

Common Musculoskeletal Problems in Primary Care Settings

Module on Low Back Pain

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1. Introduction

Low Back Pain (LBP) is the pain at the posterior trunk between the ribcage and the gluteal folds and it includes lower extremity pain that result from low back disorder (sciatica/ radiating LBP), whether there is trunk pain or not.

Mechanical LBP refers to back pain that arises intrinsically from the spine, intervertebral disks, or surrounding soft tissues. This includes lumbosacral muscle strain, disk herniation, lumbar spondylosis, spondylolisthesis, spondylolysis, vertebral compression fractures, and acute or chronic traumatic injury.¹

Referred pain is the pain perceived at a location other than the site of the painful stimulus/ origin. The pain spreads into the lower limbs, and is perceived in regions innervated by nerves other than those that innervate the site of noxious stimulation.² Since referred pain is not caused by compression of nerve roots, there are no neurological signs. The pain is dull aching, and is sometimes described as an expanding pressure. It expands into wide areas that can be difficult to localize.

Radicular pain is the pain evoked by ectopic discharges emanating from a dorsal root or its ganglion.² The pain evoked was distinctive. It had a lancinating, shocking, or electric quality. Clinical findings include a history of dermatomal leg pain, leg pain worse than back pain, worsening of leg pain during coughing, sneezing or straining.³

Radiculopathy is a neurological state in which conduction is blocked along a spinal nerve or its roots.² Radiculopathy is characterised by the presence of weakness, loss of sensation, or loss of reflexes associated with a particular nerve root, or a combination of these, and can coexist with radicular pain.³

Acute LBP is defined as pain that lasts less than 3 months and chronic LBP lasts for longer than 3 months.^{4,5}

2. Natural course

For many individuals, episodes of back pain are self-limited. The pain usually resolves in 4 to 8 weeks in more than 50% of patients, yet the recurrence rate is common and high, about 85%.⁶ A systematic review found that most episodes of LBP improve substantially within 6 weeks. However, two-thirds of patients still report some pain at 3 months and 12 months.⁷ Another systematic review suggested around 33% of people have a recurrence within 1 year of recovering from a previous episode.⁸

3. Risk factors of Low Back Pain

Some studies indicate that lifestyle and psychosocial factors such as smoking^{3,9}, obesity^{3,10}, occupation requiring working with heavy weights or lengthy periods of standing or walking^{3,11}, symptoms of psychologic distress^{3,12}, and low levels of physical activity^{3,13} that relate to poorer general health, are associated with occurrence of LBP episodes or development of persistent LBP, although independent associations remain uncertain.

Another systematic review reported that people with other chronic conditions, including asthma and diabetes, are more likely to report LBP than people in good health.¹⁴

4. Prevention of Low Back Pain

A sedentary lifestyle significantly increased the incidence of recurring LBP, while increased physical activity had a significant effect on the presence of chronic LBP.¹⁵

Exercise alone or in combination with education is effective for preventing LBP. Other interventions, including back belts and shoe insoles, do not appear to prevent LBP.¹⁶

Regular exercises can enhance strength and flexibility of muscles, tendons and ligaments helping to support the spine. Learning and maintaining proper postures at work and during daily activities, enhancing consciousness in self-management and

health through regular exercise and balanced diet can help prevent LBP. Table 1 provides some tips for preventing LBP.

Table 1: Some tips on prevention of Low Back Pain¹⁷⁻¹⁹

- Stand up straight, with shoulders parallel to the hips, and abdomen pulled in, to maintain the natural curvature of the spine. Avoid wearing high heels if possible.
- When sitting, keep your back straight with your feet rest on the floor, lower legs falling naturally and vertically, and buttocks touching the back of the chair.
- Change the sitting posture frequently.
- Don't cross your legs for too long.
- Your bed should be firm enough without sagging to give your body sufficient support. Do not get in or out of bed by twisting your back.
- Bending exerts great pressure on the spine and should be avoided. Always bend at your knees and squat down instead.
- When lifting heavy objects, avoid hurting your back. Make use of leg and shoulder muscles to do the work. Keep the load close to you and avoid exceeding your limits. Do not twist your waist while turning, turn your whole body instead.
- Avoid holding prolonged (e.g. more than 20 minutes) unaccustomed postures, or making sudden waist movements or forceful exertions.
- Exercise can strengthen muscles and slow down degenerative changes in the spine.

5. Etiologies

Majority of patients presented with LBP to primary healthcare practitioners which is non-specific and is not attributable to a recognisable, known specific pathology (e.g. infection, tumour, osteoporosis, fracture, structural deformity, inflammatory disorder, radicular syndrome, or cauda equina syndrome). However, some factors have been identified as possible causes of the pain or as being able to affect its development and subsequent course, e.g. disc space narrowing, disc degeneration etc. although the results are inconsistent.²⁰

Less than 1% have a serious systemic etiology such as metastatic cancer, spinal infections, inflammatory arthritis. Less than 10% of patients may have other less serious etiologies such as vertebral compression fracture, radiculopathy or spinal stenosis.²¹

Table 2 shows some of the differential diagnosis of LBP.

