):2593-2602.
67. Sufka A, Hauger B, Trenary M, et al. Centralization of low back pain and perceived functional outcome. *The Journal of Orthopaedic and Sports Physical Therapy.* 1998;27(3):205-212.
68. Vroomen PC, de Krom MC, Wilmink JK, Yelland M. Diagnostic value of history and physical examination in patients suspected of lumbosacral nerve root compression. *Journal of Neurology, Neurosurgery and Psychiatry.* 2002;72:630-634.
69. Kent PM, Keating JL. Classification in non-specific low back pain - what methods do primary care clinicians currently use? *Spine.* 2005;30:1433-1440.
70. Arnbak B, Jensen TS, Manniche C, Zejden A, Egund N, Jurik AG. Spondyloarthritis-related and degenerative MRI changes in the axial skeleton--an inter- and intra-observer agreement study. *BMC musculoskeletal disorders.* 2013;14:274.