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Rating scales for assessment of low back pain and disability: A literature review

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Abstract
Aim: This study aims to find out all the available scoring systems for Assessment of Low Back Pain and Disability.
Introduction: During the past decades several scoring systems have been developed to assess the functional status of patients with low back pain.
Methods: Electronic searches were performed using Google scholar, Medline, PubMed and Cochrane library.
Result: Thirty-five scoring systems are currently available for the evaluation of low back pain and Disability. Each of them evaluates low back pain using specific variables. All these scoring systems are presented.
Discussion: Although many scoring systems have been used to evaluate the back function, we are still far from a single outcome evaluation system that is reliable, valid and sensitive to clinically relevant changes, considered both patients' and physicians' perspective and is short and practical to use.
Conclusion: Further studies are required to evaluate the reliability, validity and sensitivity of the low back pain scoring systems used in the common clinical practice.

Keywords: Low back pain /assessment/rating scores

1. Introduction
Low back pain is the most common musculoskeletal condition affecting the adult population, with a prevalence of up to 84%. Chronic Low Back Pain (CLBP) has well-defined underlying pathological causes and it is a disease, not a symptom. CLBP represents the leading cause of disability worldwide and is a major welfare and economic problem [1].
The prevalence of acute and CLBP in adults doubled in the last decade and continues to increase dramatically in the aging population, affecting both men and women in all ethnic groups [2].
LBP has a significant impact on functional capacity, as pain restricts occupational activities and is a major cause of absenteeism. Its economic burden is represented directly by the high costs of health care facilities and indirectly by decreased productivity. These costs are expected to rise even more in the next few years [3-5].
Many generic and disease-specific measures are available for orthopedic clinical and research practice. Generic measures allow one to evaluate symptoms, functions or organ systems, which are not necessarily spine related; moreover, they can be used in all kind of patients. Disease-specific measures assess symptoms and functional limitations related to a specific disease/condition, so in the back-pain patient backrelated problems are focused [6].
Self-report questionnaires of pain and functional status allow one to evaluate patients before and after a given treatment, and they can be used to detect short-term or long-term clinical changes of symptoms and disabilities [7].
A wide variety of rating systems to measure functional outcomes in patients with LBP have been described in the past decades. Each of them evaluates low back performance using specific variables, including both objective and subjective criteria [8].

1.1 Aim of study
This study aims to find out all the available scoring systems for Assessment of Low Back Pain and Disability.

1.2 Need of study
Among a broad range of available tools, only a limited number of measurement instruments are generally known and frequently used. The development of instruments to measure the treatment outcome of patient with LBP has been the subject of increasing interest. During the past decades, several scoring systems have been developed to assess the functional status of patients with LBP. This study can help to find out all the available scoring systems for the evaluation of LBP and their use in the current orthopedic practice.

2. Methodology
Research Design - Literature Review
Duration of study – 6 months
Search strategy and selection criteria – Electronic searches were performed using Google scholar, Medline, PubMed, Cochrane library.
Keywords - We performed a search using the keywords 'spine' in combination with 'scoring system', 'scale', 'scores', 'outcome assessment', 'low back pain' and 'clinical evaluation'.

Inclusion criteria
- Articles on scales for assessment of Low back pain and disability.
- Studies done between 2001-2023.
- Articles which are published in English language only.
- Full text articles.

Exclusion criteria
- Studies published in language other then English. Abstracts and unpublished articles.