Table 2: Differential diagnosis of Low Back Pain**Mechanical low back pain**

- Lumbosacral muscle strains/sprains
- Degenerative disease (e.g. discs (spondylosis), facet joints (osteoarthritis))
- Spondylolisthesis
- Herniated disc
- Spinal stenosis
- Fractures
- Congenital disease (e.g. severe kyphosis, severe scoliosis, possible type II or type IV transitional vertebra)
- Possible spondylolysis
- Possible facet joint asymmetry

Non-mechanical back pain

- Neoplasia (e.g. multiple myeloma, metastatic carcinoma, lymphoma and leukemia, spinal cord tumors, retroperitoneal tumors)
- Infection (e.g. osteomyelitis, septic discitis, paraspinous abscess, epidural abscess)
- Inflammatory arthritis (often HLA-B27-associated) (e.g. ankylosing spondylitis, psoriatic spondylitis, reactive arthritis, inflammatory bowel disease)
- Scheuermann disease (osteochondrosis)
- Paget disease

Referred pain from visceral disease

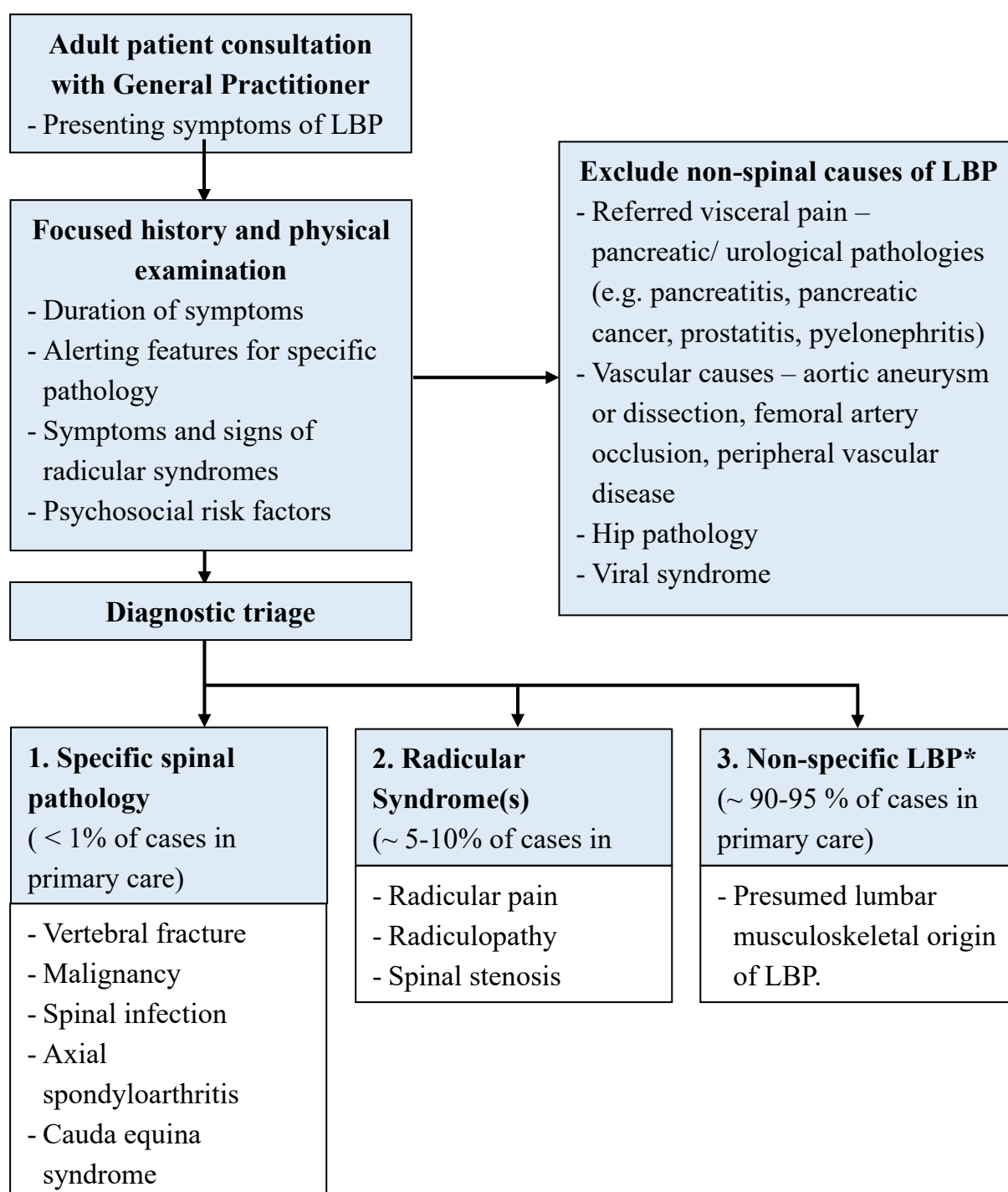
- Pelvic organs (e.g. prostatitis, endometriosis, chronic pelvic inflammatory disease)
- Renal disease (e.g. nephrolithiasis, pyelonephritis, perinephric abscess)
- Aortic aneurysm
- Gastrointestinal disease (e.g. pancreatitis, cholecystitis, penetrating ulcer)
- Fat herniation of lumbar space

6. Clinical evaluation of Low Back Pain

A thorough clinical assessment is necessary to rule out rare but serious “red flag” conditions which require urgent referral to appropriate specialist care for timely intervention. Subsequently, clinicians can manage the vast majority (90-95%) of non-

specific LBP at primary care setting. It is also recommended to look for “yellow flag” which are psychosocial factors associated with less favourable outcome. The assessment algorithm is shown in Figure 1.

