

NASM-CES™ - Quiz Questions with Answers

1. Introduction to Corrective Exercise Training

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1.

A Corrective Exercise Specialist performs a static posture assessment of a client and notices deviations in the lumbo-pelvic-hip complex (LPHC). Which of the following options would they be least likely to observe?

The client has overly pronated feet bilaterally.

The client's right iliac crest rests slightly higher than the left.

The client exhibits a slight posterior pelvic tilt.

The client has an overly arched lower back.

Correct answer: The client has overly pronated feet bilaterally.

While it is plausible that pronation of the feet may affect the LPHC (Lumbo-Pelvic-Hip Complex) through a kinetic chain, it's important to clarify that this question specifically focuses on the observation within the LPHC region itself. Since the point of observation is not the LPHC, this response is correct.

The position of the iliac crest is indicative of the overall pelvic alignment. Any asymmetry in hip levels could potentially be noted when assessing the LPHC. A posterior pelvic tilt represents a deviation from the optimal neutral posture. Ideally, a neutral pelvic tilt is the goal when evaluating the LPHC. An excessively arched lower back is still within the LPHC purview, as the lower back is often referred to as the lumbar spine. In proper posture, both the lower back and pelvis should maintain a neutral alignment, without excessive arching or rounding.

2.

A client is recovering from a hip flexor injury and is presently receiving treatment from their physical therapist. The Corrective Exercise Specialist expects the client to have difficulty initiating hip flexion during their sessions.

Which of the following muscles would you least likely to expect to be affected?

Vastus lateralis

Rectus femoris

Iliopsoas

Sartorius

Correct answer: Vastus lateralis

The vastus lateralis originates on the femur and inserts into the tibial tuberosity of the tibia. It is primarily responsible for knee extension. It does not have any effect on hip flexion and would be least likely to be affected by a hip flexor injury.

The rectus femoris is one of the quadriceps muscles and plays a role in both knee extension and hip flexion. It may be affected to some extent by a hip flexor injury. The iliopsoas is a primary hip flexor muscle, and it is often directly affected by a hip flexor injury. The sartorius is another muscle that assists in hip flexion and is relatively more likely to be affected by a hip flexor injury.

3.

A client reports discomfort with neck flexion, rotation, and side bending. The Corrective Exercise Specialist refers the client to their physical therapist and suspects, based on the client's complaints, that dysfunction in which of the following muscles may be directly contributing to these issues?

Sternocleidomastoid

Spinalis capitis

Pectoralis major

Lower trapezius

Correct answer: Sternocleidomastoid

The sternocleidomastoid (SCM) muscle plays a significant role in neck flexion, rotation, and side bending. Dysfunction in the SCM can lead to limitations in these movements, which is why the Corrective Exercise Specialist suspects its involvement.

The spinalis capitis is a cervical muscle but is responsible for spinal extension, not flexion, in addition to rotation and lateral flexion. The pectoralis major is a chest muscle and is not directly related to the movements of the neck. The lower trapezius is primarily responsible for scapular depression and also does not directly relate to movements of the neck.

4.

It is important to assess a client thoroughly in order to fully understand their quality of movement and compensations. Which of the following scenarios regarding pattern overload is true?

Pattern overload can lead to imbalances and injuries when clients excessively use the same movement patterns and muscle groups.

Pattern overload occurs when clients perform a wide variety of exercises regularly, enhancing their overall fitness.

Pattern overload is primarily a concern for experienced athletes.

Pattern overload is a rare occurrence and doesn't typically affect clients during exercise routines.

Correct answer: Pattern overload can lead to imbalances and injuries when clients excessively use the same movement patterns and muscle groups.

Pattern overload occurs when a segment of the body is repeatedly moved or chronically held the same way, leading to a state of muscle overactivity. This scenario refers to the repetitive use of the same movement patterns or muscle groups, which can result in imbalances and increase the risk of injuries.

This is a significant consideration in fitness and rehabilitation, affecting clients of various experience levels, not just experienced athletes. Pattern overload is not rare, and performing a wide variety of exercises is generally beneficial as it reduces the risk of pattern overload.

5.

A fitness professional should be aware of synergistic dominance as it relates to their clientele and their movement patterns. Which of the following scenarios best describes this concept?

A client with anterior pelvic tilt relies heavily on their quadriceps when performing squats, neglecting the activation of their hamstrings and glutes

A client with neutral posture has difficulty feeling the activation of their deep core muscles during a squat

A client with a well-balanced exercise routine evenly works all major muscle groups during each session

A client performs yoga regularly, emphasizing flexibility and mobility but neglecting strength training

Correct answer: A client with anterior pelvic tilt relies heavily on their quadriceps when performing squats, neglecting the activation of their hamstrings and glutes

Synergistic dominance describes the process in which a synergist compensates for the prime mover to maintain force production. Poor static malalignments, such as anterior pelvic tilt, alter the length-tension relationship and altered muscle recruitment patterns. In this example, the anterior pelvic tilt decreases the neural drive of the glutes and hamstrings.

