

Contributing Factors and Management of Back Pain

Amy Collison, PT, DPT



1

Objectives

Upon completion of this session, the participant will

1. Describe the prevalence and economic impact of back pain
2. Identify factors contributing to back pain in relation to the anatomy of the spine and surrounding muscles.
3. Describe techniques to manage back pain and what exercises to avoid further pain issues.

2

Prevalence of back pain

- Low back pain is a leading cause of disability worldwide
- Low back pain is the most common musculoskeletal condition in adults
- In the United States, low back is one of most common reasons people seek healthcare



3

Economic Impact

- Low back pain is the leading cause of lost productivity worldwide
- Leading cause of disability in many countries
- It is estimated that over 100 billion dollars is spent annually in the US on the management of low back pain
 - Two-thirds of which is associated with lost wages and decreased productivity

4

Risk Factors for Low Back Pain



Obesity

Age

Smoking

Sedentary work

Manual labor

Female

5

Anatomical Structures



5 lumbar
vertebrae

- Provide stability for the back
- Protect the spinal cord
- Site for muscle attachments

Intervertebral
discs

- Distribute compressive loads

Nerves

- Spinal nerves exit the spine at the intervertebral foramen

6

Muscle That Support The Spine



- Grouped into 4 primary groups
 - Flexors
 - Extensors
 - Lateral flexors
 - Rotators
- Muscles act a guy wires providing a balance of stability and mobility to the spine



7

Classifications of Low Back Pain



Acute: <6 weeks

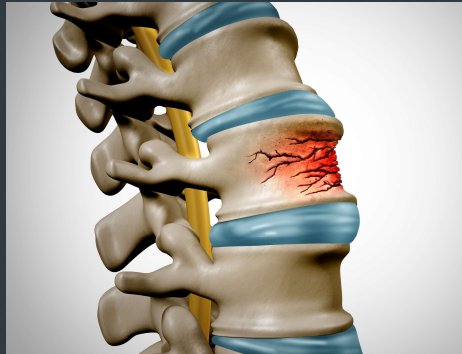
Sub-acute: 6-12 weeks

Chronic: >12 weeks

8

Sources of Pain

- Low back pain can originate for many potential structures
 - Vertebrae
 - Joints
 - Nerves
 - Discs
 - Muscles
 - Ligaments



9

Imaging in Low Back Pain

- Imaging findings are weakly related to symptoms
- One study showed that in asymptomatic people 60 year or older:
 - 36% had a herniated disc,
 - 21% had spinal stenosis
 - >90% had generative or bulging discs



10

Diagnoses

- Clinical findings are the primary driver of treatment plan
- Imaging is not recommended within the first 6 weeks unless red flags are present
 - Trauma, unexplained weight loss, immunosuppression, history of cancer, IV drug use, prolonged corticosteroid use, osteoporosis, neurological deficits

11

Examination: History

Onset

- Acute
 - strain, disc, fracture
- Insidious
 - Degenerative changes

Location of pain

- Localized
- Diffuse
- Radiating

12

Examination: Nature of Pain



- Description
 - Achy, burning, sharp, throbbing, shooting, stiffness
- Location of pain
 - Localized, diffuse, radiating
 - Midline vs unilateral
- Neurological symptoms
 - Weakness, paresthesia
- Aggravating factors
 - More comfortable in sitting vs standing
 - Does activity improve or aggravate symptoms
- 24-hour pattern

13

Examination: History



History of abdominal/pelvic surgery

- Impaired muscle activation
- Scar tissue

Pregnancy/delivery

- Diastasis
- Posture

Prior treatment

- Surgery, injections, massage, acupuncture, chiropractic care, physical therapy

Pelvic floor dysfunction

- Tight pelvic floor muscles
- Laxity
- Impaired coordination

14

COZEAN PELVIC DYSFUNCTION SCREENING PROTOCOL



- ☐ I sometimes have pelvic pain (in genitals, perineum, pubic or bladder area, or pain with urination) that exceeds a 3/10 on the pain scale
- ☐ I can remember falling onto my tailbone, lower back, or buttocks (even in childhood)
- ☐ I sometimes experience one or more of the following urinary symptoms
 - Accidental loss of urine
 - Feeling unable to completely empty my bladder
 - Having to void within a few minutes of a previous void
 - Pain or burning with urination
 - Difficulty starting or frequent stopping/starting of urine stream
- ☐ I must get up to urinate two or more times at night
- ☐ I sometimes have a feeling of increased pelvic pressure or the sensation of my pelvic organs slipping down or falling out
- ☐ I have a history of pain in my low back, hip, groin, or tailbone or have had sciatica
- ☐ I sometimes experience pain or discomfort with sexual activity or intercourse
- ☐ Sexual activity increases one or more of my other symptoms
- ☐ Prolonged sitting increases my symptoms

