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Clinical-state-of-the-art

## Treatment strategy for chronic low back pain

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### ABSTRACT

The management of non-specific low back pain relies chiefly on analgesics, education, and physical exercises. Of the many risk factors for chronicity, the most relevant are psychosocial and occupational. Identifying homogeneous patient subgroups helps to develop personalized treatment strategies, thus improving the outcomes. Current clinical research is focusing on subgroup identification via simple validated questionnaires that are suitable for use in everyday practice. We suggest a management approach leading from the individual patient profile to the treatment strategy.

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Clinical practice guidelines categorize patients with low back pain (LBP) into three groups: pain indicating a specific underlying disease (1–2% of cases), nerve root involvement (about 5%), and non-specific LBP (more than 90%). The consensus for many years has been that the exact pain source cannot usually be identified in patients with non-specific LBP. Most recommendations involve the use of a one-size-fits-all management strategy that relies chiefly on patient education and physical exercises. However, no specific evidence is available to determine which interventions work best in which type of patient. Furthermore, in recent well-designed randomized trials, the effect size of the tested interventions was small to modest on average. Although this finding may be ascribable in part to the self-limited nature of LBP and to inadequate efficacy of the therapeutic interventions, heterogeneity of the patient population may also play a role [1]. The identification of homogeneous patient subgroups would allow the development of personalized treatment strategies that might prove more effective. To date, no anatomic classification for separating LBP patients into subgroups is available. Research efforts are therefore focusing on symptoms, sociopsychological profiles, and occupation as potential criteria for patient subgrouping [2].

### 1. Epidemiology

LBP is a highly prevalent health problem that most individuals experience at some point in their lives. LBP is among the leading causes of activity limitation and absence from work. The epidemiological data on LBP are widely conflicting. A 2012 systematic review found a point prevalence of  $18.3\% \pm 11.7\%$ , a 1-month prevalence of  $30.8\% \pm 12.7\%$ , a 1-year prevalence of  $38\% \pm 19.4\%$ ,

and a lifetime prevalence of  $38.9\% \pm 24.3\%$  [3]. Prevalence was higher in women (35.3% versus 29.4% in men) and was highest in the groups aged 40 to 49 and 60 to 69 years. Episodes lasting longer than 3 months contributed 20.1% of all episodes. Recurrence was an integral feature of the natural history of LBP: the recurrence rate was estimated at 50% within 1 year, 60% within 2 years, 70% within 5 years, and 30% within 1 year in working LBP patients [4]. In population-based studies, among patients who sought medical help for LBP, 62% reported persistent pain 1 year later and 16% of the subgroup on sick leave initially were still on sick leave 6 months later [5]. For this last subgroup, the development of optimal treatment strategies is crucial to avoid progression to chronicity.

### 2. Risk factors for chronic low back pain

Investigations of prognostic factors are of the utmost importance to the identification of factors associated with unfavorable outcomes. Numerous studies have been conducted, often with conflicting results. However, a number of factors were consistently found [5]:

- factors related to the LBP episode:
  - severe functional impairment,
  - concomitant sciatica;
- individual factors:
  - older age,
  - poor general health;
- psychological factors:
  - high level of psychological or psychosocial stress,
  - negative thoughts about the LBP;
- work-related factors:
  - negative relationship with co-workers,
  - physically demanding work;

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**Table 1**  
Red, yellow, blue, and black flags.

Red flags (serious disease)	Yellow flags (person)
Age < 20 years or > 55 years	Beliefs
History of high-energy trauma	Catastrophizing
Permanent, crescendo, nonmechanical pain	Misguided beliefs about the condition, pain, and potential adverse consequences
Pain in the back	Negative expectations
History of neoplasia	Feelings
Long-term glucocorticoid therapy	Worrying, distress, anxiety, depression
Addiction, immunosuppression, HIV infection	Fear of moving
Decline in general health, weight loss, fever	Uncertainty about the future
Extensive neurological symptoms	Behavior
Deformity of the spine	Description of extreme symptoms
	Passive coping strategies
	No response to multiple treatments
Blue flags (workplace)	Black flags (context)
Work involving high physical demands	Misunderstanding among those involved (patient, employer, physician)
Low control over working conditions	Financial compensation
Work-related stress	Beliefs held by family and friends
Lack of social support	Social isolation
Lack of job satisfaction	Inappropriate employer policies
Low expectation about ability to resume work	Delays in the processes
Fear of re-injury	

- social factors:
  - financial compensation.