While difficulty feeling a muscle group can be a characteristic of synergistic dominance, there is no postural deficit described that could explain an altered length-tension relationship leading to that compensation. A well-balanced exercise routine does not describe synergistic dominance but, rather, a balanced exercise routine, which is a positive approach to avoiding muscle imbalances. Yoga describes a client's exercise preferences but doesn't address muscle dominance in a specific movement pattern.

6.

A Corrective Exercise Specialist is programming a workout routine to help their client achieve more optimal shoulder function and stability. The client is instructed to perform a banded shoulder rotation exercise during the warm-up.

Which of the following muscles performs external rotation of the shoulder?

Infraspinatus

Pectoralis major

Latissimus dorsi

Teres major

Correct answer: Infraspinatus

The infraspinatus muscle is one of the key muscles responsible for external rotation of the shoulder joint. It is part of the rotator cuff muscles and plays a significant role in stabilizing and rotating the shoulder externally.

The pectoralis major is primarily responsible for actions like shoulder flexion, adduction, and internal rotation. The latissimus dorsi is responsible for various movements of the shoulder, including adduction, extension, and medial rotation, but not external rotation. The teres major muscle contributes to the action of shoulder extension and adduction, and internal rotation.

7.

Which of the following client training scenarios best describes the consequences of underactive/lengthened muscles?

A client who sits at a desk for the majority of the day has difficulty engaging the gluteal muscles.

A client experiencing reduced muscle soreness and fatigue after a strength training session.

A client quickly progresses to advanced yoga poses without any flexibility issues.

A client consistently notices reduced force output of shortened hamstrings.

Correct answer: A client who sits at a desk for the majority of the day has difficulty engaging the gluteal muscles.

In the seated position, the gluteal muscles are in a long-duration stretch while the hip flexors are in a shortened position. This is a common scenario where a client will notice difficulty engaging their gluteal muscles with certain exercises.

Reduced muscle soreness and fatigue after a strength training session are not typical consequences of underactive/lengthened muscles. In fact, underactive muscles can lead to weakness and imbalances, potentially increasing soreness or discomfort. A client exhibiting flexibility in advanced yoga is not related to the consequences of lengthened muscles. Noticing reduced force output of shortened hamstrings is an example of overactive/shortened muscles, not underactive/lengthened.

8.

In comparison to a Certified Personal Trainer, how are the techniques and skills of a Corrective Exercise Specialist different?

A Corrective Exercise Specialist designs and implements programs to improve movement performance.

A Corrective Exercise Specialist must hold a current CPR and AED certification.

A Corrective Exercise Specialist aims to improve the performance levels of their clientele.

A Corrective Exercise Specialist is the only fitness professional allowed to interface with the other members of the Care and Performance Continuum.

Correct answer: A Corrective Exercise Specialist designs and implements programs to improve movement performance.

Fitness professionals, including the Corrective Exercise Specialist, must hold CPR and AED certifications. This is not exclusive to the Corrective Exercise Specialist. Similarly, all fitness professionals share the common goal to improve their client's overall fitness and performance.

Corrective Exercise Specialists are not the only fitness professionals that interface with the Care and Performance Continuum. Certified personal trainers, group trainers, etc. all have the option to collaborate with other medical professionals.

9.

A trainer assesses a client and gauges their risk of injury. Which of the following factors would least likely lead to injury?

Decreased range of motion

Working a desk job

Poor exercise form

Lack of exercise

Correct answer: Decreased range of motion

Decreased activity and poor movement quality may lead to muscular dysfunction and, ultimately, injury. Working a desk job and a lack of exercise are ways to describe decreased activity.

Decreased range of motion is not a factor that would lead to injury.

10.

Which of the following is not a reason for the categorization of global musculature into four distinct subsystems?

Categorization based on muscle innervation

Easier description and review of functional anatomy

A clearer picture of the Regional Independence Model

To further assist the Corrective Exercise Specialist with programming during the integration phase

Correct answer: Categorization based on muscle innervation

The categorization of global musculature into four subsystems is to provide a more organized and systematic approach for understanding and targeting various muscle groups during fitness training and corrective exercise programs. The central nervous system optimizes the selection of muscle synergies, not based on muscle innervation alone.

The categorization assists in visualizing functional anatomy, the Regional Independence Model, and programming during the integration phase. By breaking down the global musculature into these subsystems, fitness professionals and healthcare practitioners can create tailored exercise regimens, assess functional imbalances, and address specific movement patterns, ultimately leading to more effective and comprehensive training and rehabilitation strategies.

11.

The musculocutaneous nerve is responsible for powerful movements of the upper extremity. Which of the following exercises targets a muscle innervated by this nerve?

Bicep curls

Front raises

Tricep extensions

Shoulder press

Correct answer: Bicep curls

Bicep curls directly target the biceps brachii, a muscle of the upper arm that is innervated by the musculocutaneous nerve.

Front raises and shoulder presses work the deltoid muscle, which is primarily innervated by the axillary nerve. Tricep extensions target the tricep muscle, which is primarily innervated by the radial nerve.

12.

Which of the following options best describes the Corrective Exercise Specialist's role in addressing muscle imbalances as a result of joint positioning and poor movement adaptations?