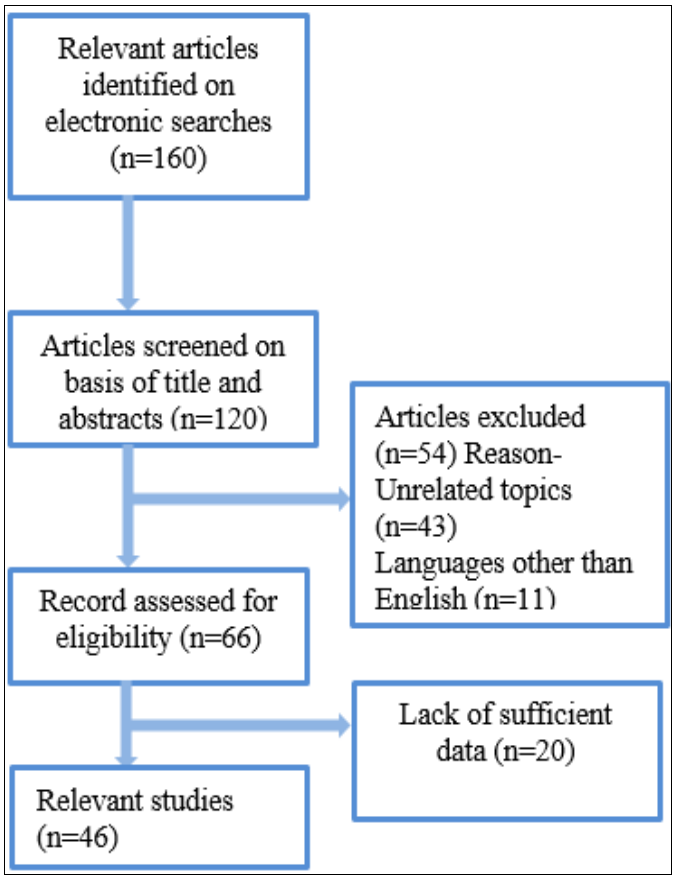

Fig 1: Overview of methodology

3. Result

Table 1: Analytic description for every score

Scale	Author	Sample	Domains	Reliability, validity	Validation
Roland–Morris Disability Questionnaire	Roland and Morris [9].	Patients with low back pain aged 16–64 years from all social classes	Physical functions (walking, bending over, sitting, lying down, dressing, sleeping, self-care and daily activities)	ICC – 0.91 Cronbach's alpha – 0.89/0.92 r=0.692 p=0.000	English, French, German, Greek, Portuguese, Spanish, Swedish, Turkish, Norwegian, Iranian And Moroccan
RDQ-23	Patrick *et al.* [10]	Patients with sciatica due to lumbar disc herniation	Physical functions	------	------
RDQ-18	Stratford and Binkley [11]	Patients with low back pain of musculoskeletal origin	Physical functions	------	------
RDQ-16	Dionne *et al.* [12]	Patients with low back pain aged 18–75 years	Physical functions	------	------
RDQ-7p	Walsh and Radcliffe [13]	Patients with chronic low back pain	Physical functions	------	------
RDQ-12	Atlas *et al.* [14].	Patients 18 years of age or older	Physical functions	------	------
RDQ-two	Underwood *et al.* [15]	Individuals with chronic back pain	Physical functions	------	------
Oswestry Disability Index	Fairbank *et al.* [16]	Patients with low back pain	Pain intensity; personal care; lifting; walking; sitting; standing; sleeping; sex life; social life and travelling	ICC – 0.91 Cronbach's alpha – 0.76 r=0.48 p=0.002	English, Finnish, French, German, Greek, Norwegian, Iranian.
ODI version 2.0	Baker *et al.* [17]	Patients with chronic low back pain	Pain intensity; personal care; lifting; walking; sitting; standing; sleeping; sex life (if applicable); social life and travelling	------	------
Revised Oswestry	Hudson-Cook *et al.*	Patients with acute or chronic low back pain	Pain intensity; personal care; lifting; walking; sitting; standing; travelling and changing	------	------

