

Low Back Disorders

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Learning Objectives

After reading Low Back Disorders, the participant will be able to:

1. List several common sense recommendations for treating low back problems.
2. Explain why patients with back problems often continue to have pain even after treatment.
3. Identify what should be included in exercises for protecting the low back to make them more effective.
4. Explain why tissue damage that causes back pain often goes undiagnosed.
5. Identify the work related risk factors in the development of low back disorders.
6. Identify the muscles of the abdominal wall.
7. Identify the muscles involved in spinal stability.
8. Explain what happens to spinal motion during the process of disc degeneration.
9. Explain why sit-ups are not a recommended exercise for the abdominal muscles.
10. Explain why full lumbar flexion should be avoided immediately after arising in the morning.
11. Identify two factors to consider to minimize stress on the back when lifting.
12. Explain why lifting should be avoided after prolonged periods of stooping or sitting.
13. List strategies to use to reduce back problems caused by prolonged sitting.
14. Explain what is meant by the term Cross Pelvis Syndrome.

15. Explain the positive slope of improvement and its use in evaluating patient progress.
16. Identify several techniques used to teach an individual how to find and use neutral spine when performing active tasks.
17. Explain how to correctly brace the abdominals.
18. Explain the purpose of provocative testing.
19. Explain why traditional exercises for the back may not be effective.
20. Explain the “flossing” technique and when it is used.
21. Explain why the prone back extension exercise is not recommended for anyone at risk for low back injury.
22. Explain the correct form to use to perform a curl-up exercise and how to progress it from a basic to an advanced exercise.
23. Explain how to modify the side bridge for an individual unable to tolerate shoulder load.
24. Explain how to perform a “bird dog” exercise for an individual with a very de-conditioned back.
25. Explain why exercise training for back rehabilitation should begin on a stable rather than a labile surface.



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CEC/CEU Test for Low Back Disorders

Choose the best answer. Mark all answers on the answer sheet

1. Common sense recommendations for alleviating or preventing back problems may be inappropriate because:
 - a. These recommendations are only promoted by people with no formal medical training
 - b. These recommendations are backed by little or no scientific evidence that proves they are beneficial
 - c. These recommendations are not documented and have to be learned through experience
 - d. These recommendations are not supported by clinicians or physicians
2. A factor used by lawyers and Compensation Boards to measure back disability and award compensation is:
 - a. The location on the spine where injury occurred
 - b. The ability of the lumbar spine to tolerate compressive loads
 - c. The loss of range of motion in the spine
 - d. The amount of rehabilitation required in order to return to work
3. Which of the following statements is true?
 - a. Age has no affect on the spine's ability to bear a compressive load
 - b. Females are able to bear higher loads than males
 - c. Older females are able to bear higher loads than younger females
 - d. Younger males are able to bear higher loads than older males
4. Which of the following statements about work related back problems is true?
 - a. Some scientists and physicians believe psychosocial factors play a more important role in low back problems than mechanical factors
 - b. The modern work place is a more physically active work environment which is more damaging to the back
 - c. Research has developed surgical procedures that can cure any work related back problem
 - d. Due to medical advances in surgical and non-surgical therapies for low back problems back pain and work disability has decreased in recent years

5. Patients with chronic bad backs often continue to have problems even after receiving treatment because:
 - a. The cause of most chronic back pain cannot be determined so back rehabilitation is rarely permanent
 - b. Patients continue to do the same type of physical activities they always have because mechanical concerns were not addressed in their treatment plan
 - c. Patients don't follow the exercise and stretching guidelines their doctors or therapists prescribe for them
 - d. If a medical treatment or recommended therapy is not productive, patients frequently change doctors seeking pain relief
6. In order for exercises for the back to be the most effective in helping protect the back, they should:
 - a. Emphasize increasing the strength in both the upper and lower back
 - b. Emphasize improving the flexibility of the back muscles
 - c. Emphasize the ability of the back to safely lift heavy loads
 - d. Emphasize muscle endurance, not just muscle strength
7. Which of the following is not a common recommendation for improving the health of the back?
 - a. Strengthening the abdominal muscles with sit ups will make the back healthier
 - b. When performing sit ups, bend the knees
 - c. When lifting, bend the back and keep the knees straight
 - d. To protect the back, strengthen the muscles that stabilize the spine
8. Which of the following statements about back injuries is true?
 - a. Any injury to the tissues of the lower back should heal in 12 weeks
 - b. Treatment methods have become so effective that no back injury should last longer than 4 months
 - c. Back injuries that cause disc bulging may cause osteophytes to develop years after the injury
 - d. Tissue damage to the lower back always results in a life time of back pain and disability

