

# Demystifying Low Back Pain in Primary Care

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Dr. Bodine earned his medical degree and completed an osteopathic family medicine residency at the University of Medicine and Dentistry of New Jersey (UMDNJ) School of Osteopathic Medicine, Stratford. He also completed a fellowship in primary care sports medicine at Christiana Care Health Care System in Wilmington, Delaware. He practices osteopathic primary care sports medicine and has head team physician experience caring for athletes at all levels. Dr. Bodine's leadership experience includes serving in positions on the Massachusetts Medical Society's Committee on Student Health and Sports Medicine, the Massachusetts Interscholastic Athletic Association's Sports Medicine Committee, and the National Board of Osteopathic Medical Examiners' Family Medicine Faculty. He also serves as a concussion trainer for the Massachusetts Department of Public Health.

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# Learning Objectives

1. Perform history and physical examination utilizing multidimensional pain, functional, psychological and opioid assessment tools to evaluate patients presenting with back pain.
2. Select appropriate diagnostic imaging tests, as necessary, for patients with back pain emphasizing that imaging is not necessary in the absence of red flag signs and symptoms.
3. Identify, elicit, and document red flags signs and symptoms that indicate a need for immediate aggressive treatment or referral to a spine specialist, and coordinate referral and follow-up as necessary.
4. Develop collaborative care plans with appropriate pharmacologic, non-pharmacologic including appropriate physical therapy trials, or combination treatment plan for a patient with low back pain.
5. Identify and consistently utilize evidence-based algorithms and focus on teaching self-management skills rather than salvage therapy for long-term control of back pain.