Figure 1. Diagnostic triage for Low Back Pain²¹



* No tests available in primary to reliably specify the pathoanatomical source of LBP.

6.1. History taking

The history should include

- pain onset, primary site and presence of radiation, characteristics of pain (e.g. nocturnal pain/pain that wakes patients up) and intensity of pain, relieving factor and aggravating factor;
- progression of symptoms;
- effects of the pain on daily function e.g. sleep, self-care and work and effects on psychological impact e.g. depression
- history of trauma
- past history of back pain, previous treatment, and how current symptoms compare with any previous back pain;
- history of recent infections (particularly bacteremia);
- history of malignancy;
- history of intravenous substance use;
- history or current use of corticosteroid medications;
- recent history of epidural or spinal procedures;
- constitutional symptoms (e.g. unintentional weight loss, fever, or night sweats);
- neurologic symptoms (e.g. weakness, falls or gait instability, numbness or other sensory changes, or bowel/bladder symptoms); and
- social history;

Features that may suggest underlying serious disease include history of cancer, age >65 years, unexplained weight loss, pain >1 month, persistent pain, night time pain, and unresponsiveness to previous therapies.²²

Documented fever, intravenous drug use, recent infection (particularly bacteremia), or recent epidural or spinal instrumentation/ procedures increase the suspicion of spinal infection.

Red flags are often used to distinguish a common, benign episode from a more significant problem that requires urgent workup and treatment. However, family physicians should rely on a comprehensive clinical approach rather than solely on a checklist of red flags. Table 3 shows some red flag warning symptoms that may require immediate or urgent evaluation.

| Table 3. Red flag warning signs²³ | |
|--|---|
| Possible diagnosis | Red flag symptoms |
| Cauda equina syndrome | <ul style="list-style-type: none"> - Saddle anesthesia - Motor deficit at multiple levels - Urinary retention - Urinary incontinence - Fecal incontinence |
| Significant or progressive neurological deficits | <ul style="list-style-type: none"> - Progressive motor weakness - Severe or incapacitating back or leg pain (e.g., requiring hospitalization, precluding walking, or significantly limiting activities of daily living) |
| Cancer | <ul style="list-style-type: none"> - History of cancer with new onset LBP - Night/ Resting pain - Unexplained weight loss |
| Vertebral infection | <ul style="list-style-type: none"> - Fever - IV drug use - Recent infection/ Spinal procedure or surgery |
| Vertebral compression fracture or fracture due to acute injury | <ul style="list-style-type: none"> - History of osteoporosis - Use of corticosteroids - Older age |
| Inflammatory arthritis | <ul style="list-style-type: none"> - Morning stiffness lasting longer than 30 minutes (especially upon rising) in patient under age 40 |

Yellow flags are those psychosocial variables that, when present in multiples, are associated with a poor prognosis in terms of pain and related disability. These should be identified and dealt with early and appropriately to minimize the risk to poor prognosis.²¹ A checklist for yellow flag can refer to Table 4.

Table 4. Checklist for yellow flag indicators²⁴

| Work | Behaviours |
|---|---|
| <ul style="list-style-type: none"> - belief that pain is harmful - belief that all pain must be abolished before attempting to return to work or normal activity - expectation of increased pain with activity or work - poor work history - unsupportive work environment | <ul style="list-style-type: none"> - passive attitude to rehabilitation - use of extended rest - reduced activity with significant withdraw from activities of daily living - avoidance of normal activity - impaired sleep because of pain - increased intake of alcohol or similar substances since the onset of pain |
| Beliefs | Affective |
| <ul style="list-style-type: none"> - catastrophising, thinking the worst - misinterpreting bodily symptoms - belief that pain is uncontrollable - poor compliance with exercise - expectation of “techno-fix” for pain - low educational background | <ul style="list-style-type: none"> - depression - feeling useless and not needed - irritability - anxiety about heightened body sensations - disinterest in social activity - over protective partner/spouse - socially punitive partner/spouse - lack of support to talk about problems |

6.2. Physical examination

In general, the purpose of the physical examination is to identify features that suggest indication for further evaluation. The conventional paradigm of musculoskeletal physical examination consists of “look”, “feel” and “move” should be utilized in the assessment of LBP. Neurological examination should be performed and other tests (e.g. straight leg raising) should be performed as appropriate. A thorough physical examination is an important stepping stone to patient reassurance.²¹

6.2.1. Inspection

The patient is observed in standing from the front, back and sides for body habitus, as well as any asymmetry of posture, spinal curves e.g. scoliosis or kyphosis, or muscle bulk, or abnormalities on the skin.