9. Which of the following statements about increasing the range of motion in the spine as part of back rehabilitation is true?
- Increasing the range of motion in the spine is an accurate and measurable factor for determining the success of back therapy
 - Increasing the range of motion in the spine has been shown by some research to increase the risk of future back problems
 - Increasing the range of motion in the spine always enhances athletic performance
 - Increasing the range of motion in the spine improves joint stability and prevents injury in all joints
10. One of the primary causes of low back injuries is:
- Twisting the back while attempting to lift an object
 - A single impact on the spine occurring during participation in a sports activity
 - Injuries to the back resulting from a car or other vehicle accident
 - Cumulative trauma caused by repetitive overload to the point of tissue failure
11. Which of the following statements is true regarding the epidemiological studies included for review?
- The Norman and colleagues study is often quoted to support the viewpoint that psychosocial factors are the most important causes of back disorders
 - The studies suggest that both psychosocial factors and physical loading factors are important variables for low back disorders
 - The Bigos and colleagues study surveyed industrial lifting jobs and, using medical records, classified each type of job as being either low, medium, or high risk for causing low back disorders
 - The studies all concluded that in the industrial jobs studied, psychosocial factors and not mechanical loading was the most important cause of low back disorders

12. Workers who suffer a job related low back tissue injury may not be able to return to work because:
 - a. Their rehab program uses a work hardening approach that incorporates the injury mechanism as part of treatment and causes more tissue damage
 - b. The worker acts disabled in order to receive more compensation
 - c. The employer may conclude the worker is unable to meet the physical challenges of their job
 - d. The worker may have nonspecific back pain which can't be diagnosed or successfully treated within 6 – 12 weeks
13. Tissue damage that causes low back pain often goes undiagnosed because:
 - a. Low back pain that does not improve within six weeks is not considered disabling, so further diagnosis is not necessary
 - b. If a causative event, such as an accident or injury, can't be identified it is assumed there is no organic basis for pain
 - c. Current tests used to diagnosis low back pain often don't detect articular damage, fractures, or deep fissures of the annulus
 - d. If no lesion is detected using typical diagnostic procedures the low back pain is assumed to be idiopathic with no organic basis

14. All of the following statements concerning nonspecific or undiagnosed low back disorders are true except:
- To aid in making functional diagnosis of low back pain, physicians can utilize provocative testing
 - There is no link between biomechanical factors and psychosocial factors in association with low back disorders
 - According to some research, chronic low back problems can benefit from treatment that includes physical therapy and exercise
 - Chronic pain can produce psychological difficulties which disappear when the pain is relieved
15. Epidemiological studies have identified all of the following work-related tasks as risk factors in the development of low back disorders except:
- Jobs that require maintaining deviated postures such as trunk flexion
 - Jobs that require frequent bending and twisting
 - Jobs that require multiple activities involving both sitting and moving
 - Jobs that involve vibration, particularly seated vibration
16. Studies comparing work load and subsequent development of back pain have shown:
- Workers who performed heavy work in their early years had disc degeneration in their later years
 - Workers who performed no heavy physical work in their early years had arthritic changes in their back in later years
 - Workers who performed heavy work in their early years were more prone to develop nerve entrapment syndrome in later years
 - Workers who performed no heavy physical work in their early years were more prone to develop nerve entrapment syndrome in later years
17. Back injury that occurs when an individual performs an ordinary benign task can be the result of that individual's _____, with the task often not recorded as the cause of the injury
- Tight, inflexible back muscles
 - Deficient motor control mechanisms
 - Weak back muscles
 - Increased range of motion in the spine