FMX

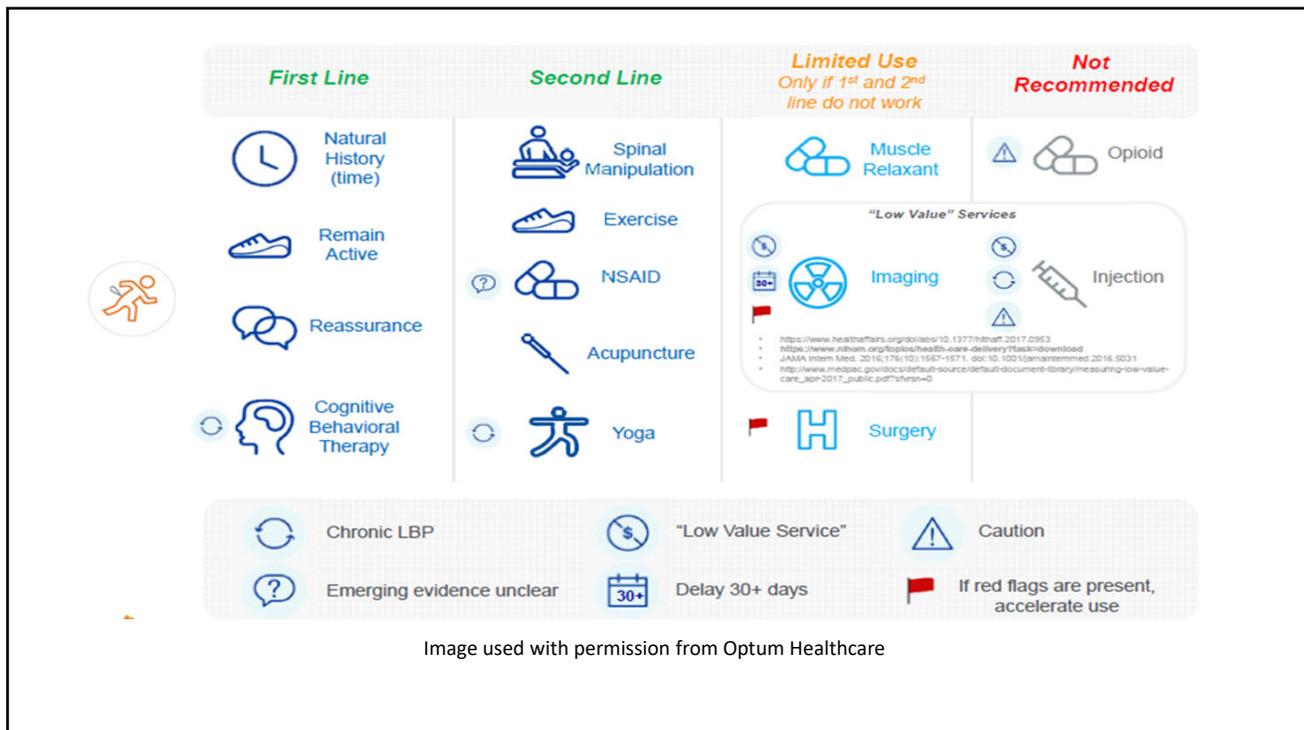
# Audience Engagement System



FMX

# How I Treat Low Back Pain

- Take a thorough history
- Learn about the individual behind the pain
- Assess and manage patient's expectations at every encounter
- Provide interventions in a step-wise fashion (non-Rx 1st)
- Not a "one size fits all" algorithm
- Give the patient what works for them
- Treat mental illness and depression



## Poll Question 1

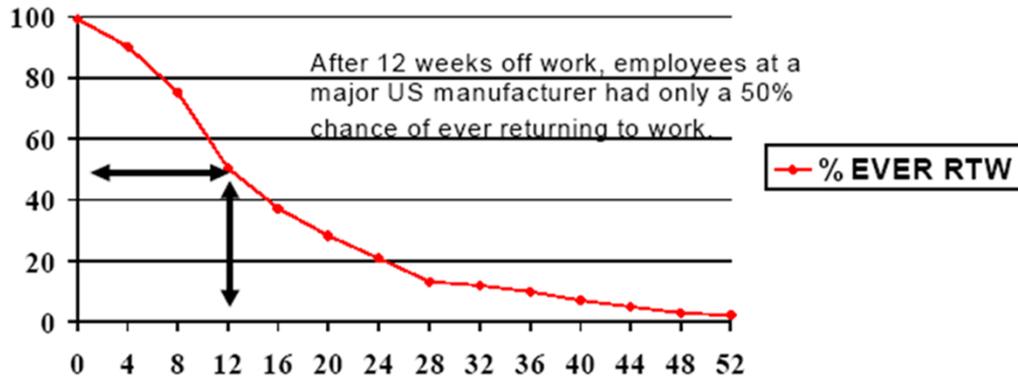
What percentage of Americans will report one episode of low back pain in the next 3 months?

- A. 25%
- B. 40%
- C. 50%
- D. 75%
- E. 85%

## Scope of the Problem

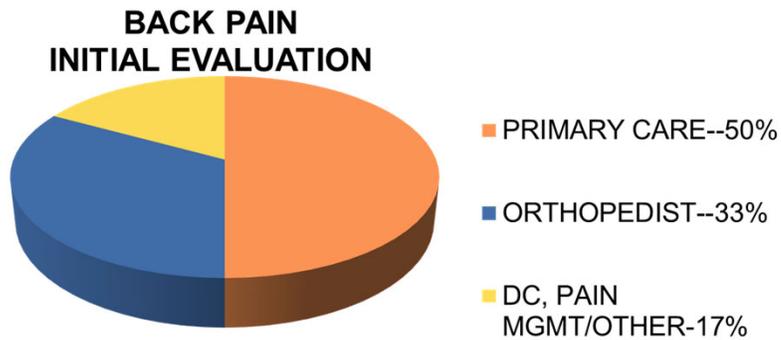
- Low back pain is the second most common reason for primary care physician visits in the United States
- Approximately one quarter of U.S. adults reported having low back pain lasting at least 1 day in the past 3 months → 2/3 of these that recover will have recurrence within 12 months
- Total costs attributable to low back pain in the United States were estimated at \$100 billion in 2006, two thirds of which were indirect costs of lost wages and productivity

# Timing is Everything



**Time away from work in weeks**  
U.S. Department of Labor, Bureau of Labor Statistics. Nonfatal occupational injuries and illnesses requiring days away from work, 2005

# Initial Back Pain Evaluation



## Physicians Not Following Guidelines

- Despite numerous published clinical guidelines, management of back pain has relied increasingly on guideline discordant care
- NSAID or acetaminophen use per visit decreased from 36.9%(1999-2000)→ 24.5% (2009-2010)
- Narcotic use increased from 19.3%→29.1%
- CT/MRI referrals increased from 7.2%→11.3%

## Primary Care Reluctance to Address Low Back Pain

Knowledge Gaps in the Following:

- Etiologies of Low Back Pain and Red Flags
- Use of Diagnostic Imaging
- Recommendation of Pharmacologic Treatments
- Recommendation of Non-pharmacologic Treatments