A systematic literature review established that recurrence, chronicity, and absence of work resumption shared a large number of risk factors [6].

### 3. Identifying risk factors in practice

#### 3.1. Flags

Flags are risk factors for chronicity that can be easily identified by asking simple questions. Recommendations for LBP management include an evaluation of flags (Table 1). First, red and orange flags should be assessed to identify patients who require specific treatment. Red flags are signs and symptoms that suggest a specific underlying disease (tumor, infection, or inflammatory disease) and should be looked for in every patient with acute LBP. Orange flags identify psychopathological issues that require specific treatment, such as posttraumatic stress disorder, personality disorders, and depression. Patients with orange flags should be referred to specialists. Orange flags should be evaluated routinely, particularly in patients on sick leave for longer than 4 weeks.

#### 3.2. Psychosocial flags

There are three categories of psychosocial flags. Most of these flags detect risk factors that are potentially amenable to modification:

- yellow flags identify psychological risk factors such as inappropriate fears or beliefs. Yellow flags have been proven to correlate with both the development of LBP and progression to chronicity [7]. Among studies evaluating the effects of interventions targeting yellow flags, six showed improved outcomes in terms of function and return to work, whereas six others obtained no evidence of efficacy [7];
- blue flags assess perceived features of the work environments such as stress, lack of support, and excessive demand [8];
- black flags assess objective factors associated with the workplace and other components of the environment (e.g., insurance, family). They can adversely affect interventions implemented to tackle the other flags.

#### 3.3. Standardized questionnaires

The evaluation of LBP should be multidimensional. Several questionnaires have been developed to facilitate the evaluation of patients with LBP. Some of them incorporate the flags listed above. Here, we will confine our discussion to questionnaires for which validated French versions are available or that hold particular promise.

##### 3.3.1. Örebro Musculoskeletal Pain Screening Questionnaire

The Örebro Musculoskeletal Pain Screening Questionnaire (OMPSQ) has been validated in many northern European countries and is available in French [9]. It covers most of the yellow flags and is fairly short, with only 25 items and a completion and scoring time of 5 to 10 minutes. The OMPSQ evaluates five categories of risk factors for prolonged disability: pain, perceived function, psychological variables, fears and beliefs, and demographic data and history. The score can range from 0 to 210. Risk cutoffs have been established: scores less than 90 indicate low risk, scores of 91–105 moderate risk, and scores more than 105 high risk. The 105 cutoff correctly identifies nearly 80% of patients who are subsequently on long-term sick leave and the 112 cutoff identifies 80% of the patients who do not return to work at treatment completion [10].

##### 3.3.2. Core Outcome Measure Index

When evaluating a patient with LBP, at least five domains should be investigated [11]: pain, function, social and professional disability, overall well-being, and patient satisfaction with care. Specific questionnaires exist for each of these domains. The Core Outcome Measure Index (COMI) investigates each of the five domains by a single item and has one additional item on quality of life. Thus, the COMI is a multidimensional questionnaire with seven items (Appendix 1). Validated versions exist in several languages including French [12]. The acceptability and feasibility of the COMI in clinical practice have been established [13]. The COMI is used as an evaluation criterion for the EuroSpine Tango registry. Other data on the COMI will become available soon. The role for this index as a risk evaluation tool in LBP patients remains to be determined.