18. Evidence supports all of the following statements regarding back injury as true except:
- Injury to low back tissue can last for up to ten years
 - Psychosocial issues and biomechanical issues influence each other in terms of both absenteeism and recovery
 - Disc herniation is not always caused by excessive loads, but can also be caused by repetitive motion with light loads
 - All of the above statements are true
19. Muscle activation and motion can be generated from _____ or from _____.
- Subconscious learned muscle memory residing in the brain; a conscious thought in the brain
 - An encoded pattern residing in the spinal cord; a conscious thought in the brain
 - An encoded pattern residing in the spinal cord; a reflexive action originating in the brain
 - Only conscious thought in the brain produces muscle activation and motion
20. In the vertebrae, nutrients such as oxygen and glucose are transported in the _____.
- Cancellous bone
 - End plate
 - Cortical bone
 - Lamina
21. All of the following statements regarding the architecture of the vertebrae are true except:
- According to many textbooks, the major shock absorbers of the spine are the discs
 - Under a compressive load the end plates of the vertebrae bulge inward
 - When the transverse trabeculae fracture under a compressive load the cancellous bone is unable to rebound back to its original shape
 - The alignment of the trabeculae is with the dominant trajectories of stress
22. Older women with osteoporosis will have which of the following changes in their vertebrae?
- A loss of cancellous bone that forms vertical columns that run from end plate to end plate
 - An increase in mineral content and bone density
 - Heavy bony gusseting at the intersection of the vertical columns and transverse trabeculae
 - A loss of mechanical integrity of the transverse trabeculae

23. An injury which can cause extensive trabeculae damage but can go unnoticed in a diagnostic exam is:
- A herniated disc
 - A Schmorl's node
 - Stellate pattern fractures
 - A slow crush fracture
24. An injury often misdiagnosed as a herniated disc is:
- A degenerated disc
 - A thoracic stress fracture
 - An end plate fracture
 - A spinous process fracture
25. The facet joints on the transverse processes are _____ joints and the superior facets together with the transverse process are attachment sites for the _____ muscle groups
- Cartilagenous; longissimus and iliocostalis extensor
 - Synovial; longissimus and iliocostalis extensor
 - Fibrous; longissimus and iliocostalis flexor
 - Facet; longissimus and iliocostalis extensor
26. Repetitive cyclic full spine flexion and extension can eventually cause a fatigue fracture in the pars and can lead to _____ which is an injury often found among _____.
- A degenerated disc; female gymnasts
 - A herniated disc; professional cricket players
 - Spondylolisthesis; professional weight lifters
 - Spondylolisthesis; female gymnasts
27. Which two components of an intervertebral disc work together to support compressive load when the disc is compressed and bent?
- Lamina and cancellous bone
 - Annulus and nucleus
 - Spinous processes and facet joints
 - End plates and nucleus

28. Which of the following is not a valid conclusion about disc bulging or herniation?
- Disc herniation is associated with fully flexing the spine for a repeated or prolonged period of time
 - There is a link between disc herniation and sedentary occupations requiring prolonged periods of sitting
 - Disc herniations tend to occur more frequently in older spines
 - It appears herniation occurs when the disc is bent to the full end range of motion
29. Which of the following statements regarding how to accurately estimate muscle force and spinal function is false?
- Large numbers of muscle fibers are not seen in a single MRI or CT scan of pennated muscle
 - Transverse scan information should be combined with data documenting fiber architecture from dissection
 - Specimens of muscles obtained in the anatomy lab are the best source to use to estimate muscle size
 - MRI and CT scans of abdominal musculature done from a supine position underestimate abdominal muscle moment arms
30. Which of the following statements is true regarding the difference between the longissimus thoracis pars lumborum and the longissimus thoracis pars thoracis?
- The pars thoracis has more slow twitch fibers than the pars lumborum
 - The pars thoracis have relatively short contractile fibers and short tendons
 - The forces in the thoracis have the smallest possible extensor moment arm
 - The pars thoracis has fewer slow twitch fibers than the pars lumborum