Strengthen underactive muscles, inhibit and lengthen shortened muscles, and integrate these corrections into functional movement patterns

Strengthening overactive muscles, inhibiting and lengthening shortened muscles, and integrating these corrections into functional movement patterns

Strengthening underactive muscles and prescribing medications to alleviate pain

Strengthen underactive muscles, inhibit lengthened muscles, and integrate these corrections into a training routine

Correct answer: Strengthen underactive muscles, inhibit and lengthen shortened muscles, and integrate these corrections into functional movement patterns

Corrective Exercise Specialists aim to address muscle imbalances through this comprehensive approach.

It is incorrect to strengthen overactive muscles instead of underactive ones. Corrective Exercise Specialists primarily address underactive muscles to restore balance. Corrective Exercise Specialists typically do not prescribe medications; their focus is on exercise-based solutions. Inhibiting lengthened muscles is incorrect, as lengthened muscles are typically underactive.

13.

A client you are training recently suffered from a knee injury and arrives to their session ready to continue with the leg workout. As a Corrective Exercise Specialist, which of the following is the best course of action?

Switch the day's focus to the upper body

Continue the workout as planned

Modify the workout to avoid knee valgus

Assess the movement dysfunction and program accordingly

Correct answer: Switch the day's focus to the upper body

Corrective exercise strategies may be applied post-injury after the client has received treatment and clearance from a healthcare provider to return to normal activity. It is inappropriate to, in any scenario, diagnose or treat an injury. In this case, the client must receive clearance from their healthcare provider before continuing with their lower body program. It is most appropriate to avoid using the injured limb until the client receives medical attention.

14.

A client is instructed to slowly lower the weight during a bicep curl halfway and hold it at 90 degrees for 10 seconds. According to the muscle action spectrum, which of the following muscle contraction types are being utilized in this movement?

Eccentric, isometric

Concentric, isokinetic

Eccentric, isokinetic

Concentric, isometric

Correct answer: Eccentric, isometric

The muscle action spectrum describes the range of muscle contractions used to accelerate, decelerate, and stabilize forces. In this motion, the client is performing an eccentric contraction to slowly lower the weight, then an isometric contraction to hold a position for 10 seconds.

Eccentric Contraction: *This occurs when a muscle lengthens while generating force. In the scenario described, the eccentric contraction takes place as the client slowly lowers the weight during the bicep curl halfway.*

Isometric Contraction: *This type of contraction occurs when the length remains constant. During the 10-second hold at 90 degrees, the bicep muscle is working to maintain the arm's position, but there is no change in the length of the muscle.*

Concentric Contraction: *This type of contraction is typically associated with the lifting phase of an exercise, where the muscle contracts and shortens to lift a weight.*

Isokinetic Contraction: *Isokinetic contractions involve maintaining a constant speed or velocity of muscle movement, typically with specialized equipment. This answer is not applicable to the scenario because it does not mention a constant speed of movement.*

15.

An athlete throws a ball, generating power and engaging both stabilizer and agonist muscle groups. Which of the following options correctly identifies the categorization of stabilizer and agonist muscles in this action?

Stabilizer: Rotator cuff muscles; Agonist: Latissimus dorsi

Stabilizer: Biceps; Agonist: Rotator cuff muscles

Stabilizer: Gluteus maximus; Agonist: Quadriceps

Stabilizer: Erector spinae; Agonist: Latissimus dorsi

Correct answer: Stabilizer: Rotator cuff muscles; Agonist: Latissimus dorsi

Stabilizer muscles are responsible for maintaining joint stability and controlling movement while the prime movers and synergists contract to create movement. In this case, the rotator cuff muscles, which are located in the shoulder region, stabilize the shoulder joint during the throwing motion. These muscles ensure that the shoulder remains in its proper position and that the throw is executed smoothly. The main agonist for this motion is the latissimus dorsi.

The biceps are typically not stabilizer muscles during a throw. The gluteus maximus and quadriceps are primarily involved in lower body movements like standing, squatting, and running. They are not the primary stabilizer or agonist muscles in a throwing motion. The erector spinae muscles are typically involved in maintaining an upright posture and extending the spine.

16.

While a client performs the concentric action of a push-up, which of the following muscles experiences reciprocal inhibition?

Latissimus dorsi

Deltoid

Pectoralis major

Triceps brachii

Correct answer: Latissimus dorsi

During the concentric action of a push-up, the latissimus dorsi is the antagonist muscle experiencing reciprocal inhibition. As the client pushes their body away from the floor, the latissimus dorsi relaxes to allow the opposing muscles (e.g., triceps and pectoralis) to contract effectively.

The deltoid muscle is involved in the push-up but is not typically the antagonist muscle during the concentric action. The pectoralis major plays a significant role in the push-up and typically acts as the agonist, not the antagonist of this action. The triceps brachii is also involved in the push-up. Particularly during the extension phase, it is a prime mover of this multi-joint movement.

17.

Which of the following is not an essential component of motor behavior?

Motor integration

Motor control

Motor learning

Motor development

Correct answer: Motor integration

Motor development refers to the process of acquiring and refining motor skills throughout a person's life, from infancy through adulthood. Motor control is the process by which the central nervous system (CNS) coordinates the various systems of the body to produce precise, coordinated movements. Motor learning encompasses the acquisition and refinement of motor skills through practice and experience leading to permanent change in the capacity to produce motor behavior over time.