Disability Questionnaire	[18]		degree of pain		
Modified ODI	Fritz and Irrgang [19]	Patients with work-related acute low back pain due to injury of the lumbosacral spine	Pain intensity; personal care; lifting; walking; sitting; standing; sleeping; social life; travelling and employment/homemaking	------	------
Quebec Back Pain Disability Scale	Kopec *et al.* [20]	Patients with back pain	Daily tasks (Self-care, sleeping, walking, climbing stairs, sitting, standing, lifting large or heavy objects, bending and stooping, physical activities and housework.	ICC – 0.92 Cronbach's alpha – 0.96	English, Dutch, French and Iranian
Waddell Disability Index	Waddell and Main [21]	Patients aged 20–55 years with low back pain or sciatica	Daily living activities (lifting, sitting, standing, travelling, walking, sleeping, social life, sex life and putting on footwear	ICC – 0.74 Cronbach's alpha= 0.69 r=0.69	English, Spanish
Million Visual Analogue Scale	Million *et al.* [22]	Patients with chronic back pain	Body functions (Pain, sleep, stiffness and twisting); daily activities (Walking, sitting, standing)	Cronbach's alpha – 0.93	English
Low Back Outcome Score	Greenough and Fraser [23]	Patients with low back pain	Current pain; employment; domestic chores; sport activities; resting; medical treatments or consultations; drug use; sex life and daily activities	Cronbach's alpha – 0.85	English
Low Back Pain Rating Scale	Manniche *et al.* [24]	Patients undergone first-time lumbar surgery for disc prolapse, without re-operation	Pain (low back pain/leg pain); disability (sleeping, ability to perform housework, walking, sitting, lifting, working, dressing, driving, running, getting up from a chair, climbing stairs, contact with people and expectations of future pain) and physical impairment (back muscle endurance, spinal mobility, patient mobility and use of analgesics)	Cronbach's alpha – 0.98 r=0.89 p<0.001	English, Danish
NASS Lumbar Spine Outcome Assessment Instrument	Daltroy *et al.* [25]	Patients with central low back pain without radiation or compression of a spinal nerve root (herniated disc syndrome) or lumbar spinal stenosis or chronic low back pain syndrome or patients undergone discectomy or decompression for spinal stenosis	Demographic data (age, sex, race, education and insurance information); medical history (diagnosis, past surgeries, comorbidities, etc.); pain, neurogenic symptoms and function; employment history; outcomes of treatment	ICC – 0.85 Cronbach's alpha – 0.88 r=0.72	English, German and Italian
Clinical Back Pain Questionnaire	Ruta *et al.* [26]	Patients with low back pain	Pain Body functions (pain, sleep, bending, and loss of feeling and leg weakness) and daily activities (self-care, walking, sitting, standing, sport.	ICC=0.90 p<0.001	English, Chinese
Resumption of Activities of Daily Living Scale	Williams and Myers [27]	Injured workers with acute low back pain	Sleeping patterns; sexual activity; self-care; light and heavy household chores; shopping; socializing inside and outside home; travelling; recreational activities and paid employment	------	------
Functional Rating Index	Feise and Menke [28]	Patients seeking professional care for spinal pain and dysfunction (cervical, thoracic, lumbar) at chiropractic practices	Daily activities (sleeping, self-care, travel, work, recreation, lifting, walking and standing) and pain (intensity and frequency)	Cronbach's alpha= 0.913 r=0.173 p=0.307	English, Japanese and Spanish
Back Pain Functional Scale	Stratford *et al.* [29]	Patients of ages 18–79 years affected by LBP of suspected musculoskeletal origin	Functional status of patient (work, hobbies, home activities, bending or stooping, dressing shoes or socks, lifting, sleeping, standing, walking, climbing stairs, sitting and driving)	ICC=0.88	German, English and Spanish
General Function Score	Ha¨gg *et al.* [30]	Patients with chronic low back pain; patients with different low back disorders admitted for surgery; patients operated for lumbar disc herniation.	Physical activities of daily living (walking a flight of stairs; sitting more than 30 min; standing more than 30 min; walking more than 30 min; lifting more than 10 kg; lean over a basin; carry a bag of groceries; make the bed.	------	------
Patient-Specific Functional Scale	Stratford *et al.* [31]	Patients of ages 12– 80 years with neck pain of suspected musculoskeletal origin	Pain question set; pain limitation section and pain intensity section	------	------
Outcome Measure in	Stucki *et al.* [32]	Patients with low back pain and/or leg pain undergone	Symptom severity (pain severity, pain frequency, pain in the back, pain in the leg,	------	------