6.2.2. Palpation

Palpation of the spine to assess spinal, paraspinal and soft tissue tenderness. Vertebral spinous process tenderness is a sensitive but non-specific finding for spinal infection, and may also be seen in patients with vertebral metastases and osteoporotic compression fracture. However, it should be noted that it can also be present in non-specific LBP.

6.2.3. Movement

Observe for gait/ movement while walking or changing posture. Detection of gross limitations of movement, and pain on gross movement.

6.2.4. Neurological examination

Neurological examination is required, especially the patient has radicular leg pain, or if the history suggests neurological symptoms such as paraesthesia, weakness, or sphincter dysfunction. Table 5 showed some of the physical signs on neurological examination. Table 6 is added for easy reference of myotome and dermatome.

| Table 5. Physical Signs on Neurological examination for Low Back Pain | |
|---|--|
| Diagnosis | Physical signs |
| Radicular pain | <ul style="list-style-type: none"> - Positive provocative tests for nerve root irritation: straight leg raise (L4, L5, S1, S2) and prone knee bend (L2, L3, L4). - Lumbar extension and ipsilateral side flexion may exacerbate radicular pain - Sometimes accompanying radiculopathy signs |

| | |
|------------------------|--|
| Radiculopathy | <ul style="list-style-type: none"> - Sensory: diminished light touch or pinprick in dermatomal distribution, paraesthesia intensifies with lumbar extension - Motor: myotomal weakness - Reflexes: reduced or absent knee jerk or ankle jerk |
| Lumbar spinal stenosis | <ul style="list-style-type: none"> - Normal neurological assessment during rest (sometimes mild motor weakness or sensory changes) - Antalgic postures (stooped standing and walking), straightened posture can amplify leg pain or numbness. - Wide based gait |

Table 6. Myotome and dermatome²⁵**Dermatomes of the lower limb**

- L1: the inguinal region and the very top of the medial thigh.
- L2: the middle and lateral aspect of the anterior thigh.
- L3: the medial epicondyle of the femur.
- L4: the medial malleolus.
- L5: the dorsum of the foot at the third metatarsophalangeal joint.
- S1: the lateral aspect of the calcaneus.
- S2: at the midpoint of the popliteal fossa.
- S3: at the horizontal gluteal crease (the horizontal crease formed by the inferior aspect of the buttocks and the posterior upper thigh).
- S4/5: the perianal area.

Myotomes

- C4: shoulder shrugs
- C5: shoulder abduction and external rotation; elbow flexion
- C6: wrist extension
- C7: elbow extension and wrist flexion
- C8: thumb extension and finger flexion
- T1: finger abduction
- L2: hip flexion
- L3: knee extension
- L4: ankle dorsiflexion
- L5: big toe extension
- S1: ankle plantarflexion
- S4: bladder and rectum motor supply

6.2.5. *Other examination as appropriate*

- Straight leg raising test and femoral nerve stretch test can be helpful in determining whether symptoms are radicular in nature. The straight leg raising test is done with the patient supine. The examiner raises the patient's extended leg on the symptomatic side with the foot dorsiflexed, being careful that the patient is not actively "helping" in lifting the leg. Straight leg raising results in an increase in dural tension in the low lumbar and high sacral levels. It is most helpful in the evaluation of radiculopathy at the L5 and S1 levels. A positive Lasègue's sign (usually occurs when hip flexion is between 30 and 60 degrees) indicates the presence or worsening of radicular pain.
- The femoral nerve stretch test is accomplished by placing the patient prone on the table and passively extending the hip and leg straight up off the plane of the table. This maneuver is most useful for evaluating the L2, L3, and L4 roots.
- Patrick's test can be considered if there is suspected hip or sacroiliac disease. It is a maneuver during which the hip is externally rotated with the ipsilateral knee flexed at 90 degrees and placed on the opposite knee. The test is positive if it elicits hip or buttock pain. A positive test raises suspicion for hip or sacroiliac disease. However, it is nonspecific for a radicular process.
- If a patient's history strongly suggests malignancy, evaluate as appropriate (e.g. lymph node exam, breast exam, prostate evaluation). The commonest primary malignancy site is thyroid, prostate, breast, lung, kidney, colon, rectum. Multiple myeloma should also be considered.
- Examination of hip joints and lower limb vascular status e.g. peripheral vascular disease, should be performed based on the history.