Motor integration is not a valid phase of the concept of motor behavior.

18.

A fitness professional will regularly assess the resting and dynamic posture of a client. Which of the following statements regarding posture and human movement is false?

Posture is an unchangeable aspect of an individual's physiology, making modifications an important aspect of exercise programming.

Resting posture refers to an individual's body position when at complete rest and is critical for identifying potential issues.

Dynamic posture relates to body alignment and movement efficiency during various activities and is essential for functional fitness.

Postural assessments can provide valuable insights into an individual's movement patterns and help design effective exercise programs.

Correct answer: Posture is an unchangeable aspect of an individual's physiology, making modifications an important aspect of exercise programming.

Posture is not an unchangeable aspect of an individual's physiology. Fitness professionals can make modifications through exercise programming to improve posture and address issues related to body alignment and movement efficiency. Posture is the independent and interdependent alignment and function of all components of the human movement system at any given moment.

Static and dynamic posture are important factors to assess in designing corrective exercise programs to identify potential issues and improve movement efficiency.

19.

A client presents with decreased hamstring strength and a long history of chronic hamstring strains. Which of the following findings would you most likely expect with this presentation?

Weakness in the gluteus maximus and latissimus dorsi

Weakness in the gluteus medius and tibialis anterior

No weakness in any muscle group other than the hamstrings is to be expected

Weakness in the thoracolumbar fascia and sacroiliac joint

Correct answer: Weakness in the gluteus maximus and latissimus dorsi

The hamstrings, gluteus maximus, and latissimus dorsi are all members of the posterior oblique subsystem (POS). The weakening of the gluteus maximus, latissimus dorsi, or both can lead to increased tension in the hamstring complex, which is very common for recurrent hamstring strains.

The tibialis anterior is a member of the deep longitudinal subsystem and is not known to be associated with chronic hamstring strains. The thoracolumbar fascia and sacroiliac joint are components affected by the posterior oblique subsystem, which can be affiliated with hamstring strains. However, it is incorrect to state that those structures are weak, since they are not a muscle group.

20.

It is valuable for the fitness professional to be able to anticipate potential deficits if a client has suffered a peripheral or central nerve injury. Which of the following muscles is innervated by a cranial nerve?

Sternocleidomastoid

Scalenes

Anconeus

Rhomboids

Correct answer: Sternocleidomastoid

The sternocleidomastoid muscle is innervated by the accessory nerve (cranial nerve XI). It is one of the few skeletal muscles innervated by a cranial nerve.

The scalenes are innervated by the ventral rami (C3-C7). The anconeus muscle is located in the arm and innervated by the radial nerve. The rhomboids are innervated by the dorsal scapular nerve (C4-C5).

21.

What is the primary function of the cross-bridge mechanism in a sarcomere during muscle contraction?

To generate force by forming temporary connections between myosin and actin filaments

To release calcium ions from the sarcoplasmic reticulum

To prevent the sliding of myosin and actin filaments

To maintain the structural integrity of the sarcomere

Correct answer: To generate force by forming temporary connections between myosin and actin filaments

The primary function of the cross-bridge mechanism is to generate force by forming temporary connections (cross-bridges) between myosin and actin filaments, which results in muscle contraction. When the muscle relaxes, the filaments let go and slide back to a neutral position.

The release of calcium ions from the sarcoplasmic reticulum initiates muscle contraction but is not the primary function of the cross-bridge mechanism. The cross-bridge mechanism does not prevent the sliding of myosin and actin filaments but, in fact, facilitates the opposite. Maintaining the structural integrity of the sarcomere is essential but is not the primary role of the cross-bridge mechanism, which primarily focuses on force generation.

22.

A client bends over and picks up a heavy dumbbell from the floor using his right arm and places it onto the waist-height weight rack. Which of the following muscles is the agonist of this movement pattern?

Latissimus dorsi

Triceps

Pectoralis major

Rhomboids

Correct answer: Latissimus dorsi

The agonist is the prime mover for a given movement pattern and provides the majority of force generation. In order to pick something up off of the floor and place it at waist height would involve a significant amount of elbow flexion and shoulder adduction. Of these answers, the latissimus dorsi is primarily responsible for shoulder adduction (think about a rowing motion) and would be the agonist of this movement.

The triceps are primarily responsible for elbow extension, which is not occurring in this motion. Rhomboids are primarily responsible for scapular adduction (bringing the shoulder blades or scapula together). It is not directly responsible for moving the shoulder or upper extremity in this movement. The pectoralis major is responsible for the adduction and internal rotation of the shoulder. This does not occur in the described movement pattern.

23.

A client is training lower body strength one year after ACL surgery and has been cleared by his physical therapist to exercise. The client attempts a single-leg exercise and quickly loses balance.

Which of the following statements best explains this observation?

The client's proprioception may be impaired due to the surgery, due to the physical location of mechanoreceptors in and around the affected joint.

The client's ACL surgery had no impact on balance, and this is a normal reaction to the exercise.

The client's lower body strength is impaired and imbalanced.

The client has a weak core due to inactivity.

Correct answer: The client's proprioception may be impaired due to the surgery, due to the physical location of mechanoreceptors in and around the affected joint.

