

# Low Back Pain Decision Tree

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The aim of the 2012 Academy of Orthopaedic Physical Therapy / *Journal of Orthopaedic and Sports Physical Therapy* Low Back Pain Clinical Practice Guideline (2012 LBP CPG) was to “describe the peer-reviewed literature and make recommendations related to:

- (1) treatment matched to LBP subgroup responder categories
- (2) treatments that have evidence to prevent recurrence of LBP
- (3) treatments that have evidence to influence the progression from acute to chronic LBP and disability.”<sup>1</sup>

Since 2012, the primary literature and associated CPG recommendations for managing individuals with LBP have consistently identified the elements of best clinical practice.<sup>3,5,7</sup> These elements of best practice include:

- (1) ensuring that the healthcare is patient-centered and incorporates shared decision-making;
- (2) assessing for medical conditions that require referral for medical or surgical management;
- (3) assessing for co-existing psychosocial factors and target education, counseling, physical activity, and exercise strategies to facilitate the individual’s confidence with self-managing their condition;
- (4) performing examination procedures to determine relevant physical impairments that respond to matched

interventions;

- (5) empowering the problem-solving, coping strategies, self-monitoring skills of patients with LBP and guide them with implementing the CPG-driven recommendations;
- (6) using validated outcome measures, as well as patient-specific outcome assessments, collected during the initial visit and on an ongoing basis, including scheduled interim assessments, to monitor patient progress (or lack thereof) and inform modification of the intervention approaches and tactics based upon emerging measurement data; and
- (7) match education, counseling, exercise, movement training, and manual therapy interventions to the patient’s clinical characteristics.

Since the 2012 CPG, recommendations from multiple CPGs have also strongly encouraged healthcare practitioners to decrease the reliance on pharmacologic interventions, especially opioids, in favor of non-pharmacologic interventions as first-line treatment for acute and chronic pain LBP.<sup>8</sup> For example, a key message from the 2018 publication of *The Lancet* Low Back Pain Series Working Group is that “Little prevention research exists, with the only known effective interventions for secondary prevention being exercise combined with education, and exercise alone.”<sup>3</sup> However, these recommendations are made broadly with-

out providing substantial guidance to clinicians for implementing non-pharmacologic treatments. Thus, the 2021 AOPT/JOSPT LBP CPG Revisions<sup>4</sup> (2021 CPG Revision) focused on guiding clinicians to focus on relieving pain, improving function, and/or reducing disability in individuals with LBP by using recommendations for the following interventions:

- (1) Exercise
- (2) Manual and Other-Directed Therapies
- (3) Classification Systems
- (4) Patient Education

This Low Back Pain Decision Tree intends to integrate the recommendations from the 2012 CPG,<sup>1</sup> the elements of best practice consistently recommended in clinical practice guidelines for management of individuals with LBP,<sup>2,3,5-10</sup> and the 2021 CPG Revision<sup>4</sup> by providing an algorithmic presentation of the decisions that healthcare practitioners, along with individuals who are experiencing LBP, should make for addressing the impairments of body function, activity limitations, and participation restrictions associated with LBP.