Yes to 3 or more questions indicates pelvic floor dysfunction is likely

15

History: Occupation



Workstation set up

- Ergonomic assessment
- Sit to stand desks

Active vs sedentary

- Lifting mechanics
- Barrier to utilizing proper lifting mechanics
- Repetitive movements
- Breaks

16

Workstation Set Up



- Keep your monitor at eye level,
- Place your keyboard close to your body (elbow at ~90 degrees)
- Sit in a chair with back support to avoid slumping
- Make sure your feet are firmly planted on the ground
 - Use a footstool if your feet don't reach the ground

17

Activity



- Current exercise program
 - Aerobic vs strengthening
 - Educated on how to proper technique
- Tolerance to exercise



18

Observation: Posture



Is posture contributing to low back pain?

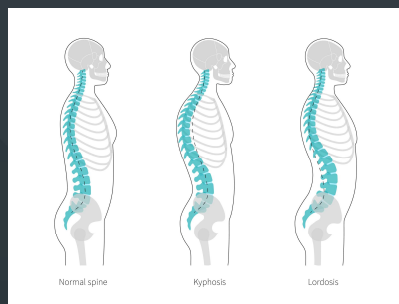
- Lateral shift
- Side bending
- Spinal curvatures
- Pelvic position

Does the person assume postures to decrease symptoms?

- Off-loading strategies

19

Spinal Curvatures



20

Observation: Gait



Gait deviations

- Trendelenburg gait?
- Decreased step length?

Posture

- Forward bent posture?
- Hands behind back?
- Favor one leg?

21

Evaluation: Objective Measurements



Range of motion

- Limited motion
- Effect on pain

Strength testing

- Hip
 - Manual muscle testing
 - Bridge progression
- Core strength
 - Plank progression

22

Observation: functional movements



- Stairs
 - Step over step vs one step at a time
 - Pelvic stability
- Sit to stand
 - Excessive spinal flexion
 - Excessive spinal extension
- Getting out of bed
 - Log roll vs sit up
 - Require assistance

23

Lumbar Strain



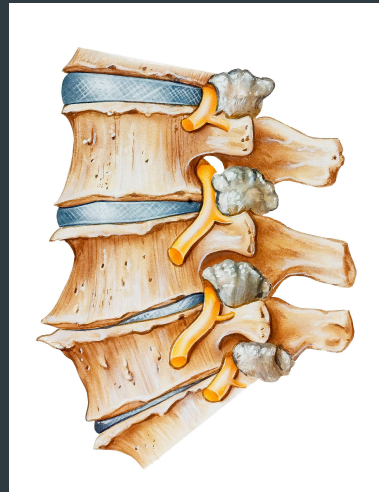
- Injury to the muscles of the spine
- Causes by trauma or mechanical stress
- Pain often described as an ache or muscle spasm
 - Does not radiate into leg
- Pain aggravated with trunk flexion



24

Facet Joints

- Joints that connect adjacent vertebrae
- Limit the motion of the spine
- Are prone to degenerative changes such as osteoarthritis.
- Load bearing through joints increases with disc degeneration



25

Facet Joint Pain:

- Pain typically lateral of midline
- Aggravated with prolonged walking/standing
- Alleviated with sitting and bending forward
- Excessive lumbar lordosis
- Increased muscle activation in lumbar extensors
- Weakness in abdominal and hip musculature

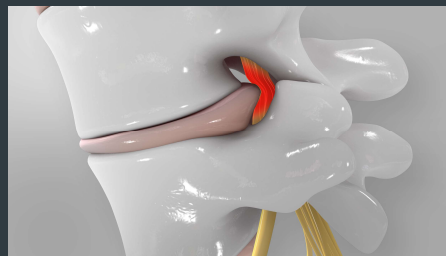
26

Herniated Disc

- More common in men and people aged 30-50
- Pain radiates below the knee
- Pain described as sharp, burning, or shooting
- Pain aggravated with increased intrabdominal pressure (coughing, sneezing)
- Pain generally worse with lumbar flexion
 - Sitting, bending forward
- May have numbness or tingling associated with innervation pattern of nerve root

