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## Acute nonspecific (musculoskeletal) low back pain Guidelines of the Russian Society for the Study of Pain (RSSP)

The examination of a patient with acute low back pain (LBP) includes the clarification of complaints and history data, brief physical and neurological examinations, and an assessment of danger symptoms. The diagnosis of acute nonspecific (musculoskeletal) LBP is based on the exclusion of a specific cause of pain (a potentially dangerous disease), discogenic radiculopathy, and lumbar spinal stenosis. If there is typical musculoskeletal pain and no danger symptoms, radiography, X-ray computed tomography, and magnetic resonance imaging are not recommended in the first 4 weeks of disease. Whether it is expedient to perform these techniques is considered when LBP persists over this time period.

A patient with acute nonspecific (musculoskeletal) LBP should be informed about the favorable outcome of the disease and the need to maintain physical and social activities, to avoid bed rest, and, if possible, to continue professional activities. The lowest effective dose of nonsteroidal anti-inflammatory drugs for short-term duration, as well as muscle relaxants (the medium level of evidence) can be used to relieve pain.

It is recommended that one should use an educational program (to prevent over-exercising and prolonged standing or sitting in static and awkward positions; to lift weights properly; etc.) to prevent recurrent LBP, as well as therapeutic exercises during a non-exacerbation period.

**Keywords:** acute nonspecific (musculoskeletal) low back pain; guidelines for diagnosis, treatment, and prevention.

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**For reference:** Parfenov VA, Yakhno N.N., Kukushkin ML, et al. Acute nonspecific (musculoskeletal) low back pain. Guidelines of the Russian Society for the Study of Pain (RSSP). *Nevrologiya, neiropsikhiatriya, psikhosomatika* = Neurology, neuropsychiatry, psychosomatics. 2018;10(2):4–11.

**DOI:** 10.14412/2074-2711-2018-2-4-11

### 1. Relevance

Low back (lumbosacral) pain (LBP) is one of the most common reasons for seeking medical attention [1–4]. About 6% to 9% of the population yearly have to see a doctor for LBP [5]. It has been found that 70% to 80% of people had at least one episode of LBP during their lives [6, 7], and 75% of those people had recurrent LBP episodes [8]. Worldwide, 632 mln people suffer from LBP [9]. A survey conducted at Moscow polyclinics revealed that 24.9% of 1,300 interviewed patients consulted a doctor for LBP and over a half (52.9%) of the respondents said that they had experienced LBP during the past year [10]. The MERIDIAN study conducted in 61 cities of Russia found that actually every second patient visits a polyclinic for a pain and half of them present with complains of back pain; this category accounts for most visits to neurologists and general practitioners [11].

LBP is the leader among all non-infectious diseases in terms of Years Lost due to Disability [12, 13].

Currently, there are several national and international guidelines for management of LBP based on the results of a great number of randomized trials (958 such trials had been completed by April, 2009) [14]. The year of 2010 saw a publication of a comparative analysis of several national and international guidelines dated from 2000 to 2008 [15–27]. The analysis revealed that these guidelines are basically the same when it comes to patient examination and treatment methods [14]. More recently, similar guidelines have been published in Canada [28], UK [29], Denmark [30] and USA [31]. In 2017, Canadian experts reviewed four guidelines of good methodological quality [21, 32–34] and also concluded that recommendations on diagnosis and treatment of acute back pain are essentially the same [28].

Table 1. *Alert symptoms («red flags») in acute LBP*

Factors	Alert symptom
Age	Younger than 18 and older than 50 years
History	Recent back injury; malignancy (even in the case of tumor eradication); unexplainable weight loss; long use of GCs; drug abuse, HIV infection, immunodepression; occasional malaise.
Pain character and localization	Continuously progressing pain which does not subside at rest («non-mechanical» pain); unusual pain localization (in the chest, perineum, rectum, abdomen, vagina); pain associated with defecation, urination, coitus
Symptoms found at examination	Signs of intoxication, fever; Structural deformation of the vertebral column; neurological signs of cauda equina or spinal nerve roots damage

Note. GC = glucocorticoids.