31. The _____, _____, and _____ comprise the layers of the abdominal wall and all three are involved in _____.
- Rectus abdominis, internal oblique, external oblique; extension
 - Rectus abdominis, internal oblique, external oblique; torso twisting
 - Transverse abdominis, internal oblique, external oblique; torso twisting
 - Transverse abdominis, internal oblique, external oblique; flexion
32. Which of the following muscles is believed to be involved in spinal stability and the generation of intra-abdominal pressure?
- Rectus abdominis
 - Transverse abdominis
 - Internal oblique
 - External oblique
33. The primary role of the psoas muscle is:
- Spinal stabilization
 - Hip flexion
 - Back extension
 - Hip extension
34. The _____ ligaments are aligned to the compressive axis of the spine at an oblique angle and the _____ ligaments are aligned parallel to the compressive axis of the spine.
- Interspinous; longitudinal
 - Superspinous; longitudinal
 - Interspinous; superspinous
 - Superspinous; interspinous
35. All of the following statements regarding the muscles of the pelvis and hips is true except:
- The gluteus maximus flexes and externally rotates the hip
 - The Piriformis and quadratus femoris assist in the control of internal and external rotation
 - The quadriceps muscles extend the knee
 - The hamstring muscles eccentrically contract and function as a brake in upright activities such as walking and running

36. Which of the following statements best describes what happens to the motion of the spine during the process of disc degeneration?
- The range of motion increases when disc degeneration reaches grade V
 - The range of motion increases through grades I and II and then starts to decrease when disc degeneration reaches grade III
 - The range of motion in the spine is not affected by disc degeneration until grade V
 - The range of motion increases through grades I, II, III, and IV but is replaced by extreme loss of motion in grade V
37. In order to lower the load and the torque on the lumbar spine while walking the person who is walking should:
- Take smaller, faster steps
 - Swing the arms while walking
 - Walk faster than a stroll
 - Both b and c
38. Which of the following statements best explains why performing traditional sit-ups is not a recommended exercise for the abdominal muscles?
- Only bent knee sit-ups can be safely performed because bending the knees reduces the load on the spine
 - A compression load of approximately 3300N is imposed on the spine each time a sit-up is performed
 - The compression load imposed on the low back during a sit-up is much higher than the action limit for low back compression set by the National Institute of Occupational Safety and Health
 - All of the above
39. Which of the following back extension exercises places the highest load on the spine?
- Kneeling on all fours and extending one leg at the hip
 - Using a roman chair or bench to perform torso extensions
 - Lying prone and simultaneously extending and lifting both legs and both arms
 - Kneeling on all fours and extending one leg at the hip and extending the opposite arm at the shoulder

40. Exercises requiring full lumbar flexion or bending should not be performed in the morning because:
- The discs in the lumbar spine have increased fluid content in the morning, are more resistant to bending, and are more susceptible to injury
 - The lumbar spine is more flexible in the morning and is therefore more susceptible to ligament injury
 - The discs in the lumbar spine have decreased fluid content in the morning, are more resistant to bending, and are more susceptible to injury
 - The muscles in the back have an increased resistance to bending in the morning and are therefore more susceptible to muscle pulls
41. Which of the following statements is true regarding the avoidance of injury when performing a lifting activity?
- Bending at the legs when performing a lifting activity greatly reduces the shear load on the spine
 - Maintaining a neutral lordotic curve when lifting recruits the pars lumborum muscle groups and aligns the fibers to support the shear forces
 - Fully flexing the spine when lifting recruits the extensor musculature which provides support for the moment and reduces shear loading
 - Maintaining a neutral spine posture when lifting allows the ligaments to support the moment and reduces shear loading
42. The term Crossed Pelvis Syndrome refers to which of the following conditions?
- Inflexible hamstrings and hip extensors with a weak abdominal wall and gluteal complex
 - Flexible hamstrings and tight hip flexors with a weak abdominal wall and gluteal complex
 - Flexible hamstrings and hip flexors with a strong abdominal wall and gluteal complex
 - Inflexible hamstrings and hip flexors with a weak abdominal wall and gluteal complex