6.2.6. *Non-organic signs*

A number of ‘nonorganic’ clinical signs²⁶ (Table 7) suggested the presence of possible significant psychosocial distress in a patient presenting with LBP. These are not signs of malingering. A patient with nonorganic signs needs to evaluate psychosocial distress, which can be addressed during a careful, caring examination. This is a vitally important role for the primary care practitioner.

| Table 7. Non-Organic signs of Low Back Pain²⁶ | |
|---|---|
| Sign | Description |
| Superficial tenderness | The patient’s skin over a wide area of the lumbar skin is tender to light touch or pinch. |
| Non-anatomical tenderness | The patient experiences deep tenderness over a wide area that is not localized to one structure and crosses over non-anatomical boundaries. |
| Axial loading | Downward pressure on the top of the patient’s head elicits lumbar pain. |
| Acetabular rotation | Lumbar pain is elicited while the provider passively and simultaneously externally rotates the patient’s shoulder and pelvis together in the same plane as the patient stands. It is considered a positive test if pain occurs within the first 30 degrees of rotation. |
| Distracted straight leg raise discrepancy | The patient complains of pain during a straight leg raise during formal testing, such as when supine, but does not on distraction when the examiner extends the knee with the patient in a seated position. |
| Regional sensory disturbance | The patient experiences decreased sensation fitting a stocking-like distribution rather than a dermatomal pattern. |
| Regional weakness | Weakness, cogwheeling, or the giving way of many muscle groups that are not explained on a neuroanatomical basis. |
| Overreaction | A disproportionate and exaggerated painful response to a stimulus that is not reproduced when the same provocation is given later. These responses can include verbalization, facial expression, muscle tension, or tremor. |

6.3. Investigations

Further evaluation is usually unnecessary in patients without red flags, because acute LBP improves in 1 month in more than 50% of cases.²⁷ If symptoms have not resolved adequately within a 4- to 6-week period, reevaluation and additional diagnostic workup should be considered.⁶

6.3.1 *Imaging studies*

Routine imaging (X-ray and/ or MRI) is not recommended for patient with acute non-specific LBP. A systematic review unveiled that in patient with acute non-specific LBP, X-ray and MRI findings do not correlate with clinical symptoms or work capacity.²⁸ Another systematic review and meta-analysis of six trials that compared immediate imaging with usual care for patients with acute and subacute LBP, without signs or symptoms of infection or malignancy, found no significant differences in short-term (up to three months) or long-term (6 to 12 months) outcomes for measures of patient pain or function.²⁹ A subsequent prospective observational study in patients aged 65 years or older with back pain, but without radiculopathy, found no differences in disability at one year for patients who received early imaging (within six weeks of the index visit) compared with those who did not.³⁰

Joint guidelines from the American College of Physicians (ACP) and the American Pain Society recommend that "clinicians should not routinely obtain imaging or other diagnostic tests in patients with nonspecific low back pain" and reserve imaging for patients with severe or progressive neurologic deficits or when serious underlying conditions are suspected on the basis of history and physical examination.^{31,32}

A trial of four to six weeks of treatment (refer to section 7) is appropriate before consideration of imaging studies.³³ Imaging studies should be considered in patients with LBP if there is suspicion for cancer (e.g. new onset of LBP with history of cancer, multiple risk factors for cancer), spinal infection (e.g. new onset of LBP with fever and history of intravenous drug use or recent infection), signs of the cauda equina syndrome (new urinary retention, fecal incontinence, or saddle anesthesia) or severe or progressive neurologic deficits or risk of vertebral compression fracture (e.g. advance age, history of prolonged systemic glucocorticoid use).