## 2. Definition and risk factors

*LBP is defined as a pain localized in the region between the twelfth pair of ribs and the gluteal folds* [31]. Acute back pain is defined as a pain persisting for no longer than 4 weeks. LBP that lasts for 4 to 12 weeks is defined as sub-acute.

LBP is considered non-specific (musculoskeletal) when no compression of spinal roots (radiculopathy) or cauda equina is found and there is no specific cause of pain, such as vertebral fracture, tumor, infection, spondyloarthritis or other diseases which can cause LBP [35]. The ICD-10 codes non-specific back pain as M.54.5 – «lower back pain (lumbalgia)»§ [36].

Musculoskeletal pain is the most common cause of acute LBP (90–95% of cases) [37].

The most common anatomical sources of musculoskeletal back pain are intervertebral discs, facet joints, sacroiliac joints, muscles and ligaments of the back [37, 38]. The sacroiliac or facet joints can be affected as a result of pathological changes similar to those occurring in other peripheral joints in osteoarthritis. The precise source of non-specific (musculoskeletal) pain cannot be established in many cases; moreover, no evidence has been obtained so far to prove that identification of the precise source of pain will improve the symptoms and outcome of the disease [25]. Lumbar osteochondrosis is the result of the natural process of degeneration (aging) of vertebral structures, observed in varying degrees in all people and substantially increasing with age, is not regarded as the cause of musculoskeletal LBP.

**Risk factors** for musculoskeletal back pain include rough labor, frequent trunk bending, weight lifting, as well as sedentary lifestyle and exposure to vibration [39]. People whose professional or physical activities are associated with weight lifting or excessive twisting of the vertebral column (e.g. porters, gymnasts, tennis players, downhill skiers, metal workers, and others) are at risk, and their regular (though often minor) injuries to the articular-ligamentous apparatus and muscles as a result of

awkward movements or weight lifting are of great significance. The group of risk also includes people who experience prolonged static exertion (those who have to maintain the same posture or to sit for a long time, e.g. professional drivers, office workers).

## 3. Examination

The objective of the examination of a patient presenting with acute LBP is to exclude potentially dangerous (specific) diseases which are comparatively rare reasons for seeking primary medical care (1% to 10% of cases) [25, 40, 41]. These are mainly vertebral fractures, malignancies affecting the vertebral column (e.g. primary and metastatic vertebral tumors, erythroid myeloma), vertebral destruction and spinal nerve roots damage due to infections (osteomyelitis, epiduritis). Less often occurring diseases include dysmetabolic bone tissues abnormalities (hyperparathyroidism, Paget's disease), cauda equina tumor, myelosyringosis or other neurological disorders, as well as diseases of the pelvic organs (prostatitis, endometriosis), retroperitoneum (aortal aneurysm, nephrolithiasis, pyelonephritis) and peritoneum (pancreatitis, cholecystitis, duodenal ulcer), etc.

Exclusion or suspicion of a specific cause of LBP should be based on the analysis of complaints, medical history, findings of a brief physical and neurological examination targeted at identifying alert symptoms, or «red flags» (Table 1).

If pain localization and/or other symptoms are indicative of a possible disease of the pelvic organs, the patients should be referred to a medical specialist (e.g. urologist, proctologist, gynecologist).

Physical examination is aimed at identifying malignancies, infections and somatic diseases, if any, which are associated with a pain syndrome. It includes revealing fever, weight loss, skin changes; lung auscultation, palpation of the abdomen and lymph nodes. Examination of the skin can reveal signs of herpes zoster which causes back pain. Orthopedic examination helps to evaluate physiolog-

Table 2. *Some alert symptoms, their possible causes and medical tactics in patients presenting with acute LBP*