## Definition of Low Back Pain

- Pain/muscle tension/stiffness
- +/- sciatica/radicular symptoms
- Between L1-L5
- Acute: present up to 6 weeks
- Subacute: 6-12 weeks
- Chronic: present for > 3 months; significant enough to impact function/quality of life
- Non-specific Low Back pain: pain not attributable to a recognizable pathology

## Etiologies of Low Back Pain

### Intrinsic

- Compression Fracture
- Herniated/Bulging/Ruptured Disc
- Lumbar Strain/Sprain
- Spinal Stenosis
- Spondylolisthesis
- Spondylolysis
- Spondylosis
- Scoliosis
- Facet arthropathy

# Etiologies of Low Back Pain

## Systemic

- Connective Tissue Disease
- Inflammatory Arthropathy
- Malignancy
- Vertebral osteomyelitis

## Referred

- AAA
- GI/GU/pulmonary/CV/pelvic conditions
- Herpes Zoster
- Pregnancy/obesity
- Fascial trigger points
- Sacroiliac Joint Dysfunction
- Piriformis Syndrome

## Don't forget Cauda Equina Syndrome

- Urinary retention
- Fecal incontinence
- Saddle anesthesia
- Motor deficits at multiple levels

# History

- Onset of pain
- Location of pain
- Duration: timing of pain
- Character: sharp, dull, scale of 0-10
- Aggravating factors
- Relieving factors
- Treatments attempted
- Medical and social history
- Consider “Red flags” and “Yellow flags”

# OLDCART

# Pain Assessment

## One Dimensional

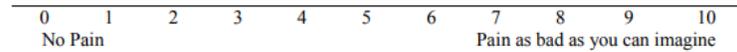
- Visual Analog
- Faces Scale

## Multidimensional

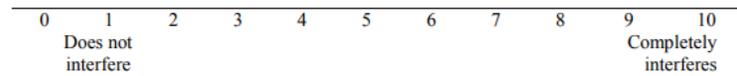
- Oswestry
- McGill
- Brief Pain Inventory
- Graded Pain Scale

# PEG Scale

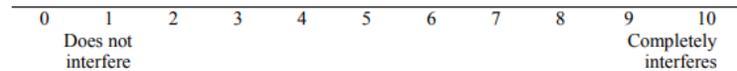
1. What number best describes your pain on average in the past week?



2. What number best describes how, during the past week, pain has interfered with your enjoyment of life?



3. What number best describes how, during the past week, pain has interfered with your general activity?



# Pain Cycle



## Red Flags

- Age < 20 or >50
- Severe or progressive neurologic deficit
- Bladder/bowel dysfunction
- History of cancer
- Fever or unexplained weight loss
- Disturbed gait and saddle anesthesia
- Patients with back pain in the primary care setting (80 percent) tend to have one or more **red flags**, but rarely have a serious condition

## Yellow Flags

- Affect: anxiety; depression; feeling of uselessness
- Behavior: adverse coping strategies; passive attitude about treatment
- Beliefs: thinks pain is “the worst” and must be eliminated before returning to activity
- Social: history of abuse; lack of support
- Work: expectation that pain will increase with work; pending litigation; unsupportive employer

## Questions to Address Psychosocial Factors

- Have you had time off work in the past with back pain?
- What do you understand is the cause of your back pain?
- What are you expecting will help you?
- How is your employer responding to your back pain? Your co-workers? Your family?
- What are you doing to cope with back pain?
- Do you think that you will return to work? When?

## Physical Examination

- Informal observation
- Full PE on initial evaluation, focused PE on subsequent visits
- Neurologic evaluation on initial evaluation
- Inspection (skin/posture)
- Palpation
- Active Range of motion (flexion, extension, lateral flexion, axial rotation)
- Gait and Mobility
- Bilateral neural tension test (straight leg raise test)
- FABER test



## Poll Question 2

An afebrile patient with low back pain notices pain going down the posterior lateral aspect of the R thigh/leg. On exam she has a +SLR, sensory deficit on the lateral aspect of the R foot, a diminished ankle jerk, weakness with plantar flexion of great toe and inability to perform toe walking. Which nerve root is likely affected?