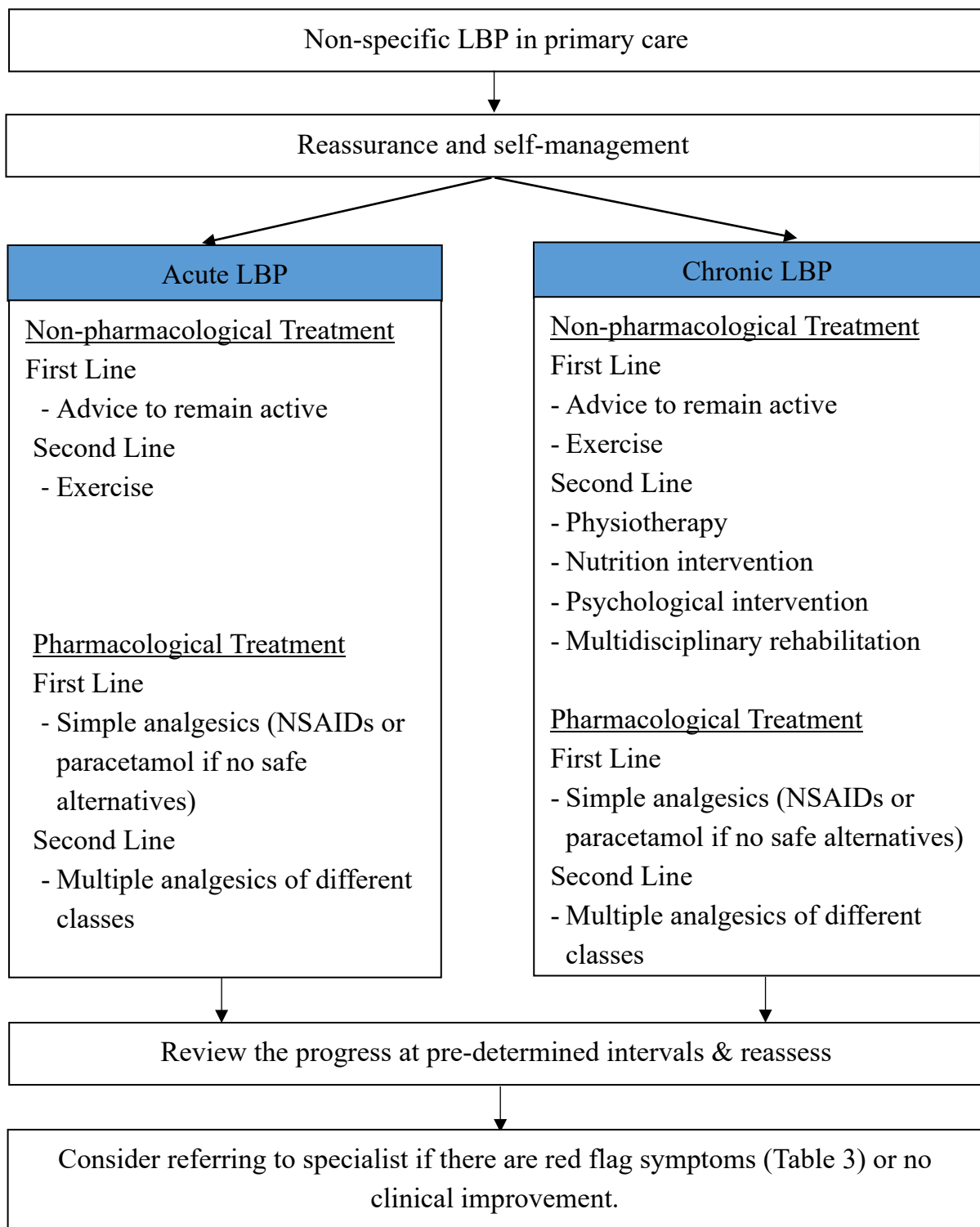
6.3.2 *Laboratory studies*

Most patients with acute LBP do not require any laboratory testing. In some patients with condition such as suspected infection, inflammation or malignancy, erythrocyte sedimentation rate (ESR) and/or C-reactive protein (CRP) are checked in addition to plain radiographs. Other specific tests are ordered as indicated by the clinical evaluation.

7. Management

The management algorithm is shown in Figure 2.

Figure 2. Management algorithm of Low Back Pain in primary care



7.1. Non-pharmacological treatment

7.1.1 *Reassurance and Self-management*

Advice, reassurance and staying active is recommended in all patient with non-specific LBP. It is important to teach them the self-management of non-specific LBP.

For both acute and chronic LBP, clinicians should

- address the patient's specific fears or worries (e.g. long-term disability, undiagnosed serious disease)²³;
- acknowledge the patient's pain and suffering/loss of function²³;
- provide patient with advice and information, tailored to their needs and capabilities, to help them self-manage their LBP with or without sciatica, including the following:
 - 1) information on the nature of LBP;
 - 2) encouragement to avoid bed rest, stay active and continue with normal activities including work, as much as possible while paying attention to correct posture to minimize spine loading³⁴⁻³⁶; and
 - 3) reassurance that they do not have a serious disease and that majority of patients will have symptoms improved over time^{37,38}.
- reassure the workers on the followings:
 - 1) addressing the common misconception and providing support and information among workers and employers of the need to be pain free before returning to work; and
 - 2) encouraging the worker to resume / continue ordinary activity including their work as normally as possible despite some remaining LBP.

For self-management in acute LBP, superficial heat is often applied with the rationale that it may reduce muscle spasm. In a systematic review, the application of superficial heat was superior to no heat for short-term improvement (5 days) in pain. Patients should be reminded to use superficial heat carefully to prevent scald and burn. There was insufficient evidence to determine the effects of cold packs.³⁹ The use of heat could be advised to patients for symptomatic relief.

For patients with chronic LBP, it was shown that self-management programme, including theory based (cognitive behavioural therapy based or social cognitive theory based) or no theory based and through face-to-face mode or internet-based strategy, is effective in reducing pain and improving disability from short to long term.⁴⁰

7.1.2 Exercise

Exercise therapy includes both self-care exercises done by the patient and supervised exercises in the context of physical therapy.

In general, patients with acute LBP can try self-management first and consider to refer for exercise or physical therapy later. Systematic reviews did not clearly demonstrate a treatment benefit of general exercise therapy, stabilization exercise, McKenzie therapy or motor control exercise compared with other conservative treatments.^{41,42} There was also inconsistent evidence on the cost-effectiveness of exercise therapy compared with usual care for acute LBP.⁴³ Advice and education, reassurance and encouragement to avoid bed rest, stay active, and continue with usual activities, including work will be sufficient as initial management.⁴⁴

For patients with chronic LBP, there is evidence to support any type of exercise therapy for them.⁴⁵⁻⁴⁷ In several systematic reviews, most of the exercises modestly improved pain and function in patients with chronic LBP.^{45,47-49}

Pilates, McKenzie therapy, functional restoration (pain intensity only) and flexibility exercises (functional limitation only) were shown to be more effective than other types of exercise treatment for reducing pain intensity and functional limitation.⁴⁷

Motor control exercises are shown to be effective for treating patients with chronic LBP in reducing pain.^{47,50,51} Low impact activities such as walking, swimming or elliptical could be encouraged to patients.^{52,53} Walking places low stress on the spine and is available to almost everyone. Walking helps maintain endurance and function, and helps with pain. Patients should be advised to start slow with short walks 2–3 times per day and then increase their distance or speed every 3–5 days if there is no increase in symptoms.