Alert symptoms	Possible pain causes	Medical tactics
A history of neoplasm; unexplainable weight loss; age older than 50 years; pain onset or increase at rest, at night-time	Neoplasm	An X-ray study, CT or MRI of vertebral column, in some cases – scintigraphy of vertebral column, oncologist consultation
Fever, recent infectious disease, parenteral drug abuse	Vertebra or disc infection	CT or MRI of vertebral column
Pelvic disorders, limb paresthesia, perineal anesthesia	Cauda equina syndrome	CT or MRI of vertebral column, consultation with a neurologist, a neurosurgeon
Signs of osteoporosis, use of GCs, age older than 50 years, recent back injury	Vertebral compression	An X-ray study, CT or MRI of vertebral column, densitometry
Morning stiffness, young age, second night-half awakings because of pain, improvement after physical exercise and use of NSAIDs	Spondyloarthritis	Consultation with a rheumatologist
Formation of a pulsating tumor in the peritoneum	Abdominal aneurysm	US, consultation with a surgeon
Pronounced or increasing leg weakness	Hernia of intervertebral disc and/or lumbar spinal stenosis	CT or MRI of vertebral column, consultation with a neurologist, a neurosurgeon

**Note.** CT = computerized tomography; MRI = magnetic resonance imaging; NSAIDs = non-steroid anti-inflammatory drugs; US = ultrasound investigation

ical spinal curvatures, leg length and pelvic position (possible asymmetry), establish the presence of scoliosis, determine the movement range in different regions of the vertebral column and pelvic joints, back muscle tension and tenderness on palpation.

The main objective of neurological examination is to identify paresthesia, impaired sensitivity; it also includes testing knee, ankle and sole reflexes. If any signs of radiculopathy (e.g. paresthesia, impaired sensitivity, reflex decrease or loss) and/or cauda equina damage (pelvic disorders) are revealed, the patient needs to be seen urgently by a neurologist.

On the basis of the signs found, the doctor can suspect a particular disease and perform additional investigations (Table 2).

No additional examination is required for young- and middle-aged patients (18 to 50 years) showing no signs of a dangerous disease («red flags») and presenting with a typical disease pattern consistent with non-specific (musculoskeletal) LBP [25, 42, 43]. These patients do not need an urgent X-ray study, CT scan or MRI of the lumbar spine. If

non-specific (musculoskeletal) pain is diagnosed and any signs indicative of a dangerous disease are absent, no instrumental investigation is indicated during 4 weeks after the pain onset [37, 44] (Table 3).

Performing X-ray, CT scan or MRI in patients with musculoskeletal LBP does not improve disease prognosis and has no influence on either development of complications or chronicity while unreasonably adding to the cost of examination, raising patient concerns and increasing the rate of surgical interventions [45]. Explaining to the patient the lack of necessity in such investigations is important [46].

If no back pain relief is observed following an adequate treatment for 4 weeks, a re-examination should be performed to exclude any specific cause of the disease and evaluation of the factors for pain chronicity.

#### 4. Clinical presentation, course, diagnosis and prognosis

Non-specific (musculoskeletal) LBP typically appears after physical exertion, after an awkward move-

Table 3. *Brief recommendations on examination of patients presenting with acute non-specific LBP*

Investigations	Recommendations
Scope	Complaint and history taking, a brief physical and neurological examination
Initial examination objective	Exclusion of a specific (serious) disease, diagnosis of either non-specific (musculoskeletal) pain or discogenic radiculopathy or lumbar spinal stenosis
Instrumental investigations (X-ray study, CT, MRI, etc.)	Not used in disease pattern consistent with the diagnosis of non-specific pain; indicated for exclusion of a specific pain cause in the presence of alert symptoms («red flags»)

Table 4. *Recommendations on the treatment of acute musculoskeletal LBP*

Recommendations	
Information for the patient	A benign character of the disease, high chances of quick recovery
Recommendations to the patient	Avoiding long bed rest, maintaining active lifestyle, social and daily-living activities, continuing working activity, if possible
Drug therapy for pain relief	Administration of NSAIDs and muscle relaxants
Non-pharmaceutical treatment	Manual therapy in the case of the failure of drug therapy for 2 weeks

ment or long staying in an uncomfortable position. Usually, the pain is of aching character, varying in intensity, increasing with movements of the lumbar spine, at certain postures, during walking while decreasing at rest. Pain spreading to the abdomen, perineum and genitalia is not common. Neurological examination does not usually reveal any signs of radiculopathy and other neurological disorders (e.g. paresthesia, impaired sensitivity, reflex loss, pelvic disorders, etc.).