- A. L2
- B. L3
- C. L4
- D. L5
- E. S1

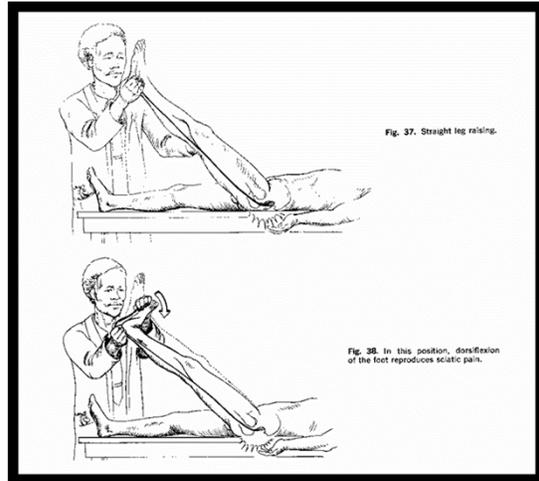
## Physical Examination

Affected nerve root	Motor deficit	Sensory deficit	Reflex	Disk herniation		
				Central	Paracentral	Lateral
L3	Hip flexion	Anterior/medial thigh	Patella	Above L2-L3	L2-L3	L3-L4
L4	Knee extension	Anterior leg/medial foot	Patella	Above L3-L4	L3-L4	L4-L5
L5	Dorsiflexion/great toe	Lateral leg/dorsal foot	Medial hamstring	Above L4-L5	L4-L5	L5-S1
S1	Plantar flexion	Posterior leg/lateral foot	Achilles tendon	Above L5-S1	L5-S1	None

- Gait Analysis
- Heel Walking
- Toe Walking
- Strength of Lower Extremities
- Reflexes of Lower Extremities
- Sensation of Lower Extremities

# Straight Leg Raise Test

- Reproduce Pain on affected side
- Usually between 30-60 degrees
- With knee extended, raise leg until pain is reproduced
- Dorsiflex foot (increases sensitivity of test if pain is increased)
- Sensitivity 91%; Specificity 26%
- Cross SLR-passively raising the opposite leg reproduces sciatica (sensitivity 29%; specificity 88%)



# FABER/Patrick Test



- Hip or Sacroiliac joint; isolates spasm to the iliopsoas/piriformis muscle
- Flex, ABduct, and externally rotate the hip, pain while completing maneuver is positive
- Sensitivity 77%; Specificity 100%

### STANDING

Trendelenburg	gluteus medius	Behind pt, observe dimples over post sup iliac spines. Stand on one leg, alternate.	abnormal = dimple on unsupported side falls
Gillet's	SI joint	Behind patient, thumbs on SI joints, flex one hip, alternate.	abnl = SI moves superior; nl= SI moves inferior
Gluteus Strength	gluteus complex	One legged squat.	weakness

### SEATED

Deyerle	sciatic nerve	Knees flexed, passively extend knees.	same symptoms as SLR
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### SUPINE

True Leg Length	leg length discrepancy	Measure ASIS to med malleolus. If differs, flex knees to 90, feet flat, observe knees.	knee higher = longer tibia; anterior = longer femur
Thomas	hip flexion contracture	Place hand in small of back, flex hip until lordosis gone/feel pressure on hand.	unable to keep contralateral leg flat
Modified Thomas	hamstring and quad flexibility	Lay flat on back, lower legs dangling off table. Flex hip and knee.	unable to keep contralateral leg relaxed on table
Ely	rectus femoris	Flex knee so heel approximates buttock.	hip/buttock rise = tight
Piriformis	piriformis	Resisted ext rotation or forced passive int rotation.	reproduce symptoms
Straight Leg Raise	sciatic nerve or herniated disc	Passive hip flex w/knee extended. Then flex knee 90, compress nerve in popliteal fossa (CRAM).	symptoms, hip flex<80, contralateral pain = HNP
Lasegue's	sciatic nerve	SLR until pain, back off and dorsiflex foot.	same symptoms as SLR
Spurling's	sciatic nerve	Flex hip/knee 90, then extend knee.	same symptoms as SLR
Patrick/FABER	SI joint	Flex foot/ankle on opposite knee, abduct/ext rotate leg w/gentle pressure on top of flexed knee.	pain in ipsilateral SI joint, dec motion = contracture
Gaenslen's	SI joint	Passive hip maximal flexion with opposite side passive maximal hip extension.	pain at SI joint (must R/O other hip/nerve problems)
Hip Rotation	SI joint	Mark level of medial malleoli. Abduct, ext rotate leg, bring back to neutral. Repeat with int rot.	nl ext rot - moves distally; nl int rot - moves proximal