Other exercise programs can be considered include core strengthening (e.g. abdominal and trunk extensor), stretching, aerobic exercise and yoga.⁴⁷

Nevertheless, the decision on which type of exercise to recommend should be based upon practical considerations, including local availability, patient preferences and abilities, and previous history of success (or lack of success) with a particular exercise program.

7.1.3 *Acupuncture*

The evidence of benefit of acupuncture in acute LBP is limited as randomized trials of acupuncture tend to be small and heterogeneous in methodology, and blinding is difficult. Systematic reviews of acupuncture for acute LBP showed there might have small beneficial effect on relieving pain but not function.⁵⁴

For patients with chronic LBP, a systematic review found acupuncture had a small beneficial effect in reducing pain and improving functional status compared with sham, placebo, or other passive modalities at short-term (one month) and intermediate-term follow-up (three and/or six months).⁵⁵

7.1.4 *Spinal manipulation*

Spinal manipulation is a form of manual therapy that involves the movement of a joint near the end of the clinical range of motion.

A systematic review and meta-analysis of spinal manipulative therapy for acute LBP found it was associated with modest improvements in pain and function at up to 6 weeks, with transient minor musculoskeletal harms. However, heterogeneity in study results was large.⁵⁶ There is little evidence that manipulation is cost-effective for treating acute LBP.⁵⁷

Spinal manipulation may have small beneficial short-term (1 to 12 months) benefits in the management of chronic LBP.⁵⁸⁻⁶¹

7.1.5 *Massage*

Compared with patients receiving no other treatment, those receiving massage therapy had only short-term improvement in pain and function for acute and chronic LBP.⁶² Massage therapy provided by licensed massage therapists also showed short-term improvement in pain and function for chronic LBP.⁶³ However, harms from massage treatment appear to be minimal, and some patients report symptomatic relief with massage. Thus, it is a reasonable adjunctive short-term pain management option for those patients with acute non-specific LBP and who are interested in pursuing massage treatment.

7.1.6 *Nutrition*

Low Back Pain is associated with increased inflammation and high levels of oxidative stress which can be modulated through optimizing nutrition.⁶⁴ A recent systematic review suggested that altered overall dietary pattern has a significant impact on pain scores⁶⁵, while another review suggests a plant-based diet may put alleviation on chronic musculoskeletal pain.⁶⁶

Plant-based diet usually has higher proportion of vegetables, fruits, legumes (beans and peas) and whole grains. Plant-based diet is associated with lower levels of inflammatory biomarkers as such diet is generally packed with antioxidants, phytochemicals and polyphenols.⁶⁷ Additionally, plant-based diet contributes to the diversity of gut microbiota⁶⁸, which its composition is linked to pain and inflammation through the gut–central nervous system axis.^{69,70}

One randomized control trial study in 2019 has shown evidence that dietitian-delivered personalized dietary intervention had clinically meaningful improvements in pain interference and pain self-efficacy in patients experiencing pain, including LBP and significant reduction in intake, compared to the control group.^{64,71} Participants in the experimental group received three personalized telehealth consultations with education about food groups and nutrients critical to chronic pain management, setting goals and priorities, providing summaries by email for participants reference, discussing successes and managing challenges towards achieving goals, troubleshooting, answering questions and with further reinforcement on the strategies at the last session. Clinicians may refer patients with severe chronic LBP to a dietitian for assessing the food/nutrition-

related history, identifying diet-related behavioural barriers as well as diet education critical to chronic pain management e.g. vegetables, fruits, antioxidants, omega-3, vitamin B, etc. Follow-up consultations may be recommended by the clinician or the dietitian.

7.1.7 Psychological therapy

For patients with yellow flags identified or patients with persistent LBP or radicular pain who have not responded to previous treatments for chronic LBP, the use of psychological therapies, e.g. cognitive behavioural therapy and pain education, could be considered although inconsistent results on pain and function using different type of psychological therapies were found.⁷²

7.1.8 Multidisciplinary rehabilitation

For patients with chronic Low Back Pain, who have not responded to first line treatments, and who are substantially functionally disabled by pain, multidisciplinary rehabilitation programmes with coordinated delivery of supervised exercise therapy, cognitive behavioural therapy, and medication are more effective in relieving pain and improving functional status in short to long term than standard treatments.^{5,73-75}

7.2. Pharmacological treatment

Pharmacological treatment should be considered, especially after inadequate response to first-line nonpharmacological interventions.^{44,48}