Diagnosis of acute musculoskeletal pain is based on the patient's complaints, history, findings of physical and neurological examinations, which allow to exclude a specific disease, discogenic radiculopathy and lumbar spinal stenosis. Neither laboratory nor instrumental investigation is required to confirm typical cases of acute non-specific LBP.

In most cases, acute non-specific (musculoskeletal) LBP has a favorable prognosis [47], remarkably subsiding within 1 to 3 weeks [48] and completely regressing within several weeks (within 6 weeks in 90% of the cases) [25, 37]. In discogenic pain, its regress is usually due to a decrease in the hernia dimensions and related inflammatory changes. One third of the patients experience a repeated LBP episode within a year after the first one. [29].

Acute LBP progresses to the chronic pain syndrome in 40% of patients [49]. Factors that contribute to the progression to pain chronicity include long-term bed rest, undue limitation of physical activity, «pain» personality type, emotional disorders (depression, anxiety), symptom aggravation and non-adaptive type of the attitude towards the disease [1, 21].

A prognosis for recovery is worse in those patients who underwent an X-ray, CT scan or MRI which revealed any changes, such as disc herniation, as compared to those patients who did not undergo these investigations at all.

## 5. Treatment

Non-pharmaceutical methods of patient management play a leading role in acute non-specific (musculoskeletal) LBP. All guidelines recommend to inform the patient about the causes and favorable prognosis of acute non-specific LBP, as well as to instruct him/her to maintain an active lifestyle and avoid long bed rest [21, 28–34].

In the case of discogenic LBP, the patient should be informed of a possible spontaneous disc hernia regression [50–55] (Table 4).

**Patients' informing** about the causes and favorable prognosis of acute non-specific LBP, expected pain regress, full recovery and return to usual daily activities is the first important stage of treatment of acute non-specific LBP, which prevents pain catastrophizing and enhances recovery [21, 28–34].

**Maintaining an active lifestyle** and continuing working, if possible, is the next key stage of treatment of acute non-specific LBP. A long-term decrease in professional, social and daily-living activities worsens the disease prognosis [56].

**Bed rest** is not indicated in acute musculoskeletal LBP as it worsens the basic characteristics of the disease course, such as duration of pain persistence, time to recovery of physical activities [21, 55]. If the patient has to stay in bed because of severe pain, the bed rest should not last for longer than 2 days; staying in bed for a longer period worsens the course of the disease [14]. It would be wise to explain to the patient that he/she can stay in bed for a short period if the pain is severe, but this is a way of pain relief rather than a method of treatment.

**An educational program (school)** is a wise measure (low level of evidence), provided that there are conditions for its implementation [14, 21]. There is no reasonable basis for recommending patients with LBP to sleep on a hard surface, such as firm mattress, floor, board, etc.

There is no strong evidence supporting the efficacy of **therapeutic exercises** during the first 4 weeks of musculoskeletal LBP [21, 25, 30].

There is no strong evidence supporting the efficacy of **traction, acupuncture, various physiotherapeutic methods, bearing special girdles and lumbo-sacral supports, corrective insoles and orthopedic footwear** in acute non-specific (musculoskeletal) LBP [14, 28–30, 56].

**Manual therapy** can be used as a moderate-efficacy method of treatment of acute non-specific (musculoskeletal) LBP [57, 58]. This therapy is recommended for use when the standard treatment (patient information, maintenance of an active lifestyle, prescription of NSAIDs) did not result in pain regress or recovery of activities of daily living [28].

There is no strong evidence supporting the efficacy of the back *muscle massage* in acute non-specific back pain [29, 31]. It has been found that a combination of the back muscle massage with the standard therapy is superior to the standard therapy alone in patients with subacute back pain in terms of short-term pain relief (low level of evidence) [59].