### SIDE LYING

Ober	iliotibial band	Lie on uninvolved side, stabilize pelvis, passively flex, abduct, extend upper hip in arc. Slowly lower.	pain, knee unable to reach/pass normal
Modified Ober	gluteus complex	Lie on uninvolved side, stabilize pelvis, flex, abduct, extend upper hip. Actively hold in place.	weakness

### PRONE

Femoral Nerve Stretch	femoral nerve	Flex knee to 90, stabilize pelvis, passively extend hip.	pain in anterior thigh
Yeoman's	SI joint	Stabilize Pelvis, passive hip ext rot/ext.	pain at SI joint

## Poll Question 3

What percentage of patients that present with low back pain will have a clear anatomical explanation?

- A. 15%
- B. 25%
- C. 50%
- D. 75%
- E. 90%

## What is the Pain Generator?

Classify patient as:

- Nonspecific (Acute/Subacute/Chronic)
- Radicular pain
- Pain from another cause

## When to Image?

- In patients with LBP that cannot be attributed to a specific disease or spinal abnormality following H&P, imaging with xray, CT or MRI Does Not improve outcomes.  
(ACP Strong recommendation, Moderate-quality evidence)

## When to Image?

OK to Image when:

- You perform thorough exam
- Concern for infection, fracture, cauda equina syndrome
- Patient with radicular symptoms concerning for specific LBP
- Patient has leg weakness that is disabling and worsening
- Required before intervention

## Poll Question 4

What percentage of asymptomatic patients will have an abnormality on Lumbar MRI?

- A. 10%
- B. 20%
- C. 50%
- D. 60%
- E. 75%

## Treatment Strategies

- Rx
- Manual/Physical
- Procedures
- Behavioral



## Pharmacologic Therapies

### Acute/Subacute Low Back Pain

- Acetaminophen
  - no difference vs Placebo or NSAIDs
- NSAIDS
  - small improvement in pain intensity
  - small increase in function compared with placebo, no difference in COX-2 selective vs traditional NSAIDs

## Acute/Subacute Low Back Pain

- Skeletal Muscle Relaxants
  - improved pain after 2-4 and 5-7 days
- Systemic Corticosteroids
  - no improvement in pain/function of IM methylprednisolone or 5 days of oral prednisone
- Other Therapies
  - insufficient evidence to determine effectiveness of antidepressants, benzodiazepines, anti-seizure medications or opioids vs placebo

## Chronic Low Back Pain

- NSAIDs
  - small to moderate improvement in pain
- Opioids
  - strong opioids (tapentadol, morphine, hydromorphone, oxycodone) had small improvements in pain/function
  - no difference among long acting opioids for pain/function
  - Tramadol had moderate pain relief and small improvement in function

## Chronic Low Back Pain

- Skeletal Muscle Relaxants
  - insufficient evidence vs placebo
- Benzodiazepines
  - tetrazepam improved pain relief at 5-7 days, overall improvement 10-14 days

## Chronic Low Back Pain

- Antidepressants
  - no difference in pain between TCAs/SSRIs
  - Duloxetine had small decrease in pain and increase in function
- Other Rx
  - insufficient (acetaminophen, systemic corticosteroids or anti-seizure medications)

## Radicular Low Back Pain

- Benzodiazepines
  - no difference in function at 1 week through 1 year
- Systemic Corticosteroids
  - no difference in pain, no to small effect on function
- Other Therapies
  - NSAIDs inconsistent for pain

## Pharmacologic Therapies

Class of Low Back Pain	Acute/Subacute	Chronic	Radicular
Acetaminophen [=placebo]			
NSAIDs [SOE low to moderate]	X	X	
Muscle Relaxants/BZD	X	X	
Opioids [SOE low to moderate]	X	X	
Steroids [=placebo]			X
Tramadol/Tapentadol [SOE moderate]		X	
Duloxetine [SOE moderate]		X	
Topical Agents	X	X	

# Nonpharmacologic Therapies

## Acute/Subacute Low Back Pain

- Exercise
  - inconsistent results, no difference between different exercise regimens
- Acupuncture
  - small decrease in pain intensity, slight increase in likelihood of overall improvement
- Massage
  - moderately improved short term pain relief/function
  - better results when combined with another intervention