43. Using the comparison of the spine to an upright fishing rod secured with guy wires illustrates the role of _____ to spinal stability
- The skeleton and muscular attachments
 - Ligament strength
 - Muscular tension
 - Muscular strength
44. Which of the following statements regarding stability and muscular strength is true?
- Multiple muscles play a role in maintaining stability, depending on the requirement of the task being performed
 - The multifidus is the most important muscle in maintaining stability in the spine
 - The multifidus and the transverse abdominis should always be targeted when improving stability in the spine
 - The transverse abdominis should be the targeted muscle for maintaining stability regardless of the task being performed
45. The National Institute for Safety and Health (NIOSH) proposed lifting guidelines for the amount of load lifted in the hands in 1981 and revised them in 1993. Which of the following identifies the difference between the 1981 and the 1993 guidelines?
- The 1981 guidelines incorporated a factor for non-sagittal lifts and a factor for object shape
 - The 1993 guidelines incorporated a factor for non-sagittal lifts and a factor for whether or not the object lifted has handles
 - The 1993 guidelines added a provision for the different lifting capacities of men and women
 - The 1993 guidelines are less conservative than the 1981 guidelines in predicting smaller loads
46. Which of the following tools for assessing the risk of back troubles that can result from task demands utilizes a three dimensional goniometer?
- NIOSH approach
 - Lumbar Motion Monitor approach
 - Snook Psychophysical approach
 - Ergowatch approach

47. Which of the following lifting techniques would be preferable to use for repeatedly lifting light loads off the floor?
- Knees bent, back straight
 - Squat lift
 - Stoop lift
 - Golfer's lift
48. Workers should avoid "end of range" spine motion for all of the following reasons except:
- Maintaining a neutral spine eliminates the risk of disc herniation
 - Maintaining a neutral spine when lifting minimizes shear support
 - Maintaining a neutral spine ensures joint tolerance to compressive forces
 - Maintaining a neutral spine eliminates the risk of damage to ligaments
49. Two important factors to consider to minimize stress on the back when lifting are to:
- Push the load with the foot before lifting to estimate weight, and avoid a fully flexed spine
 - Lift one leg off the floor and to the back when lifting heavy objects and maintain neutral spine
 - Place the load close to the body, and avoid a fully flexed spine
 - Place the load close to the body and avoid a fully extended spine
50. One technique that can be used to spare the spine from compressive load is to learn to control the _____ during pushing or pulling movements
- Transmissible vector
 - Muscle forces
 - Perpendicular vector
 - Pushing force
51. It is recommended that lifting be avoided immediately following prolonged stooping or sitting because:
- There is residual laxity in the posterior passive tissues following prolonged flexion that increases the risk of injury to the back
 - The spinal tissues need time to recover from prolonged flexion in order to not compromise spinal stability
 - Prolonged flexion causes a redistribution of the nucleus within the annulus and the risk of annulus damage is temporarily high
 - All of the above

52. All of the following strategies to reduce back problems caused by prolonged sitting are true except:
- Use a foot rest so that the knees and hips are bent to 90 degrees
 - Use an ergonomic chair that can be easily adjusted to accommodate posture changes
 - Get up from a seated position, stand in a relaxed posture for 10 to 20 seconds, and raise the arms overhead and stretch
 - Perform an exercise routine sometime during the day preferably at a time other than first thing in the morning
53. All of the following are valid biomechanical principles workers can use to prevent back injuries except:
- When lifting, use either a squat lift or a stoop lift and keep the load close to the body
 - Avoid lifting or forward bending shortly after getting out of bed
 - Always lift a load slowly and smoothly
 - Break up long periods of sitting by standing up at least every 50 minutes and adjusting seated posture frequently
54. Which of the following is a valid reason for using a belt when lifting?
- If an injury is sustained while wearing a belt, the injury will be less severe than if a belt was not worn
 - Temporary use of a belt may help some individuals return to work after an injury
 - Using a belt helps decrease intra-abdominal pressure and blood pressure
 - Wearing a belt helps prevent back injury or decreases the severity of a back injury
55. A _____ can be used to gauge the tolerance and effectiveness of an exercise added to the program of a patient with a back injury.
- Range of motion increase
 - Positive slope of improvement
 - Pain tolerance rating
 - Muscular strength increase