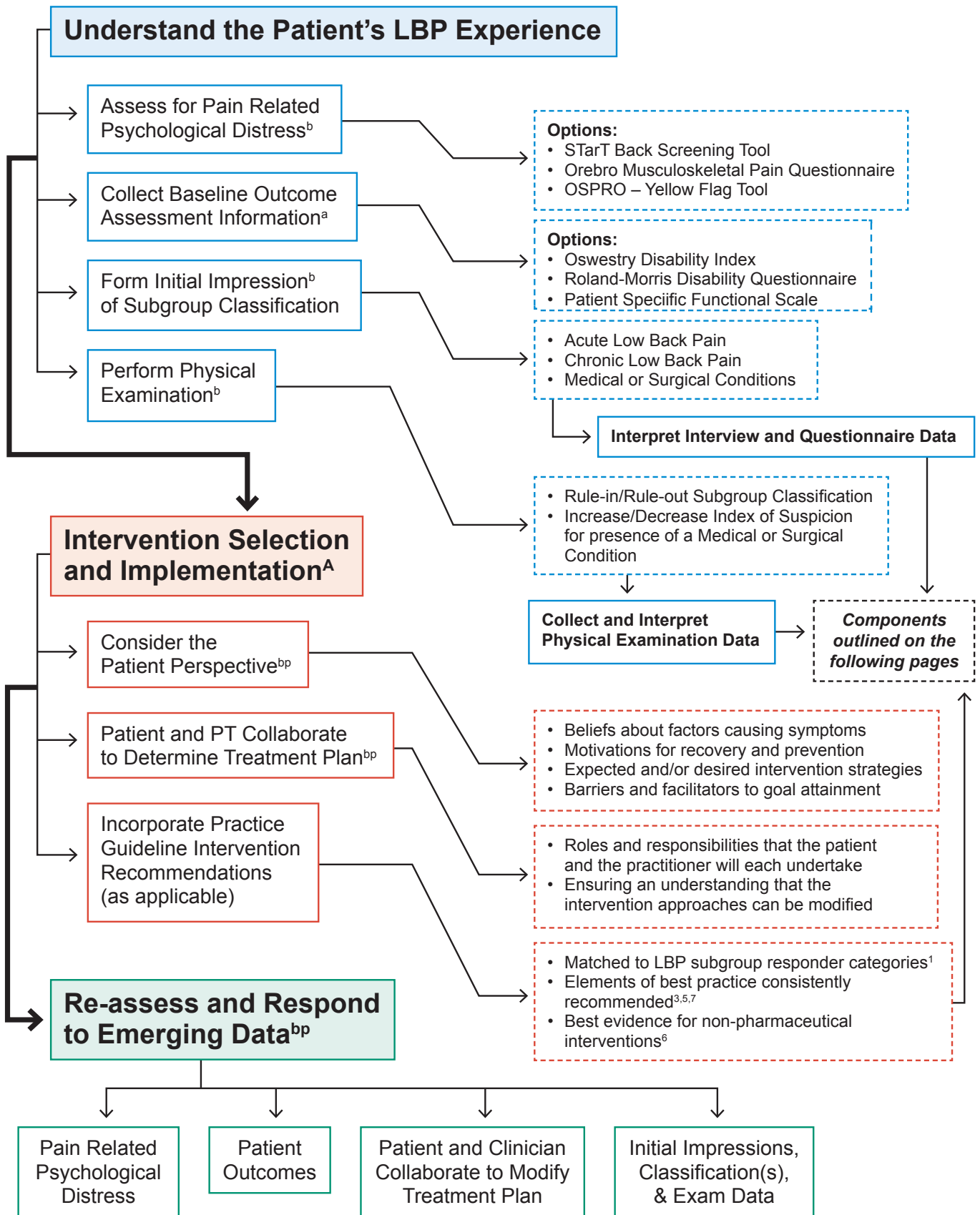
The 2012 CPG made recommendations for classifying individuals with low back and back-related lower extremity pain into one or more impairment-based patterns and matched interventions that can best be used to normalize or reduce impairments related to an individual’s reported symptoms and activity limitations.<sup>1</sup> These sub-group patterns

were labeled using the impairments of body function terminology from the World Health Organization's International Classification of Functioning, Disability, and Health.<sup>11</sup> The 2021 CPG Revision focused on analyzing the exercise, manual or other directed therapy, patient education, and the influence of subgroup categorization on treatment outcomes. The systematic search in this CPG revealed studies where individuals with identified movement coordination impairments were matched with specific trunk activation and movement control interventions for individuals with acute and chronic LBP, reporting superior outcomes when compared to unmatched comparison or controlled interventions. However, the inclusion criteria in the other LBP intervention studies referenced in the 2021 CPG Revision were not specific enough to describe whether or not the participants' clinical characteristics were consistent with one or more of the ICF-based LBP subgroups noted in the 2012 CPG. Thus, except for Low Back Pain with Movement Coordination Impairments, there is not evidence for matching the intervention recommendations of the 2021 CPG Revision to the ICF-based LBP sub-group noted in the 2012 CPG. Therefore, the suggested matched interventions in this decision tree are best practice suggestions that blend recommendations from both the 2012 CPG and 2021 CPG Revision to help guide clinicians on strategies to link the recommendations from the 2021 CPG Revision<sup>4</sup> with the subgroup categories recommended in the 2012 CPG.<sup>1</sup> Published clinical studies that analyze the outcomes of interventions provided (or not provided) with patients that included identified ICF-based LBP sub-groups would potentially enable more specific recommendations to be made in future LBP CPG Revisions.