7.2.1 Non-steroidal anti-inflammatory drugs (NSAIDs)

Consider oral NSAIDs, taking into account the risks, including gastrointestinal, liver, and cardio-renal toxicity, and if using, to prescribe the lowest effective dose for the shortest possible time.⁵ A systematic review showed that NSAIDs were slightly more effective in short-term (≤ 3 weeks) reduction of pain intensity and improvement in disability than placebo for patients with acute LBP.⁷⁶ Another review systematic review showed NSAIDs were slightly more effective in reducing pain intensity and improving

disability than placebo for patients with chronic LBP.⁷⁷

For the use of topical NSAIDs, there were limited studies on evaluating the effect for acute and chronic LBP. Considering most clinical trials and systematic reviews concluded that topical NSAIDs had a high safety margin and there were evidence showing topical NSAIDs were effective in reducing pain in patients with osteoarthritis of knee, it may be worth to try topical NSAIDs for acute and chronic LBP although the current evidence does not support.⁷⁸

7.2.2 *Paracetamol*

We are still in need of better evidence on the efficacy of paracetamol for acute and chronic back pain.⁷⁹

According to a systematic review on paracetamol for LBP, there was no difference between paracetamol and placebo for acute LBP on pain, disability, function, quality of life, and sleep quality outcomes at 1 week (immediate term), 2 weeks, 4 weeks, and 12 weeks (short term) follow-ups.⁸⁰ However, more than 90% of the participants analysed in the review were from one large trial⁸¹, which included middle-aged Australian participants with acute LBP. Therefore, care should be taken when generalising the findings of the systematic review to other types of patients, such as those with chronic symptoms. In addition, trial evaluating paracetamol for chronic LBP patients was not found.

However, in selected patients for whom there are no safe alternatives, it is reasonable to consider a trial of paracetamol as initial therapy.

7.2.3 *Opioids*

Routine use of opioids is not recommended, since benefits are small and substantial risks exist, including overdose and addiction potential.⁸² Opioid therapy should be used only in carefully selected patients, for a short duration, and with appropriate monitoring.⁸²

The efficacy of opioid analgesics in acute LBP is unknown.⁸³ For patient with chronic low back pain, a systematic review showed that opioid analgesics could reduce pain in the short to intermediate term (up to 12 months). Clinically important pain relief (more

than 20 points out of 100) was not observed within the dose range evaluated (40.0-240.0-mg morphine equivalents per day). Evidence on long-term efficacy was lacking.

Tramadol is an opioid agonist that also blocks reuptake of serotonin and norepinephrine.⁸⁴ It is recommended to limit its use to a few days and total use to two weeks. Tramadol may have a lower risk of constipation and dependence than conventional opioids but carries the risk of serotonin syndrome, especially when combined with other serotonergic agents.^{84,85}

7.2.4 *Other medications*

The following groups of medications are of limited evidence of effectiveness for the treatment of patient with acute or chronic LBP.

7.2.5 *Anti-depressants*

There is no evidence to support the use of antidepressants in treatment of acute LBP.^{86,87} In chronic LBP the role of antidepressants for the treatment is uncertain. Systematic reviews comparing antidepressants with placebo in patients with chronic back pain demonstrated conflicting results.⁸⁶⁻⁸⁹

7.2.6 *Anti-epileptics*

Antiepileptics are widely used in the treatment of various pain syndromes, including neuropathic pain, but evidence supporting the efficacy of these medications (i.e. the gabapentinoids) for the treatment of patients with subacute or chronic LBP (with or without sciatica) is limited, with mixed results.

A systematic review of eight randomized control trials evaluated gabapentinoids (gabapentin or pregabalin) for the treatment of chronic LBP.⁹⁰ Gabapentin did not improve pain compared with placebo, pregabalin was slightly less effective than other analgesics (amitriptyline, celecoxib, or tramadol/acetaminophen), and pregabalin used as adjuvant therapy did not show a benefit.

7.3. Interventional therapies/ Surgery and Referral to Specialist

The role of interventional therapies and surgery for non-specific LBP is limited and recommendations in clinical guidelines vary. Recent guidelines do not recommend spinal epidural injections or facet joint injections for LBP^{5,73,74} but do recommend consideration of epidural injections of local anaesthetic and steroid for severe radicular pain.⁵ Epidural injections are associated with small short-term (<4 weeks) reductions in pain, do not seem to provide long-term benefits or reduce the long-term risk of surgery.^{73,91}

Selected groups of patients with LBP should undergo evaluation by specialist:

- patients with suspected cauda equina lesions (characterized by saddle anesthesia, sensorimotor changes in the legs and urinary retention) and worsening neurologic deficits require immediate surgical investigation; and
- patients intractable pain that is resistant to conservative treatment.

7.4. Scheduled follow up and planned review

It is suggested to review each individual's progress at pre-determine intervals with the aim for resumption of pre-back pain activities level. Regular patient reviews are to

- ensure that evidence-based treatments are available to people in whom pain persists;
- allow ongoing health education strategies and reassurance for those with persisting pain;
- ensure patient improves as expected;
- detect any complications; and
- detect possible severe/ or other pathology which may not be obvious in the first consultation.

Nonetheless, clinicians should consider reassessment and referral to relevant specialist care as appropriate if there is insufficient progress.

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