56. Which of the following is not a valid technique to use to help an individual recognize neutral spine and separate hip rotation from lumbar motion?
- Have the person place one hand on their stomach and the other hand on their lower back to help feel the motion occurring in the hips
 - Hand out written instructions that outline how to perform a task correctly
 - Place a stick along the person's back and instruct them to flex the hips forward but maintain contact with the stick over the spine
 - Show pictures of a task being performed first with incorrect posture, then with correct posture
57. All of the following statements regarding abdominal bracing and abdominal hollowing are true except:
- When bracing, the muscles of the abdominal wall are activated to make them stiff without drawing the abdomen in
 - Bracing activates the three layers of the abdominal wall which enhances stability
 - Hollowing in the abdominal wall recruits the transverse abdominis which stabilizes the spine in bending and twisting activities
 - Abdominal bracing, which activates the obliques, enhances stability using the oblique cross-bracing
58. Many patients who do not rehabilitate properly do not _____ during squatting activities, and it is recommended the _____ exercise be used to train them to use these muscles
- Activate their gluteals; leg press machine
 - Activate their gluteals; one-legged squat
 - Activate their hamstrings; leg press machine
 - Activate their hamstrings; one-legged squat

59. Which of the following is not a valid objective to be considered when designing an exercise program for back health?
- None of the exercises in a program should be so strenuous as to cause pain
 - Low back exercises should emphasize strengthening the back by progressively increasing resistance
 - Exercise programs for back health should include a cardiovascular component
 - Low back exercises should be performed daily
60. Provocative testing is performed to identify _____ and is used to help determine _____.
- Which twisting and turning movements cause pain; which exercises should be used by the patient to strengthen the muscles in the painful area
 - Which postures, motions, and loads are pain free; which exercises to include in the patient's program
 - Which postures, motions, and loads cause pain; pain-free therapeutic exercise to include in the patient's program
 - None of the above
61. Patients who perform the McKenzie posture test and are classified as "posterior discogenic" should avoid:
- Flexion stretches
 - Extension stretches
 - Weight bearing flexed spine exercises
 - Both a and c
62. The _____ test can be used to determine if a patient might benefit from nerve flossing.
- McKenzie posture test
 - Sitting slump test
 - Flexor or back extensor test
 - Supine passive leg raise test
63. When the patient is asked to slightly raise their legs off the floor while completing the manual test for lumbar joint stability, they will contract their _____ to determine if this reduces any shearing instability and eliminate their pain.
- Rectus abdominis and obliques
 - Back extensor muscles
 - Back flexor muscles
 - Hip flexor and hamstring muscles

64. All of the following gait corrections are beneficial in making walking more therapeutic and less painful except:
- Lifting the chest and swinging the arms from the shoulder
 - Correcting “duck feet”
 - Taking slower, smaller steps
 - All of the above
65. The challenged breathing test is used to:
- Test a person’s fitness level
 - Test a person’s ability to take in sufficient oxygen when performing tasks requiring heavy breathing
 - Test a person’s ability to increase their breathing rate sufficiently to complete tasks that require a higher physiological work rate
 - Test a person’s ability to maintain spine stability during challenged breathing
66. The muscle groups involved in spinal stability during almost all tasks are the:
- Torso flexors, extensors, and lateral musculature
 - Torso rotators and lateral musculature
 - Torso flexors and extensors
 - Lateral musculature
67. The back extensor test is performed by:
- Lying prone on the floor and lifting the feet up and down
 - Lying prone on a table with the feet suspended out over the end of the table
 - Lying supine on a table with the upper body suspended out over the end of the table
 - Lying prone on a table with the upper body suspended out over the end of the table
68. All of the following statements describe reasons why traditional exercises for the low back may or may not be beneficial except:
- Sit-ups can load the spine with over 3000N of compression to a fully flexed lumbar spine
 - The posterior pelvic tilt can increase the risk of injury by flexing the lumbar joints and loading passive tissues
 - Flattening the lumbar back to the floor when performing abdominal exercises protects the back and increases abdominal strength
 - Increasing flexibility or lumbar joint mobility can lead to more back injury, not less