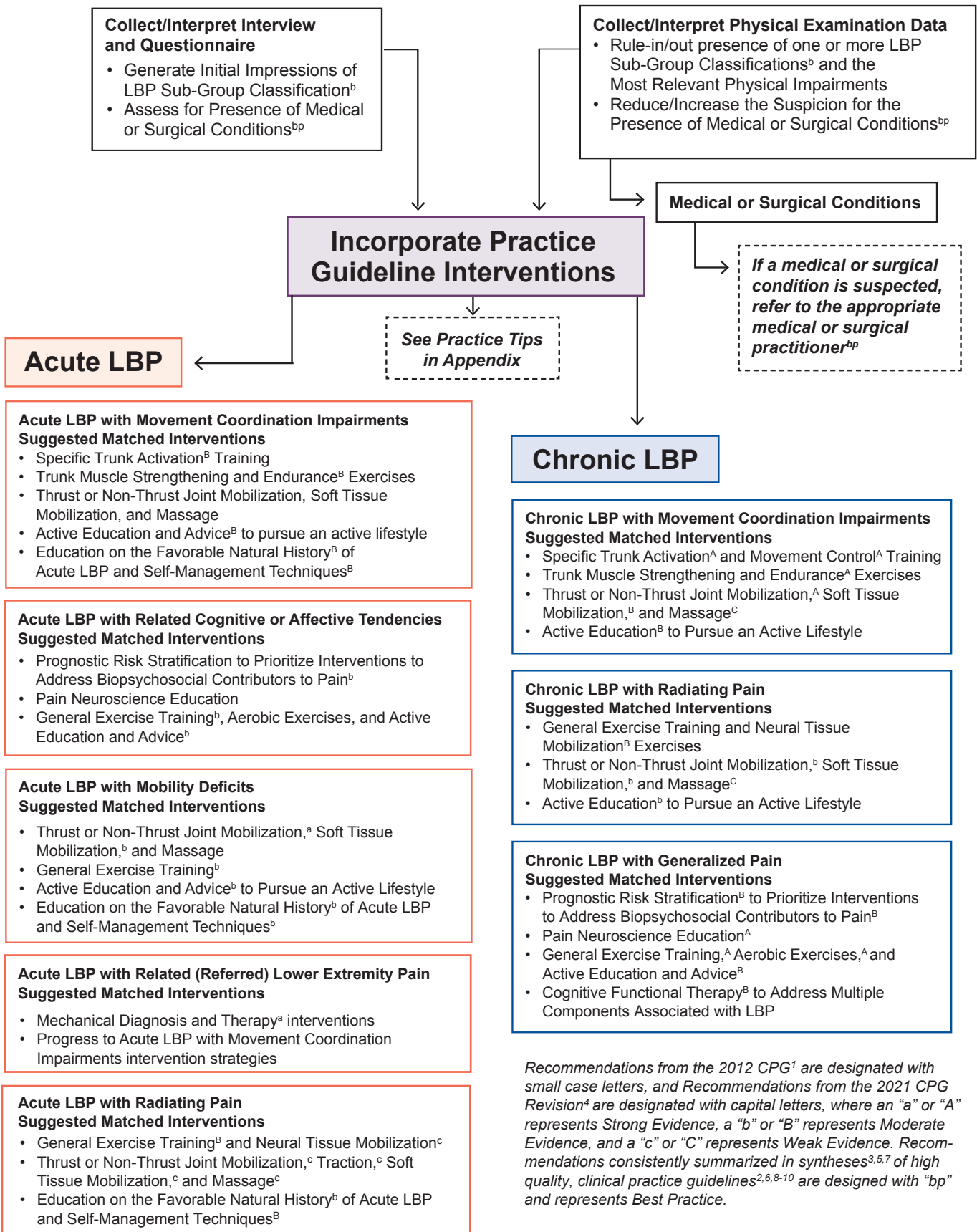
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# LOW BACK PAIN DECISION TREE