## Acute/Subacute Low Back Pain

- Spinal Manipulation
  - small effect on function, better long term pain relief
  - combined with exercise, improved function at 1 week
- Superficial Heat
  - moderate improvement in pain relief and disability
  - combined with exercise, improved function at 7 days
  - more pain relief and function compared with acetaminophen or ibuprofen after 1-2 days

## Acute/Subacute Low Back Pain

- Low-Level Laser Therapy
  - combined with NSAIDs – large decrease in pain intensity and moderate improvement in function
- Lumbar supports
  - no difference in pain or function
- Other Therapies- insufficient evidence
  - TENS, inferential therapy, short-wave diathermy, traction, Pilates, Tai chi, yoga, ultrasound, taping, superficial cold

## Chronic Low Back Pain

- Exercise
  - improvement in pain relief and function
- Motor Control Exercise
  - decreased pain scores and improved function in short to long term follow up
  - improvement in function
- Pilates
  - no effect on pain/function

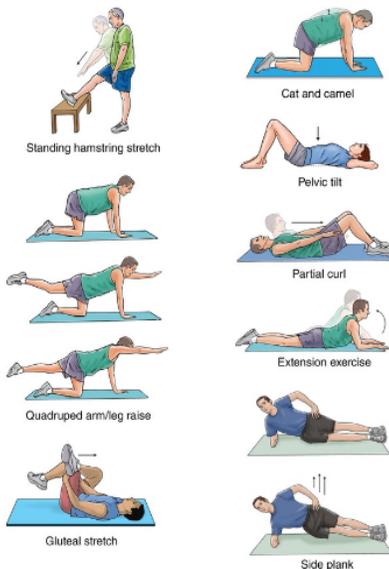
## Chronic Low Back Pain

- Psychological Therapies
  - Progressive relaxation therapy: improved pain intensity and function
  - Biofeedback: decreased pain
  - Behavioral therapy with reinforcement: decreased pain
  - CBT: decreased pain
  - mindfulness based stress reduction: improved pain and function
- Tai Chi/Yoga
  - moderate pain improvement and function

# Chronic Low Back Pain

- Multidisciplinary Rehabilitation
  - decreased pain intensity (short and long term), disability, and improved function
  - [https://www.summitmedicalgroup.com/library/adult\\_health/](https://www.summitmedicalgroup.com/library/adult_health/)
- Acupuncture
  - lower pain intensity and improved function
- Massage
  - decreased pain and improved function

## Low Back Pain Exercises



- **Standing hamstring stretch:** Put the heel of one leg on a stool about 15 inches high. Keep your leg straight. Lean forward, bending at the hips until you feel a mild stretch in the back of your thigh. Make sure you do not roll your shoulders or bend at the waist when doing this. You want to stretch your leg, not your lower back. Hold the stretch for 15 to 30 seconds. Repeat with each leg 3 times.
- **Cat and camel:** Get down on your hands and knees. Let your stomach sag, allowing your back to curve downward. Hold this position for 5 seconds. Then arch your back and hold for 5 seconds. Do 2 sets of 15.
- **Quadruped arm and leg raise:** Get down on your hands and knees. Pull in your belly button and tighten your abdominal muscles to stiffen your spine. While keeping your abdominals tight, raise one arm and the opposite leg away from you. Hold this position for 5 seconds. Lower your arm and leg slowly and change sides. Do this 10 times on each side.
- **Pelvic tilt:** Lie on your back with your knees bent and your feet flat on the floor. Pull your belly button in towards your spine and push your lower back into the floor, flattening your back. Hold this position for 15 seconds, then relax. Repeat 5 to 10 times.
- **Partial curl:** Lie on your back with your knees bent and your feet flat on the floor. Draw in your abdomen and tighten your stomach muscles. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Hold this position for 3 seconds. Don't hold your breath. It helps to breathe out as you lift your shoulders. Relax back to the floor. Repeat 10 times. Build to 2 sets of 15. To challenge yourself, clasp your hands behind your head and keep your elbows out to your sides.
- **Gluteal stretch:** Lie on your back with both knees bent. Rest your right ankle over the knee of your left leg. Grasp the thigh of the left leg and pull toward your chest. You will feel a stretch along the buttocks and possibly along the outside of your hip. Hold the stretch for 15 to 30 seconds. Then repeat the exercise with your left ankle over your right knee. Do the exercise 3 times with each leg.
- **Extension exercise**
  - Lie face down on the floor for 5 minutes. If this hurts too much, lie face down with a pillow under your stomach. This should relieve your leg or back pain. When you can lie on your stomach for 5 minutes without a pillow, you can continue with Part B of this exercise.
  - After lying on your stomach for 5 minutes, prop yourself up on your elbows for another 5 minutes. If you can do this without having more leg or buttock pain, you can start doing part C of this exercise.
  - Lie on your stomach with your hands under your shoulders. Then press down on your hands and extend your elbows while keeping your hips flat on the floor. Hold for 1 second and lower yourself to the floor. Do 3 to 5 sets of 10 repetitions. Rest for 1 minute between sets. You should have no pain in your legs when you do this, but it is normal to feel some pain in your lower back. Do this exercise several times a day.
- **Side plank:** Lie on your side with your legs, hips, and shoulders in a straight line. Prop yourself up onto your forearm with your elbow directly under your shoulder. Lift your hips off the floor and balance on your forearm and the outside of your foot. Try to hold this position for 15 seconds and then slowly lower your