69. Which of the following is a correct back sparing technique to use when performing hip and knee work, such as lunges?
- Maintain an upright torso
 - Extend the torso backward as the front leg lunges forward
 - Keep the back leg straight
 - Both a and c
70. Which of the following best describes the cause of sciatica?
- Flexing the spine or hip when a nerve is impinged causes the nerve to snap through rather than slide through the foramen creating pain
 - An impinged nerve cannot slide through the foramen with hip flexion, spinal flexion or knee extension and the nerve is stretched creating excessive nerve tension and pain
 - An impinged nerve cannot slide through the foramen with hip extension, spinal extension or knee flexion and the nerve is stretched creating excessive nerve tension and pain
 - None of the above
71. "Flossing" the nerve is based on the ability of the nerve to:
- Move in one direction in order to enlarge the impinged area enough to diminish nerve tension and pain
 - Stretch to the point that it no longer has to move and pain is eliminated
 - Chemically dissolve the tissues impinging them when they are moved back and forth even in a limited range of motion
 - Decrease in size until they can pass through the tissues creating the impingement
72. Which of the following statements regarding the flossing technique is true?
- If flossing exacerbates the sciatic symptoms and they worsen, it should be eliminated from the patient's program
 - Flossing will always provide relief from sciatic symptoms if it is carefully monitored
 - Even if flossing initially causes pain, the pain will diminish as the procedure is repeated
 - If minor sciatic symptoms are felt, the range of motion in the cervical spine should be increased to maximize the benefits of the procedure

73. Which of the following exercises had the highest level of psoas activity and is not recommended as an appropriate abdominal exercise?
- Side bridge
 - Curl-ups
 - “Bird dog” back extension
 - Press heels sit-up
74. All of the following reasons why the prone back extension exercise is contraindicated for anyone at risk for low back injury are valid except:
- Extending the arms and legs simultaneously results in over 6000N of compression to a hyper-extended spine
 - Placing the hands on either side of the head rather than extending them does not alleviate the compression on the back
 - Performing this exercise stretches the interspinous ligaments
 - The load on the back is transferred to the facets of the vertebrae
75. The _____ exercise is used to maximize activation of the spine stabilizer muscles and minimize spine load.
- Advanced curl-up
 - Side bridge
 - Prone back extension
 - Bird dog
76. If a patient experiences neck discomfort while performing curl-ups, they can?
- Place both hands behind their head
 - Place their hands to the sides of their head with the fingertips lightly touching their temples
 - Place their tongue on the roof of their mouth behind their front teeth and push the tongue upward
 - Place their hands behind the lumbar region of their back for support
77. Which of the following describes incorrect form for performing curl-ups?
- One leg is kept bent to 90 degrees while the other leg is extended
 - Focus the rotation on the thoracic spine
 - Leave the elbows on the floor while elevating the head and shoulders a short distance off the floor
 - Flatten the back to the floor

78. Which of the following modifications of the side bridge can be used with patients unable to tolerate the shoulder load?
- Perform the bridge with the hand on the floor and the arm fully extended to support the upper body
 - Lie on the floor with the legs straight and straighten the torso until the body is supported on the elbow
 - Stand on a 45 degree bench with the feet anchored and lift the upper torso off the pad
 - Both a and c
79. Which of the following describes the correct way to perform the remedial bird dog exercise used for individuals with very de-conditioned backs?
- Start on the hands and knees; lift one hand off the floor about ten inches and slightly flex the back
 - Start on the hands and knees; lift one hand and the opposite knee as high as possible and hold for 7-8 seconds
 - Start on the hands and knees; lift one hand off the floor about an inch and hold for 7-8 seconds
 - Start on the hands and knees; lift one knee off the floor about five inches and rotate the leg out to the side
80. Which of the following statements is true regarding whether training should begin on a stable surface or on a labile surface?
- Moving from a stable surface to a labile surface causes more co-contraction which can be beneficial when rehabilitating for dynamic movement
 - Beginning exercises on a stable surface increases spine loads which helps to establish a positive slope of improvement
 - Using labile surfaces for training greatly lessens the spine load which makes them appropriate for de-conditioned patients
 - Labile surfaces can be best introduced after the client has achieved spine stability and restored load bearing capacity