ACL surgery can affect proprioception, which is the body's ability to sense the position and movement of its parts. Impaired proprioception of the knee can lead to balance issues.

While it may be possible that the client's lower body and core strength have been impaired since surgery, this would not explain the balance deficits while performing single-leg exercises.

24.

A Corrective Exercise Specialist assesses a healthy client and notices a potential muscle imbalance affecting the kinetic chain during walking. Which of the following would best describe what they are observing?

The client's knee rotates inward during the stance phase of gait

The client exhibited decreased cardiovascular endurance

The client's high-speed walking pace

The client's resistance to exercise and reluctance to engage in physical activity

Correct answer: The client's knee rotates inward during the stance phase of gait

Anomalies in a client's gait pattern or irregularities in movement while walking, stemming from muscle imbalances, may manifest as deviations like inward knee rotation, often caused by weak glutes or limitations in range of motion. It's important to note that imbalances in one segment of the body can propagate disruptions throughout the entire kinetic chain, impacting other areas.

Cardiovascular endurance is not necessarily related to the observation of a muscle imbalance affecting the kinetic chain during walking. A high-speed walking pace does not necessarily provide insight into the presence of muscle imbalances in the kinetic chain. A client's resistance to exercise or reluctance to engage in physical activity may be a separate issue from the observed muscle imbalance affecting the kinetic chain.

25.

Which of the following would least likely benefit from the skills of a Corrective Exercise Specialist?

An injured hockey player who is awaiting clearance

An injury-free high school athlete

A sedentary desk worker

A teenager who is recovering from a chronic injury and has been cleared by their physical therapist for exercise

Correct answer: An injured hockey player who is awaiting clearance

All clients and athletes, regardless of current activity level, can benefit from the skills of a Corrective Exercise Specialist. As long as the client is cleared to exercise by a medical professional after an injury, it is appropriate for the Corrective Exercise Specialist to work with them.

In this case, the injured hockey player who is awaiting clearance to exercise is the least appropriate option for the Corrective Exercise Specialist.

26.

Which of the following options best describes the difference between the posterior oblique subsystem (POS) and the anterior oblique subsystem (AOS)?

The POS contributes posteriorly to rotational stability, while the AOS stabilizes anteriorly.

The POS primarily involves muscles responsible for lateral (side-to-side) movements, while the AOS focuses on muscles related to forward and backward movements.

The POS and AOS serve the same functions in the body.

The POS is primarily responsible for flexion movements, while the AOS is involved in extension and back bending motions.

Correct answer: The POS contributes posteriorly to rotational stability, while the AOS stabilizes anteriorly.

The POS primarily supports rotational stability in the posterior aspect of the body, while the AOS plays a crucial role in stabilizing the anterior aspect, especially in activities that involve trunk rotation.

The POS and AOS are more related to the support and stability of the spine and pelvis, rather than lateral vs. forward/backward movements. While the AOS is related to abdominal and core strength, it's not limited to extension and back bending motions. Both subsystems play essential roles in stabilizing the spine and pelvis. The POS and AOS are distinct subsystems with different functions in providing spinal and pelvic stability.

27.

A Corrective Exercise Specialist has identified weaknesses in the wrist and forearm, affecting their client's ability to lift heavy weights. Which of the following muscles would most likely be targeted by wrist and forearm strengthening exercises?

Pronator quadratus

Teres major

Brachioradialis

Deltoid

Correct answer: Pronator quadratus

Pronator quadratus is a muscle located in the forearm that functions to stabilize the radioulnar joint and elbow. The movement that it is primarily responsible for is forearm supination, which is a movement occurring in the wrist.

The teres major, brachioradialis, and deltoid muscles are all muscles of the upper arm and shoulder, and would not directly be targeted in wrist and forearm strengthening exercises.

28.

Which of the following scenarios would be the best example of the biopsychosocial model of pain?

A patient with chronic lower back pain due to a herniated disc, who experiences increased pain when stressed at work and finds relief through physical therapy and relaxation techniques

A patient with an acute ankle sprain who only experiences pain relief after taking over-the-counter pain medication

A patient with a severe headache, which is solely attributed to a family history of migraines, improves with the use of prescription migraine medication

A patient with chronic knee pain following a traumatic injury finds relief solely through a specialized surgical procedure

Correct answer: A patient with chronic lower back pain due to a herniated disc, who experiences increased pain when stressed at work and finds relief through physical therapy and relaxation techniques

Each individual experiences pain differently based on a variety of factors including but not limited to previous experiences, behaviors, and expectations. In this scenario, the patient's pain is attributed to a specific biological factor (the herniated disc), but it is also influenced by psychological factors (stress at work) and social factors (work environment). This patient experiences increased pain when stressed, which highlights the psychological and social aspects of pain. Additionally, the fact that they find relief through physical therapy (biological) and relaxation techniques (psychological) demonstrates the comprehensive approach of the biopsychosocial model in addressing and managing pain.

29.

A client complains of sharp lower back pain while walking. Which of the following statements regarding the erector spinae and the Deep Longitudinal Subsystem (DLS) is true?

The erector spinae is a component of the DLS, and the force transmission properties of these muscles can contribute to lower back pain during walking.