**Surgical treatment** (hernia excision) is not superior to non-surgical treatment, even in the cases of discogenic LBP, and is not recommended in acute musculoskeletal LBP.

**NSAIDs** are recommended in acute musculoskeletal LBP (moderate level of evidence) [25, 60]. It has been proved that NSAIDs are superior to placebo in terms of pain relief and slight acceleration of recovery [61].

No strong evidence has been obtained so far to support superiority of a certain NSAID over other drugs of the same class in the treatment of acute non-specific (musculoskeletal) LBP [61, 62]. Selective inhibitors of cyclooxygenase 2 (COX-2) have fewer gastrointestinal (GI) side effects [63]. Moderately selective NSAIDs include meloxicam and nimesulide and highly selective NSAIDs include celecoxib, etorixib (coxibs). Etorixib is recommended for treatment of back pain caused by osteoarthritis of the spinal joints. COX-2 selective inhibitors, coxibs, should be reserved for the cases associated with a high risk of GI side effects. Highly selective NSAIDs are not superior to moderately selective NSAIDs in terms of GI side effects. Proton pump inhibitors are drugs of choice in NSAID-associated GI events. Aceclofenac of non-selective NSAIDs and meloxicam of moderately selective NSAIDs demonstrate a good safety profile.

Generally, NSAIDs are recommended for use (in the absence of contraindications) at minimum effective doses for a short time and with due account for possible adverse events (GI, hepatic, renal, cardiovascular) and patients' age; if necessary, gastroprotective agents should be prescribed [29].

**Muscle relaxants** are recommended for pain relief in acute musculoskeletal LBP (moderate level of evidence). Their efficacy has been noted in placebo-controlled clinical trials [60, 64]. No evidence has been obtained so far to support superiority of a certain muscle relaxant over other drugs of the same class in terms of the efficacy of musculoskeletal LBP relief [31]. The results obtained in

the trials undertaken to test a hypothesis of superiority of a combination of a muscle relaxant and a NSAID over NSAID monotherapy for pain relief are inconsistent [65–67]. Prescription of a muscle relaxant as add-on to a NSAID is recommended if a NSAID-alone therapy is ineffective [28].

**Paracetamol** is less than effective as a pain-killer in acute musculoskeletal LBP [68, 69] and can be used as an add-on to NSAID therapy [29].

**Other analgesic drugs** also can be prescribed in acute musculoskeletal LBP, provided that there is no contraindication to their use (low level of evidence).

**Administration of anesthetics, GCs** into muscles and ligaments, in the region of facet joints, sacroiliac joint or epidural space is not recommended even in those cases when a particular cause of acute LBP is suspected [14, 31].

To conclude, once acute non-specific (musculoskeletal) LBP is diagnosed, the doctor should inform the patient in plain language of a favorable disease prognosis and the absence of the necessity to undergo an X-ray, CT scan or MRI. Also, it is essential to inform the patient about a benign character of the disease, high chances of quick recovery and to instruct him/her to maintain an active lifestyle and social, professional and daily-living activities. NSAIDs and muscle relaxants can be prescribed for pain relief.

## 6. Preventive care

The following is important for secondary prevention:

- 1) avoidance of strenuous physical exercise (weight lifting, carrying a heavy bag in one hand, etc.) and hypothermia;
- 2) exclusion of prolonged static loading (long-term sitting, staying in an awkward position, etc.);
- 3) regular therapeutic exercise, swimming, walking [70].

Generally, an educational program (teaching to avoid strenuous physical exercise, prolonged static loading, to use adequate weight lifting methods, etc.) and therapeutic exercise are effective [71]. There is no evidence to support the efficacy of other methods, such as bearing a protective girdle or taking chondroprotective agents or other drugs, for prevention of back pain [28–31].

Introduction of the guidelines into clinical practice is expected to improve considerably the condition of many patients and to decrease economic damage due to disability caused by acute musculoskeletal LBP.

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Received on 21.05.2018

### **Declaration about financial and other relationships**

This is a non-funded investigation. The authors are fully responsible for submitting the final version of the manuscript for publication. The final version of the manuscript has been approved by all co-authors.