Lumbar Spinal Stenosis		surgery for lumbar spinal stenosis	weakness, numbness disturbance); physical function (walking distance, ability to walk for pleasure, for shopping, for getting around the house and from bathroom to bedroom)		
Back Illness Pain and Disability 9-item Scale	Tesio *et al.* [33]	Chronic low-back pain patients with herniation or protrusion of at least one lumbar disc	Pain (aching and tiring) and mobility (lifting, sitting for 30 min, standing for 30 min, travelling, getting up from a low seat, walking and personal care)	-------	------
Bournemouth Questionnaire	Jennifer *et al.* [34]	Patients with back pain	Pain intensity; ability to perform daily activities and social activities;	Cronbach's alpha= 0.87 ICC=0.65	English, German, French
Dallas Pain Questionnaire	Lawlis *et al.* [35]	Chronic low-back pain patients of ages 21–61 years	Day-to-day activities (pain and intensity, personal care, lifting, standing, sitting, walking and sleeping); work and leisure activities (social life, travelling and vocational); anxiety-depression status (anxiety and mood, emotional control and depression) and social interest (interpersonal relationship, social support and punishing responses)	------	------
Disability Rating Index	Sale´n *et al.* [36]	Patients with neck/shoulder/low-back pain	Basic daily life activities (dressing, outdoor walks, climbing stairs and sitting for a longer time); physical activities (standing bent over a sink, carrying a bag, making a bed and running) and work-related/vigorous activities (light work, heavy work)	------	------
Jan van Breemen Functional Scale	Lankhorst *et al.* [37]	Patients affected by idiopathic low back pain	Pain (back pain 'in general', 'at night', 'during the first hour in the morning', 'during sitting', 'during walking' and 'during standing'); functional capacity (carrying, walking, standing, sitting, lifting)	------	------
Occupational Role Questionnaire	Kopec and Esdaile [38]	Individuals employed and worked with chronic back pain	Productivity (extra work, ability to work quickly, productivity/efficiency and quality of work) and satisfaction (opportunities to improve one's skills, job security, job satisfaction and relations with co-workers	------	------
Spinal Pain Independence Measure	Itzkovich *et al.* [39]	Patients with chronic low back pain	Mobility (mobility for short distances, mobility for moderate distances, mobility for long distances, stair management and maximal walking speed); activity in sitting and standing	------	------
Physical Impairment Scale	Waddell *et al.* [40]	chronic low back pain with or without referred pain into the buttock(s) or thigh(s)	Physical impairment (total flexion, total extension, average lateral flexion, average straight leg raising (SLR), spinal tenderness, bilateral active SLR and sit-up)	------	------
Functional Outcomes Questionnaire for Spinal Disorders	Nork *et al.* [41]	Patients with low back pain with or without leg pain due to degenerative spondylolisthesis with or without multilevel spinal stenosis	Ability to perform heavy activities; ability to perform light/moderate activities; ability to perform activities (such as visiting friends, eating out, etc.); sitting; walking; sleeping; duration of symptoms; depression; level of pain; pain medication usage and overall satisfaction with results	------	------
Pain Response to Activity and Position Questionnaire	Roach *et al.* [42]	Patients with low back pain	Low back pain and leg pain	------	------
Back Pain Interference Scale	Rytokoski *et al.* [43]	Patients with chronic low back	Activities of daily living	------	------

According to the three International Classification of Functioning, Disability and Health (ICF) perspectives of health (bodily, personal and social perspective), proposed a division of LBP rating systems into four groups: (I) questionnaires mainly assessing activity limitations; (ii) questionnaires mainly assessing activity limitations and few social functions; (iii) questionnaires assessing a mix of activity limitations and impairments; and (iv) questionnaires assessing items derived from all domains of functioning [45]. Most scores do not appear to have been constructed in a systematic fashion using recommended methodology. There is an increasing need for orthopedic surgeons both to be familiar with and to routinely use objective measures of outcome for their procedures [46].

There is a trend towards the increased use of validated patient-based scores, but many have not been properly tested for validity, repeatability and sensitivity to change. Scores are not valid when used in a modified form and their use should be discouraged. One of the further areas of study is to compare and contrast two or more scoring scales, to ascertain whether they address the same category of low back function.

5. Conclusion

Although many scoring systems have been used to evaluate the low back function, we are still far from a single outcome evaluation system, which is reliable, valid and sensitive to clinically relevant changes, which considers both patients' and physicians' perspective, and which is short and practical to use. Further studies are required to evaluate the reliability, validity and sensitivity of the low back pain scoring systems used in the common clinical practice.

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