##### 3.3.3. DALLAS

The Dallas Pain Questionnaire (DPQ) was developed to measure the impact of chronic LBP in four domains: everyday activities, work-related activities, anxiety–depression, and social interest. A

validated version in French is available [14]. Ozguler et al. [15] reported that the DPQ allowed subgrouping of working patients with LBP. Using cluster analysis of DPQ scores in 678 LBP patients with at least 7 days of sick leave within the last 12 months, they identified four subgroups: minor disability, intermediate disability, disability for some physical activities, and physical disability and emotional disturbance. This multidimensional approach can be used to develop treatment approaches tailored to the needs of specific patient subgroups.

#### 3.3.4. STarT Back Screening Tool

The STarT Back Screening Tool is a screening questionnaire developed to identify patients with potentially modifiable risk factors [16]. After the identification of risk factors, the items were developed, and the properties of the questionnaire were then validated using standard methods. There are nine items: radiating leg pain, pain elsewhere, disability (two items), bothersomeness, catastrophizing, fear, anxiety, and depression. The last five items form the psychosocial subscale. STarT Back has been validated and found acceptable. Three subgroups were identified a priori: low-risk subgroup (few risk factors, appropriateness of the standard treatment in official recommendations, i.e., analgesics, advice, and education); moderate-risk subgroup (risk factors with high levels of physical risk factors, good candidates for physiotherapy); and high-risk subgroup (major risk factors, high levels of psychosocial risk factors, good candidates for a combination of physical therapy and cognitive-behavioral therapy). Analyses of specificity and sensitivity were then conducted to validate score cutoffs for these three subgroups. The results showed that a total score of less than 4 indicated low risk, a total score of more than or equal to 4 indicated medium risk, and a psychosocial subscale score of more than or equal to 4 high risk. Patient care stratification based on the risk assessment was investigated in a clinical trial [17]. Patients older than 18 years of age with LBP were randomized in a 2:1 ratio to stratified care (intervention group) or standard care (control care). The primary evaluation criterion was the effect on the Roland Morris Disability Questionnaire score after 12 months. The treatment in the control group consisted of advice and exercises, with an option of further physiotherapy including up to six sessions of advice, exercises, reassurance, education, manual therapy, and acupuncture. In the intervention group, low-risk patients received advice, exercises, reassurance that no other treatment was needed, and encouragement to refrain from obtaining further treatment; medium-risk patients also received standardized physiotherapy; and high-risk patients also received psychologically informed physiotherapy focusing specifically on the psychosocial risk factors identified by STarT Back. Patients were encouraged to use coping and problem-solving strategies. The improvement in the primary evaluation criterion was significantly greater in the intervention group after 4 and 12 months. The intervention group also had a significantly smaller number of days off work within the 12-month follow-up period ( $4.4 \pm 21.2$  days versus  $12.2 \pm 35.1$  days). The intervention was cost-effective. This study constitutes strong evidence that patient subgrouping to match the treatment to the patient characteristics is effective.

## 4. Treatments

### 4.1. Medications [18,19]

According to European recommendations for the management of chronic LBP, step 1 or 2 analgesics should be used [18]. Non-steroidal anti-inflammatory drugs (NSAIDs) and weak opioids can be given for short periods to relieve pain flares. Antidepressants and muscle relaxants may deserve consideration for helping to relieve

the pain. Anticonvulsant medications are not recommended, and systemic glucocorticoid therapy is not indicated. Epidural glucocorticoid injections have not been proven effective and therefore cannot be recommended. Glucocorticoid injections into the facet joints are sometimes performed in patients with pain features suggestive of facet joint disease, but proof of efficacy is extremely limited.

### 4.2. Information

Adequate information of the patient aims to minimize the effects of psychosocial risk factors and to prevent progression to chronicity or, at least, to decrease the morbidity associated with chronic LBP [20]. Information can be delivered via materials (videos, booklets, Internet sites, public information campaigns) or orally by healthcare professionals (to individual patients or groups). The Back Book is a guide built on the psychosocial model. It emphasizes the impact of psychosocial factors on the course of LBP and, more specifically, on progression to chronicity. The message of the book centers on beliefs, inappropriate attitudes, and representations of LBP. It underlines the benefits of physical exercise. Booklets based on this model improve knowledge about LBP, help to induce favorable changes in patient's beliefs, and increase adherence to physical exercise programs. A study done in France suggests that the Back Book may decrease the risk of chronic LBP [21].