A suboptimal DLS is responsible for lower back pain during walking, while the erector spinae primarily assists in hip flexion during the gait cycle.

A suboptimal DLS is responsible for lower back pain during walking, while the erector spinae functions separately as a global muscle group.

The erector spinae is a component of the DLS, and the force reception properties of these muscles can contribute to lower back pain during walking.

Correct answer: The erector spinae is a component of the DLS, and the force transmission properties of these muscles can contribute to lower back pain during walking.

The DLS consists of muscles such as the erector spinae, biceps femoris, tibialis anterior, and fibularis longus. Its function is the transference of force, especially during normal gait (walking). The erector spinae helps support the trunk in an upright position throughout the gait cycle. Dysfunction can lead to muscle imbalances and pain.

The erector spinae is located along the posterior aspect of the trunk and inserts directly into the spine and ribs, making it unable to assist with hip flexion. Force reception is incorrect as it does not describe the transference of force between structures. The erector spinae is a part of the global muscular system; however, it does not function separately from the DLS. It functions with the DLS to assist with force transference during gait.

30.

A client has difficulty progressing in his dumbbell shoulder press. The Corrective Exercise Specialist performs a static postural analysis in order to further improve the client's training program.

Which of the following would be most likely to be observed in the shoulder and thoracic spine region?

Shoulders in front of the ears from a lateral viewpoint

Shoulders in line with the ears from a lateral viewpoint

External rotation of the elbow at rest

Shoulders slightly retracted

Correct answer: Shoulders in front of the ears from a lateral viewpoint

Ideal posture involves shoulders inline with the ears from a lateral viewpoint. Shoulders being in front of the ears would indicate a forward-rounded shoulder posture. Forward-rounded shoulders are a common postural deviation, often related to excessive tightness in the chest and anterior shoulder muscles. Limited thoracic spine extension can be associated with these rounded shoulders, which can restrict proper shoulder function and limit the ability to perform movements like the dumbbell shoulder press.

External rotation of the elbow at rest is not the correct body region to assess when observing the shoulder and thoracic spine region. Slightly retracted shoulders can potentially affect shoulder function. It is less common and less likely to be observed in the context of difficulty with an overhead dumbbell shoulder press.

31.

Which of the following scenarios best describes a force-couple relationship of the shoulder?

The trapezius and serratus anterior muscles work together to upwardly and downwardly rotate the scapula.

The deltoid and triceps brachii muscles work together to abduct and adduct the shoulder joint.

The infraspinatus and teres minor muscles work together to flex and extend the shoulder joint.

The pectoralis major and subscapularis muscles work together to rotate the shoulder joint.

Correct answer: The trapezius and serratus anterior muscles work together to upwardly and downwardly rotate the scapula.

The trapezius and serratus anterior muscles are responsible for the upward and downward rotation of the scapula, which is essential for proper shoulder movement and function. Together, the trapezius and serratus anterior work in coordination to create a force-couple relationship that allows for controlled movement of the scapula, which translates to smooth shoulder function.

While the deltoid is responsible for shoulder abduction and the triceps brachii play a role in arm extension at the elbow, they do not typically work together to move the shoulder joint.

The infraspinatus and teres minor muscles are primarily involved in the external rotation of the shoulder joint only. They do not, together, form an antagonistic pair that produces movement around the shoulder joint.

Both the pectoralis major and subscapularis both play a role in shoulder internal rotation. Similar to the above incorrect answers, they do not form an antagonistic pair that produces movement around the shoulder joint since they both perform the same function.

32.

A trainer is applying the Corrective Exercise Continuum to a long-term client who demonstrates forward shoulders with his overhead press. The athlete is instructed to stretch his pectoral muscles for two sets of 30 seconds.

Which of the following phases best describes this scenario?

Lengthen

Inhibit

Activate

Integrate

Correct answer: Lengthen

A pectoral stretch is a form of static stretching.

The Inhibit phase involves myofascial techniques. The Activate phase involves isolated strengthening. The Integrate phase involves dynamic movement.

33.

Fitness professionals are well-positioned to notice the nuances of movement and posture among their clientele. Which of the following training scenarios best describes static malalignments?

A client's pelvis is tilted forward when standing at rest.

A client experiences pain during high-intensity interval training (HIIT) workouts.

A client's right shoulder drops forward during a weighted squat exercise.

A client's knee rotates inward during the stance phase of gait.

Correct answer: A client's pelvis is tilted forward when standing at rest.

A forward-tilted pelvis when a client is at rest represents a static malalignment. These are deviations from ideal posture that are observed when standing still.

Pain during HIIT workouts does not specifically describe static malalignments. It may indicate dynamic issues rather than static posture problems. A shoulder drop during a weighted squat exercise and knee rotation during gait are dynamic issues and not representative of static malalignment.

34.

Which of the following muscles does not insert or originate on the pelvis?

Psoas major

Gluteus medius

Adductor magnus

Tensor fascia latae

Correct answer: Psoas major

The psoas major originates from the vertebral bodies of the lumbar spine (L1-L5) and inserts on the lesser trochanter of the femur. Since this muscle both originates and inserts on structures other than the pelvis, it is the only muscle of the options that does not insert or originate on the pelvis,

The gluteus medius originates on the outer surface of the ilium (the pelvic bone) and inserts on the greater trochanter of the femur. The adductor magnus originates from the pubis of the pelvis and the ischial tuberosity and inserts on the linea aspera of the femur. The tensor fascia latae originates from the iliac crest of the pelvis and inserts into the iliotibial band of the thigh.