81. All of the following are valid reasons for using or not using machines in a training program except:
- Isolating the joints and muscles to be worked helps reduce both the load and the risk
 - On a machine, the body is not required to stabilize itself and use the muscles involved in stabilization
 - The motor patterns learned on machines may not transfer over to tasks that must be done with the body supporting its weight
 - Some machines, such as a back extension or leg press, can impose higher forces and loads on the back causing injury
82. The curl-up exercise can be advanced to its highest level by:
- Lifting the head and shoulders as high as possible
 - Keeping both legs extended on the floor
 - Holding a weight behind the head as it is lifted
 - Adding deep breathing in the “up” position while maintaining bracing
83. The recommended exercise for maximum activation of the back extensor muscles is the:
- Back extension performed lying prone over a gym ball with feet secured and a weight in one hand
 - Prone back extension lifting the legs only
 - Lying prone on an incline bench with a pad under the torso and a weight in one hand
 - Prone back extension lifting the arms only
84. When training high-performance workers or athletes, which of the following two stages are added to their program?
- Stage 4 for developing muscle endurance and Stage 5 for enhancing strength
 - Stage 4 for enhancing strength and Stage 5 for developing endurance
 - Stage 4 for enhancing strength and Stage 5 for establishing power
 - Stage 4 for establishing power and Stage 5 for enhancing strength

85. Which of the following statements regarding athletes and low back disorders or injury is true?

- a. Athletes who weight train with resistance machines tend to have fewer back problems during challenged breathing
- b. Tall athletes are less able to maintain spinal stability during challenged breathing than short athletes
- c. Shorter athletes are less able to maintain spinal stability during challenged breathing than tall athletes
- d. Athletes who focus on aerobic endurance training have fewer back problems during challenged breathing

86. One method to use to establish spinal stabilization patterns with deep breathing demands is to:

- a. Have the athlete ride an exercise bike at an intensity to elevate breathing and then immediately dismount and perform a side bridge
- b. Have the athlete run a mile as fast as possible and at the end of the run immediately complete an advanced bridge
- c. Have the athlete perform bridges moving from one side to the other until breathing is elevated and then hold the posture for 7-8 seconds
- d. Have the athlete ride an exercise bike at an intensity to elevate breathing and then immediately dismount and perform cable pulldowns

87. Which of the following statements best explains why wearing a weighted back pack and walking for an hour or more helps improve the back problems from prolonged sitting?
- Wearing a weighted back pack helps strengthen the back muscles
 - The weighted back pack and walking builds endurance in the spine flexor muscles
 - The weighted back pack acts as a counter weight to extend the spine and bring the torso upright which helps reduce spine loading
 - Wearing a weighted back pack builds endurance in the spine extensors
88. Which of the following exercises is recommended for training for torsional capacity?
- Take a push up position, lift one arm off the floor and at the same time rotate the hip upwards
 - Support the upper body with one arm while raising a weight with the other arm and abdominally bracing during the movement
 - Sit in a torsional machine and twist the upper body against resistance
 - Hold a medicine ball in both hands and swing the ball from side to side twisting the upper torso
89. The _____ is an essential muscle for spine stability.
- Rectus abdominis
 - Quadratus lumborum
 - Latissimus dorsi
 - Transverse abdominis
90. Which of the following statements are true regarding training programs for athletes?
- Exercises designed for sports performance enhancement often require a high spine load
 - Maintaining a neutral spine position and fully braced torso musculature is the best posture to withstand elevated spine loads
 - When training to perform squats and power cleans, young athletes need to learn how to maintain a neutral lumbar spine before adding weight to their training
 - All of the above