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*Recommendations from the 2012 CPG<sup>1</sup> are designated with small case letters, and Recommendations from the 2021 CPG Revision<sup>4</sup> are designated with capital letters, where an "a" or "A" represents Strong Evidence, a "b" or "B" represents Moderate Evidence, and a "c" or "C" represents Weak Evidence. Recommendations consistently summarized in syntheses<sup>3,5,7</sup> of high quality, clinical practice guidelines<sup>2,6,8-10</sup> are designed with "bp" and represents Best Practice.*



**Practice Tips for Interpreting Interview and Questionnaire Data to Generate Initial Impressions of Low Back Pain Sub-Group Classification or the Presence of Medical or Surgical Conditions**

**Acute LBP**

**Acute LBP with Mobility Deficits**

- Acute low back, buttock, or thigh pain ( $\leq 6$  weeks)
- Onset of symptoms is often linked to a recent unguarded/awkward movement or position

**Acute LBP with Movement Coordination Impairments**

- Acute exacerbation of recurring LBP that is commonly associated with referred lower extremity pain
- Symptoms often include numerous episodes of low back and/or low back-related lower extremity pain in recent years

**Acute LBP with Related (Referred) Lower Extremity Pain**

- LBP commonly associated with referred buttock, thigh, or leg pain, that worsens with flexion activities and sitting
- Reports numerous low back-related lower extremity pain episodes

**Acute LBP with Radiating Pain**

- Acute LBP with associated radiating (narrow band of lancinating) pain in the involved lower extremity
- Lower extremity paresthesias, numbness, and weakness may be reported

**Acute LBP with Related Cognitive or Affective Tendencies**

- Acute or subacute low back and/or low back-related lower extremity pain

**Chronic LBP**

**Chronic LBP with Movement Coordination Impairments**

- Chronic, recurring LBP that is commonly associated with referred lower extremity pain

**Chronic LBP with Radiating Pain**

- Chronic, recurring, mid-back and/or LBP with associated radiating pain and potential sensory, strength, or reflex deficits in the involved lower extremity
- Lower extremity paresthesias, numbness, and weakness may be reported

**Chronic LBP with Generalized Pain**

- Low back and/or low back-related lower extremity pain with symptom duration for longer than 3 months
- Generalized pain not consistent with other impairment-based classification criteria
- Cognitive processes or affective behaviors exhibited that suggest the presence of fear-avoidance beliefs, pain catastrophizing, and/or depression

**Medical or Surgical Conditions**

**Back Related Tumor**

- Constant pain not affected by position or activity, worse at night
- Age over 50; History of cancer; Failure of conservative intervention
- Unexplained weight loss
- No relief with bed rest

**Cauda Equina syndrome**

- Urine retention or incontinence; Fecal incontinence
- Saddle anesthesia
- Global or progressive weakness in the lower extremities

**Back-related Infection**

- Recent infection (eg, urinary tract or skin)
- Intravenous drug user/abuser
- Concurrent immunosuppressive disorder
- Reports of fever, malaise, and swelling

**Spinal Compression Fracture**

- History of major trauma, such as vehicular accident, fall from a height, or direct blow to the spine
- History of minor trauma for osteoporotic or elderly individuals, such as falls or heavy lifts
- Age over 75
- Prolonged use of corticosteroids

**Abdominal Aneurysm**

- Back, abdominal, or groin pain
- Presence of peripheral vascular disease or coronary artery disease and associated risk factors (age over 50, smoker, hypertension, diabetes mellitus)