35.

A fitness professional creates a tailored program to enhance the strength of the global muscular system. Which of the following statements regarding the global muscular system is true?

The global muscular system includes larger, powerful muscles used for major movements.

The global muscular system primarily consists of small, stabilizing muscles.

The global muscular system is responsible for fine motor movements and precise control.

The global muscular system is mainly involved in regulating heart and lung function.

Correct answer: The global muscular system includes larger, powerful muscles used for major movements.

The global muscular system consists of the larger muscles responsible for major movements of the body, such as walking, running, lifting, and other gross motor activities. Some of the major muscles include the rectus abdominus, obliques, hamstrings, glutes, and latissimus dorsi.

The global muscular system mainly comprises larger, powerful muscles responsible for major movements, not small stabilizing muscles. Fine motor movements and precise control are typically associated with the use of smaller, intrinsic muscles, not the global muscular system. The regulation of heart and lung function is primarily the role of the cardiovascular and respiratory systems, not the global muscular system.

36.

A Corrective Exercise Specialist creates a program that optimizes the force-couple relationship of a client's muscle imbalances. Which of the following options best describes this scenario?

The Corrective Exercise Specialist develops a program to improve the coordination of opposing muscle groups

The Corrective Exercise Specialist designs exercises to increase the gross muscle strength of the targeted body region

The Corrective Exercise Specialist performs special testing to get to the root cause of the client's pain

The Corrective Exercise Specialist designs a program to lengthen shortened muscle groups only in order to restore balance

Correct answer: The Corrective Exercise Specialist develops a program to improve the coordination of opposing muscle groups

Corrective Exercise Specialist focuses on optimizing the force-couple relationship, which involves improving the coordination between opposing muscle groups. This typically includes prescribing exercises and movements aimed at correcting imbalances and enhancing functional movement patterns.

A Corrective Exercise Specialist's approach is multifaceted and targeted, it is incorrect to solely focus on strengthening or increasing muscle length. Rather, each client case is unique and requires a personalized program. Special assessments to assess the root cause of pain are outside of the Corrective Exercise Specialist's scope and are only appropriate for licensed medical providers.

37.

Which of the following is the best example of an activity that targets the Anterior Oblique Subsystem (AOS)?

Kicking a soccer ball

Running on a treadmill

Performing barbell squats

Planking on the forearms

Correct answer: Kicking a soccer ball

Kicking a soccer ball involves a dynamic rotational motion that activates the AOS, particularly the anterior core muscles required for the kicking motion. It engages muscles such as the rectus abdominis and obliques, which are key components of the AOS.

Running on a treadmill is primarily a cardiovascular exercise and does not specifically target the Anterior Oblique Subsystem (AOS). It focuses on improving cardiovascular fitness by engaging the cardiovascular and lower extremity muscles.

Squats are excellent for strengthening the quadriceps and lower body, but they do not primarily target the AOS. Squats are more associated with the quadriceps, hamstrings, and glutes. They are primarily performed in the sagittal plane of motion, whereas the AOS primarily functions in the transverse plane of motion.

Planking exercises are beneficial for core stability but are not specific to the AOS. They involve the engagement of various core muscles, including the anterior and lateral core, but are not focused solely on the AOS or are involved in rotational movement.

38.

An injury to the spinous process in the cervical region would least likely affect which of the following muscles?

Latissimus dorsi

Transversospinalis

Spinalis

Rhomboids

Correct answer: Latissimus dorsi

The latissimus dorsi originates along the spinous processes of T7-T12, the iliac crest of the pelvis, and the thoracolumbar fascia. It inserts into the inferior angle of the scapula and intertubercular groove of the humerus. Since it does not insert or originate at any spinous process in the cervical region, this answer is correct.

The transversospinalis, spinalis, and rhomboid all either insert or originate at a spinous process within the cervical region of the body.

39.

Which of the following scenarios best describes how the sensory system, afferent, and efferent neurons produce a complex movement pattern?

As a person touches a hot stove, sensory receptors in their hand send signals to the brain through afferent neurons, resulting in the withdrawal of the hand (efferent response) to avoid injury.

The central nervous system generates a motor pattern independently of sensory input, resulting in a coordinated movement.

Sensory receptors in the eyes transmit information to the muscles, causing them to contract and produce a movement pattern.

An athlete executes a complex movement pattern after several weeks of focused practice.

Correct answer: As a person touches a hot stove, sensory receptors in their hand send signals to the brain through afferent neurons, resulting in the withdrawal of the hand (efferent response) to avoid injury.

This scenario accurately describes the process of sensory input (touching a hot stove), signal transmission through afferent neurons to the brain, and the efferent response (withdrawal of the hand) as a protective mechanism.

Sensory information is essential for a coordinated movement pattern. Therefore, the central nervous system does not generate patterns independently.