27

Herniated Disc



28

Herniated Disc



- Symptoms typically better in the morning and increases through out the day
- Not all herniated discs are painful
- Some herniated discs will spontaneously regress (no MRI evidence)

29

Spinal Stenosis



- More common > age 50
- Compression on nerve
- Aggravated with standing and walking
- Pain decreases in sitting or when bending forward

30

Management

- Address impairments in range of motion
- Address muscle imbalances
- Modify daily activities to reduce pain



31

Address Limitations in Range of Motion

- Avoid exercises that reproduce pain
 - May experience stiffness and muscle tightness
- Progress exercise based on symptoms



32

Flexion Biased Exercises



- Utilized when symptoms are aggravated by extension
 - Standing, walking, lying flat on back or on stomach
- Alleviated with flexion
 - Sitting, bending forward

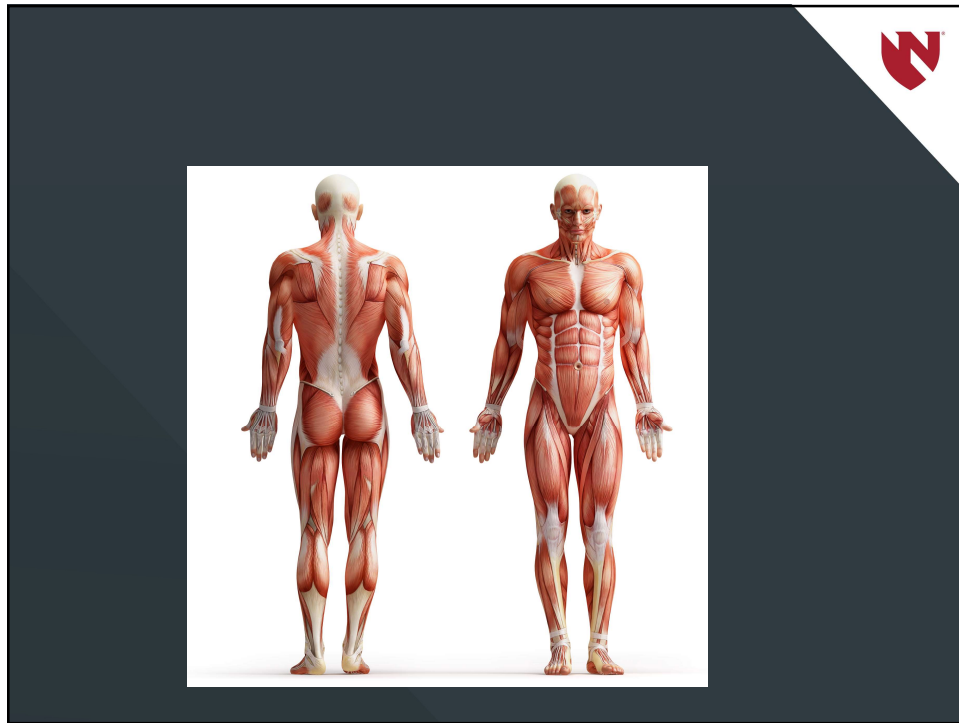
33

Lumbar Flexion



- Muscle that contract to produce lumbar flexion
 - Rectus abdominus, psoas major, external and internal obliques
- Muscle that need to lengthen during lumbar flexion
 - Paraspinals, quadratus lumborum

34



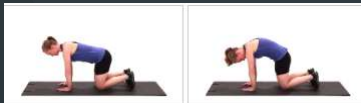
35

Stretches to Promote Lumbar Flexion

Child's pose



Cat stretch



Lumbar Flexion Stretch



36

Strengthening Exercises: Flexion Biased



- Places the spine in a relatively flexed position
- Improve muscle activation of abdominals and glutes
- Improve control of the lumbar spine and pelvis
- Isolate the appropriate muscle without compensatory strategies