**Practice Tips for Interpreting Physical Examination Data to Rule-in / Rule-out the Presence LBP Sub-Group Classifications and Reduce / Increase the Suspicion for the Presence of Medical or Surgical Conditions**

**Acute LBP Subgroups**

**Acute LBP with Mobility Deficits**

*Rule-in if:*

- Lower thoracic or lumbar range of motion limitations
- Low back and low back-related lower extremity reproduced with (1) end-range spinal motions, and (2) provocation of the involved lower thoracic or lumbar segments

*Rule-out if:*

- Combined end-range spinal motions (eg, end-range lumbar extension combined with end-range lumbar sidebending) with clinician-provided overpressure into the combined motion is pain free
- Unable to produce reported low back or low back-related lower extremity pain with provocation (eg, end-range unilateral posterior-to-anterior pressures) of the lower thoracic or lumbar segments

**Acute LBP with Movement Coordination Impairments**

*Rule-in if:*

- Symptoms reproduced with (1) mid-range motions that worsen with end-range movements or positions, and (2) provocation of the involved lumbar segment(s)
- Observable movement coordination impairments of the lumbopelvic region with flexion and extension movements or while performing daily physical activities
- Diminished trunk or pelvic region muscle strength and endurance
- Mobility deficits of the thorax and hips regions may be present
- Signs of lumbar segmental or sacroiliac hypermobility may be present

*Rule-out if:*

- Presence of adequate left and right straight leg raise (80°) and thorax rotation (80°) mobility
- Presence of normal trunk flexor (eg, double-leg lowering test), trunk extensors (Sorensen test), lateral abdominals and hip abductors (eg, side plank/side bridge tests) and hip and thigh muscle performance (star excursion balance tests)

**Acute LBP with Related (Referred) Lower Extremity Pain**

*Rule-in if:*

- Low back and lower extremity pain that can be centralized and diminished with positioning, manual procedures, and/or repeated movements
- Lateral trunk shift, reduced lumbar lordosis, limited lumbar extension mobility, and clinical findings associated with the acute or chronic low back pain with movement coordination impairments category are commonly present

*Rule-out if:*

- Baseline assessments of pain location and pain levels are not altered with prolonged positioning, manual procedures (eg, lateral shift correction), or repeated movements (eg, prone press-ups)

**Acute LBP with Radiating Pain**

*Rule-in if:*

- Symptoms are reproduced or aggravated with mid-range and worsen with end-range spinal mobility, lower limb tension/straight leg raising, and/or slump tests
- Signs of nerve root involvement (sensory, strength, or reflex deficits) may be present

*Rule-out if:*

- Lower limb tension tests (eg, straight leg raising) or slump testing do not reproduce reported low back or leg pain
- It is common for the symptoms and impairments of body function in patients who have Acute Low Back Pain with Radiating Pain to also be present in patients who have Acute Low Back Pain with Related (Referred) Lower Extremity Pain*

**Acute LBP with Related Cognitive or Affective Tendencies**

*Rule-in if:*

- Clinical presentation suggesting the presence of fear-avoidance, pain catastrophizing, or depression, such as:
  - High scores on the psychosocial subscale of the STarT Back Screening tool, assessing for bothersome, fear, catastrophizing, anxiety, and depressive tendencies
  - High scores on the Fear-Avoidance Beliefs Questionnaire and behavioral processes consistent with an individual who has excessive anxiety or fear
  - High scores on the Pain Catastrophizing Scale and cognitive process consistent with rumination, pessimism, or helplessness
  - High scores on the Patient Health Questionnaire-2 or PHQ-9 or Beck Depression Inventory and affect consistent with an individual who is depressed

*Rule-out if:*

- Scores on the psychosocial subscale of the STarT Back Screening tool total to be 0

**Medical or Surgical Conditions**

**Back Related Tumor**

*Increase index of suspicion if:*

- Constant pain not affected by movement, but worse with weight bearing
- Pain not responsive to therapy (failure to improve within 30 days)

*Reduce index of suspicion if:*

- Clinical findings are consistent with one or more of the ICF-based LBP subgroups
- Symptoms are resolving with subgroup matched interventions