## Chronic Low Back Pain

- Spinal manipulation
  - improved pain and function when used in combination with other active treatments
- Ultrasound: no effect on pain or function
- TENS: no effect on pain or function
- Low Level Laser Therapy: improved pain and function

## Radicular Low Back Pain

- Exercise: Small improvement in pain
- Traction: No effect on pain or function
- Other Therapies- no effect on pain or function
  - Ultrasound, MCE, Pilates, Tai chi, yoga, psychological therapies, rehabilitation, acupuncture, massage, spinal manipulation, LLLT, electrical muscle stimulation, short-wave diathermy, TENS, interferential therapy

## Nonpharmacologic Therapies

Class of Low Back Pain	Acute/Subacute	Chronic	Radicular
Exercise [SOE low to moderate]	X	X	X
Physical Therapy [SOE moderate]		X	
Acupuncture [SOE moderate]		X	
Massage [SOE low]		X	
Low Level Laser Therapy [SOE low]		X	
Yoga/Tai Chi [SOE low]		X	
Spinal Manipulation [SOE moderate]		X	

## Comparison of ACP Guidelines

<u>2007</u>	<u>2017</u>
Acetaminophen effective for acute low back pain	No difference in effectiveness in acetaminophen vs placebo
TCAs effective for chronic low back pain	TCAs not effective for chronic low back pain compared to placebo
Non-pharmacologic interventions had similar results	
-----	Superficial heat more effective for acute or sub-acute LBP
-----	Ultrasound and TENS not effective

## Summary of 2017 ACP Guidelines

### Acute/Subacute low back pain

- Non-Rx: superficial heat, massage, acupuncture, spinal manipulation
- Rx: NSAIDs or skeletal muscle relaxants

## Summary of 2017 ACP Guidelines

### Chronic Low Back Pain

- Non-Rx: exercise, PT, acupuncture, stress reduction, CBT, LLLT, spinal manipulation
- Rx: NSAIDs (1<sup>st</sup> line); Tramadol or Duloxetine (2<sup>nd</sup> line); Opioids only if failed other measures and benefits > risks

# Procedures

## Outpatient (PCP)

- Acupuncture
- Dry Needling
- Trigger Point Injection

## Specialty

- Epidural Steroid Injection
- Facet Nerve Block
- Prolotherapy
- Nerve Stimulator
- Pumps
- Surgery

# Behavioral

- Mindfulness-based stress reduction
- Cognitive Behavioral Therapy
- Meditation
- Biofeedback
- Address underlying psychosocial disorders

## Self Care

- Stay active (avoid bed rest) and use superficial heat
- Maintain healthy diet/weight
- Maintain proper posture and engage the core
- Identify expectations at every visit
- Provide reassurance

## Self Care

Class of Low Back Pain	Acute/Subacute	Chronic
Remain Active, managing expectations	X	X
Handouts/books	X	X
Superficial Heat	X	X

## Practice Recommendations

- Perform a focused H&P and classify low back pain patients into: non-specific; radicular; from another cause
- Inform patients about expected treatment course, advise to remain active and give self treatment options
- Order imaging with severe/progressive neurologic deficits exam suggestive of severe underlying condition

## YES You Can Treat Low Back Pain

- Take a thorough history
- Learn about the individual behind the pain
- Assess and manage patient's expectations at every encounter
- Provide interventions in a step-wise fashion (non-Rx 1st)
- Not a "one size fits all" algorithm
- Give the patient what works for them
- Treat mental illness and depression

# Thank You

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# Questions



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