### 4.3. Therapeutic patient education

Multidisciplinary treatment programs include a dynamic approach and a formal educational process aimed at helping patients to become self-sufficient in meeting the challenges raised by their disease. Therapeutic patient education (TPE) involves an active learning process. In LBP, the main goal of TPE is to provide patients with the skills they need [22], such as optimal disease control to become or to remain active for as long as possible, improved knowledge about the spinal condition in order to reassure the patient and to minimize catastrophizing the acquisition of positive coping strategies that ultimately allow the patients to live with their disease, and the selection of individually tailored activities that will prevent lumbar stiffness and deconditioning. TPE may limit the adverse consequences of inappropriate behaviors.

### 4.4. Physical exercises

A recent systematic review confirmed that, compared to standard care, supervised exercises decreased pain and disability and improved long-term function [23]. No specific type of exercise was superior over the others.

### 4.5. Functional restoration programs

Chronic inactivity leads to deconditioning with loss of spinal motion range, decreased muscle performance predominantly affecting the paraspinal muscles, and adverse psychosocial effects with increased anxiety and depression scores [24]. Functional restoration programs (FRPs) are designed to improve the physical, psychosocial, and socioeconomic situation via active involvement of the patient. FRPs are multidisciplinary programs carried out by physicians, physical therapists, occupational therapists, social workers and, in some cases, a psychologist and an occupational physician. They are delivered during a 3- to 5-week hospital stay, in group sessions. Physical retraining is the main component. FRPs are intended for patients on sick leave (or experiencing difficulties at work) because of their LBP. The objective is work resumption. FRPs are effective in alleviating pain and improving function [25].

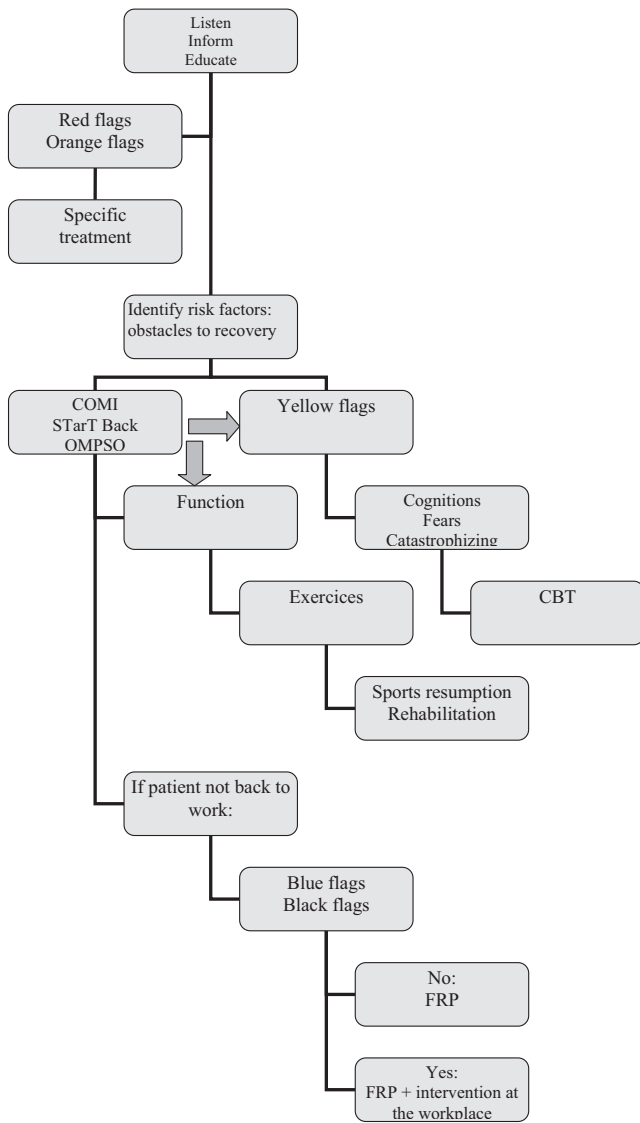


Fig. 1. Management strategy for chronic low back pain.