**Cauda Equina syndrome**

*Increase index of suspicion if:*

- Saddle anesthesia
- Sensory or motor deficits in the feet (L4, L5, S1 areas)

*Reduce index of suspicion if:*

- Lower extremity sensation is normal or improving
- Lower extremity muscle performance is normal or improving

**Back-related Infection**

*Increase index of suspicion if:*

- Fever, malaise, and swelling
- Spine rigidity; accessory mobility may be limited
- Elevated body temperature, increasing suspicion of:
  - tuberculosis osteomyelitis
  - pyogenic osteomyelitis
  - spinal epidural abscess

*Reduce index of suspicion if:*

- Body temperature is normal
- Clinical findings are consistent with one or more of the ICF-based LBP subgroups

**Spinal Compression Fracture**

*Increase index of suspicion if:*

- Increased pain with weight bearing
- Point tenderness over site of fracture

*Reduce index of suspicion if:*

- Age of 50 years or less
- Symptoms are not aggravated with weight loading or thoracolumbar flexion movements
- Clinical findings are consistent with one or more of the ICF-based LBP subgroups

**Abdominal Aneurysm**

*Increase index of suspicion if:*

- Symptoms not related to movement stresses associated with somatic LBP
- Abdominal girth <100 cm (40 in)

If a medical or surgical condition is suspected, refer to the appropriate medical or surgical practitioner

**Chronic LBP Subgroups**

**Chronic LBP with Movement Coordination Impairments**

*Rule-in if:*

- Low back and/or low back–related lower extremity pain that worsens with sustained end-range movements or positions
- Observable movement coordination impairments of the lumbopelvic region with flexion and extension movements or while performing daily, occupational, or recreational activities
- Diminished trunk or pelvic region muscle strength and endurance
- Mobility deficits of the thorax and hips regions may be present
- Signs of lumbar segmental or sacroiliac hypermobility may be present

*Rule-out if:*

- Presence of adequate left and right straight leg raise (80°) and thorax rotation (80°) mobility
- Presence of normal trunk flexor (eg, double-leg lowering test), trunk extensors (Sorensen test), lateral abdominals and hip abductors (eg, side plank/side bridge tests) and hip and thigh muscle performance (star excursion balance tests)

**Chronic LBP with Radiating Pain**

*Rule-in if:*

- Symptoms are reproduced or aggravated with sustained end-range lower-limb nerve tension/straight leg raise and/ or slump tests

*Rule-out if:*

- Lower limb tension tests (eg, straight leg raising) or slump testing do not reproduce reported low back or leg pain

**Chronic LBP with Generalized Pain**

*Rule-in if:*

- Clinical presentation suggesting the presence of fear-avoidance, pain catastrophizing, or depression, such as:
  - High scores on the psychosocial subscale of the STarT Back Screening tool, assessing for bothersome, fear, catastrophizing, anxiety, and depressive tendencies
  - High scores on the Fear-Avoidance Beliefs Questionnaire and behavioral processes consistent with an individual who has excessive anxiety or fear
  - High scores on the Pain Catastrophizing Scale and cognitive process consistent with rumination, pessimism, or helplessness
  - High scores on the Patient Health Questionnaire-2 or PHQ-9 or Beck Depression Inventory and affect consistent with an individual who is depressed

*Rule-out if:*

- Scores on the psychosocial subscale of the STarT Back Screening tool total to be 0

Practice Tips for Incorporating Practice Guideline Intervention Recommendations

**Acute LBP with Mobility Deficits – Suggested Matched Interventions**

- Thrust or Non-Thrust Joint Mobilization, Soft Tissue Mobilization, and Massage to diminish pain, reduce disability, and improve thoracolumbar mobility
- General Exercise Training to improve or maintain thorax, low back, and hip mobility
- Active Education and Advice to pursue an active lifestyle
- Education on the Favorable Natural History of acute low back pain and Self Management Techniques to prevent recurring low back pain episodes, such as routine participation or activities that enhance flexibility