37

Beginner Flexion Biased Strengthening Exercises



Supine posterior pelvic tilt



Supine posterior pelvic tilt with marches



Leg extension with posterior pelvic tilt

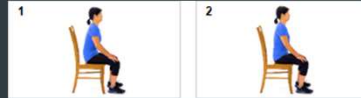


38

Seated Flexion Biased Strengthening Exercises



Leg extension with posterior pelvic tilt



Resisted shoulder external rotation with posterior pelvic tilt



Seated rows with posterior pelvic tilt



39

Modify Daily Activities



- Avoid prolonged standing/sitting until symptoms subside
- Take breaks to stretch back
- Avoid sleeping flat on your back or on your stomach
 - Sleep in sidelying
 - On your back with knees bent
 - On your stomach with pillows under abdomen
- Sit with back against chair back
- When sitting and standing, perform posterior pelvic tilt to decrease pain

40

Extension Biased Exercises

- Utilized when symptoms are aggravated by lumbar flexion
 - Sitting and bending forward
- Alleviated with extension
 - Standing, lying flat on back



41

Lumbar Extension

- Muscle that contract to produce lumbar extension
 - Paraspinals, quadratus lumborum
- Muscle that need to lengthen during lumbar flexion
 - Rectus abdominus, psoas major

42

Stretches to Promote Lumbar Extension



Prone press up



Standing Extension



43

Extension Biases Strengthening Exercises



Bridges



Prone hip extension



44

Standing Extension Biased Exercises



Standing hip extension



Resisted shoulder extension



Plank at wall



45

Modify Daily Activities



- Elevate height of chair
- Avoid prolonged sitting
- Avoid slouching when sitting
- Bend knees and avoid hinging at the hips when bending forward



46

Prevention

- Protect your back
 - Minimize stress to your back during daily activities
 - Use proper lifting techniques



47

Prevention

- Incorporate strengthening exercises into routine to support your back
 - Focus on proper form to decrease stress on your spine and encourage proper muscle activation



48

Sit ups

Compensatory Strategies

- Arching low back

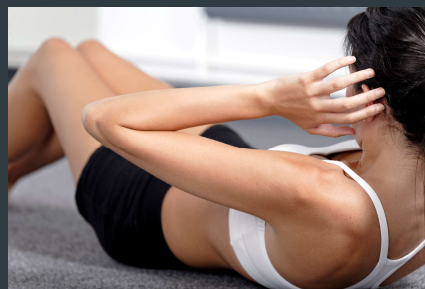


49

Sit ups

Modifications

- Increase low back support
- Decrease range of motion



50

Overhead movements



Compensatory Strategies

- Excessively arching low back



51

Overhead movements



Modifications

- Increase back support



52

Don't Ignore Back Pain



53

References

1. George SZ, Fritz JM, Silfies SP, Schneider MJ, Beneciuk JM, Lentz TA, Gilliam JR, Hendren S, Norman KS. Interventions for the Management of Acute and Chronic Low Back Pain: Revision 2021. *J Orthop Sports Phys Ther*. 2021 Nov;51(11):CPG1-CPG60. doi: 10.2519/jospt.2021.0304. PMID: 34719942; PMCID: PMC10508241.
2. Martin CD, Hale MH, Holland AC. Low back pain in women: Why does it hurt? *Women's Healthcare: A Clinical Journal for NPs*. 2023;11(1):36-40. doi:10.51256/WHC022336
3. Knezevic NN, Candido KD, Vlaeyen JWS, Van Zundert J, Cohen SP. Low back pain. *Lancet*. 2021;397(10294):78-92. doi:10.1016/S0140-6736(21)00733-9
4. Allegri M, Montella S, Salici F, Valente A, Marchesini M, Compagnone C, Baciarello M, Manferdini ME, Fanelli G. Mechanisms of low back pain: a guide for diagnosis and therapy. *F1000Res*. 2016 Jun 28;5:F1000 Faculty Rev-1530. doi: 10.12688/f1000research.8105.2. PMID: 27408698; PMCID: PMC4926733.
5. Hoy D, Brooks P, Blyth F, Buchbinder R. The Epidemiology of low back pain. *Best Practice & Research: Clinical Rheumatology*. 2010;24(6):769-781.
6. Vishali K, Kumar RVV, Vasanthan. Effect of Pain Education on Quality of Life of Chronic Low Back Pain Patients. *Indian Journal of Physiotherapy & Occupational Therapy*. 2022;16(3):25-31. doi:10.37506/ijpot.v16i3.1839
7. Sassack B, Carrier JD. Anatomy, Back, Lumbar Spine. [Updated 2023 Aug 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557616/>

54