Return-to-work rates range across flags studies from 40% to 90% [26]. Interventions at the workplace improve the results.

4.6. Cognitive-behavioral therapy

Several experimental studies have shown that beliefs influence pain perception, that beliefs can be modified, and that belief modification activates specific anatomic sites [27]. Catastrophizing promotes exaggerated outward expressions of pain, which elicit empathetic responses from others. Emotional processes not only affect pain perception, but also promote the development of pain via physiological processes involved in pain modulation. Consequently, attention to patient beliefs, expectations, and also preferences is crucial to ensure that the treatment matches the needs of the patient [27]. In the short-term, cognitive-behavioral therapy (CBT) provides greater pain relief than does standard care. Long-term effects remain unproven [28]. CBT involves a number of methods including education and information, reframing of beliefs, the acquisition of coping strategies, reassurance, positive self-affirmations, work on dysfunctional cognitions, and stress management. CBT programs are generally used in combination with FRPs.

5. Strategies for managing the patient with chronic low back pain

In every case, listening and informing are crucial components of the management strategy [27]:

- the patient must be taken seriously: the physician must listen to, and believe, what the patient says;
- easy-to-understand information on the problem must be provided;
- communication must be centered on the patient (expectations, perspectives, and preferences);
- the patient should be reassured and, if possible, informed that a favorable outcome can be achieved;
- the patient should be informed about what he/she can do and what the healthcare professionals can do.

Pharmacotherapy is given to nearly every patient. Fig. 1 summarizes the management strategy. On-going treatments should be evaluated and stopped if they are not effective.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

Appendix 1. The Core Outcome Measures Index (COMI)

During the past week, how bothersome have each of the following symptoms (1a and 1b) been? Make a mark on the line to indicate the intensity of your pain. On the line, 0 indicates no pain and 10 the worst pain you can imagine. There are separate questions for low back pain and leg pain (sciatica) or buttock pain.

1a- How bothersome was your low back pain in the past week?

0	1	2	3	4	5	6	7	8	9	10
	-----									
No pain										Worst pain imaginable

1b- How bothersome was your leg pain (sciatica)/buttock pain in the past week?

0	1	2	3	4	5	6	7	8	9	10
	-----									
No pain										Worst pain imaginable

2- During the past week, how much did pain interfere with your normal activities (at work and in everyday life)?

- 0 Not at all    1 A little bit    2 Moderately    3 Quite a bit    4 Extremely

3- If you had to spend the rest of your life with the symptoms you have right now, how would you feel about it?

- 0 Very satisfied    1 Somewhat satisfied    2 Neither satisfied not dissatisfied    3 Somewhat dissatisfied    4 Very dissatisfied

4- Thinking back about the past week, how would you evaluate your quality of life?

- 0 Very good    1 Good    2 Fair    3 Poor    4 Very poor

5- During the past 4 weeks, about how many days did you cut down on the things you usually do (work, household chores, school, recreational activities) because of your back pain or leg pain?

- 0 None    1 1 to 7 days    2 8 to 14 days    3 15 to 21 days    4 More than 22 days

6- During the past 4 weeks, how many days did low back pain or leg pain keep you from going to work or school or performing household chores?

- 0 None    1 1 to 7 days    2 8 to 14 days    3 15 to 21 days    4 More than 22 days

Computation of the score (0 to 10): 1a or 1b, whichever is highest + 2.5 (2 + 3 + 4 + (5 + 6) / 2).

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