**Acute LBP with Movement Coordination Impairments – Suggested Matched Interventions**

- Specific Trunk Activation training to promote dynamic (muscular) stability to maintain the involved lumbosacral structures in less symptomatic, mid-range positions while performing activities
- Trunk Muscle Strengthening and Endurance exercises to address identified trunk and pelvic-region Movement System Impairments
- Thrust or Non-Thrust Joint Mobilization, Soft Tissue Mobilization, and Massage to diminish pain, reduce disability, and improve thorax mobility, hip mobility, and lumbopelvic positional symmetry
- Active Education and Advice to pursue an active lifestyle
- Education on the Favorable Natural History of acute low back pain and Self Management Techniques to prevent recurring low back pain episodes, such as routine participation in activities that improve movement coordination

**Acute LBP with Related (Referred) Lower Extremity Pain – Suggested Matched Interventions**

- Mechanical Diagnosis and Therapy interventions that employ manual therapy, postures, positions, repeated movements, or traction procedures that promote centralization and improve lumbar extension mobility
- Progress to Acute Low Back Pain with Movement Coordination Impairments intervention strategies

**Acute LBP with Radiating Pain – Suggested Matched Interventions**

- General Exercise Training and Neural Tissue Mobilization to reduce pain and improve mobility of the central (dural) and peripheral neural elements
- Thrust or Non-Thrust Joint Mobilization, Traction, Soft Tissue Mobilization, and Massage to diminish pain, reduce disability, and mobilize the articulations and soft tissues adjacent to the involved nerve root(s) or nerves that exhibit mobility deficits
- Education on the Favorable Natural History of acute low back pain and Self Management Techniques to prevent recurring low back pain episodes, such as routine use of (1) positions that reduce strain or compression to the involved nerve root(s) or nerves, and (2) activities that promote painfree nerve mobility

**Acute LBP with Related Cognitive or Affective Tendencies – Suggested Matched Interventions**

- Prognostic Risk Stratification to prioritize interventions to address Biopsychosocial Contributors to Pain in individuals with acute low back pain that are associated with the progression to chronic low back pain
- Pain Neuroscience Education to lessen fear-avoidance and catastrophizing tendencies associated with low back pain disability
- General Exercise Training, Aerobic Exercises, and Active Education and Advice to reduce depressive symptoms associated with low back pain disability

**Chronic LBP with Movement Coordination Impairments – Suggested Matched Interventions**

- Specific Trunk Activation and Movement Control training to promote dynamic (muscular) stability to maintain the involved lumbosacral structures in less symptomatic, midrange positions while performing activities
- Trunk Muscle Strengthening and Endurance exercises to address identified trunk and pelvic-region Movement System Impairments
- Thrust or Non-Thrust Joint Mobilization, Soft Tissue Mobilization, and Massage to diminish pain, reduce disability, and improve thorax and hip mobility, and mobilize hypomobile lumbopelvic segments
- Active Education to pursue an active lifestyle, such as routine participation in activities that improve movement coordination

**Chronic LBP with Radiating Pain – Suggested Matched Interventions**

- General Exercise Training and Neural Tissue Mobilization exercises to reduce pain and improve mobility of the central (dural) and peripheral neural elements
- Thrust or Non-Thrust Joint Mobilization, Soft Tissue Mobilization, and Massage to diminish pain, reduce disability, and mobilize the articulations and soft tissues adjacent to the involved nerve root(s) or nerves that exhibit mobility deficits
- Active Education to pursue an active lifestyle, activities that promote painfree nerve mobility

**Chronic LBP with Generalized Pain – Suggested Matched Interventions**

- Prognostic Risk Stratification to prioritize interventions to address Biopsychosocial Contributors to Pain
- Pain Neuroscience Education to lessen fear-avoidance and catastrophizing tendencies associated with low back pain disability
- General Exercise Training, Aerobic Exercises, and Active Education and Advice to reduce depressive symptoms associated with low back pain disability
- Cognitive Functional Therapy to address multiple components associated with low back pain including pathoanatomical, physical, psychological, social, lifestyle, and health-related risk factors