The sensory system in the eyes primarily relates to vision, and while it can influence muscle contractions (e.g., tracking objects with the eyes), it does not represent a comprehensive movement pattern. This scenario implies an automatic, reflexive response but does not specify the sensory input or the generation of a complex movement pattern.

The athlete practicing for several weeks and executing a movement pattern is an example of motor learning.

40.

An athlete performs a seated resisted marching exercise prior to their sprinting workout. He brings his knees as high as he can against a band for 3 sets of 30 seconds. Which of the following of the Corrective Exercise Continuum would best describe this technique?

Activate

Lengthen

Inhibit

Integrate

Correct answer: Activate

A sprinter must use their hip flexors in an explosive and powerful way during a sprint. Performing a resisted hip flexor exercise in a seated position is a way to fully isolate that muscle group and strengthen it in a targeted way.

Inhibitory techniques would involve myofascial release such as foam rolling. Lengthening techniques increase the range of motion through activities such as stretching. Integration techniques involve functionally progressive dynamic movements.

41.

A fitness professional notices a movement impairment while observing their client perform a seated shoulder press. Which of the following observations is most likely?

The client arches their back excessively during the lift.

The client's knees are slightly bent during the exercise.

The client performs the exercise with a neutral spine and controlled breathing.

The client has difficulty completing the final repetition.

Correct answer: The client arches their back excessively during the lift.

A movement impairment is defined as a state in which the structural integrity of the human movement system is compromised because the components are out of alignment, causing the body to make compensations that put the client at a higher risk of injury. Excessive arching of the back during a seated shoulder press can be a common movement impairment. It may indicate poor core stability and can increase the risk of lower back strain or injury.

Bent knees, if not excessive, might not significantly affect the exercise. A neutral spine and controlled breathing are positive and indicate that the client is using proper form and technique. It is unlikely to be the "most likely" cause of a movement impairment. Exhibiting difficulty during the final repetition does not give enough information to determine if a movement impairment is present.

42.

A weighted front raise exercise involves a movement known as shoulder flexion. Which of the following muscles does not flex the shoulder?

Pectoralis minor

Anterior deltoid

Pectoralis major

Biceps brachii

Correct answer: Pectoralis minor

The pectoralis minor is primarily responsible for protracting the scapula, eccentrically retracting the scapula, and stabilizing the shoulder girdle. It is not involved in shoulder flexion.

The anterior deltoid initiates shoulder flexion motion, while the pectoralis major and long head of the biceps brachii contribute by flexing the shoulder, enabling various degrees of movement in the shoulder joint.

43.

A fitness professional prescribes an exercise program to address the altered reciprocal inhibition of their client's posture. The client presents with a rounded upper back and spends most of their day sitting at a computer.

Which of the following options would you most likely see in their exercise program?

Focus on strengthening the muscles of the mid and upper back

Emphasis on strengthening the chest and shoulder muscles

Exercises targeting the hip flexors and quadriceps

Stretching and mobility work for the lower back

Correct answer: Focus on strengthening the muscles of the mid and upper back

When a client presents with a rounded upper back, it's often associated with a posture-related issue, such as excessive tightness in the chest and shoulder muscles and weakness in the mid and upper back muscles. Altered reciprocal inhibition refers to the process where tight or overactive muscles inhibit the function of opposing, weaker muscles. In this scenario, addressing the rounded upper back would typically involve exercises that focus on strengthening the mid and upper back.

Emphasizing chest and shoulder muscle strengthening would exacerbate the issue by further tightening the overactive muscles. Targeting hip flexors and quadriceps is not directly related to addressing a rounded upper back. Stretching and mobility work for the lower back does not specifically target the primary issue of a rounded upper back and altered reciprocal inhibition.

44.

A client recently suffered an injury to the axillary nerve. Which of the following exercises would you expect the client to have the least amount of difficulty performing?

Bench press

Overhead shoulder press

Upright rows

Dumbbell lateral raises

Correct answer: Bench press

The bench press primarily targets the pectoral (chest) muscles and triceps. Though the deltoids may be affected by an injury to the axillary nerve, the pectoral muscles and triceps would likely be able to assist with this exercise and be the least difficult given the other scenarios. The pectoral muscles are innervated by the pectoral nerves, and the triceps are innervated by the radial nerves.

Dumbbell lateral raises, overhead shoulder presses, and upright rows directly target the deltoid muscles, which are innervated by the axillary nerve. An injury to the axillary nerve could significantly affect the client's ability to perform these exercises. Since the deltoid is typically the prime mover for these movements, we expect the client to have the greatest difficulty with these exercises.

45.

A client is instructed to lift his toes off of the ground and toward his midline while keeping the heel on the floor. Which of the following best categorizes the innervation of this muscle and insertion?

Innervation: Peroneal nerve; Insertion: Medial cuneiform

Innervation: Tibial nerve; Insertion: Lateral calcaneus

Innervation: Femoral nerve; Insertion: Patella

Innervation: Radial nerve; Insertion: Medial ulna

Correct answer: Innervation: Peroneal nerve; Insertion: Medial cuneiform

The anterior tibialis muscle performs the described action: dorsiflexion and inversion. It is innervated by the deep fibular (more commonly known as the peroneal nerve) and inserts into the medial and plantar aspects of the medial cuneiform and the base of the first metatarsal.

The tibial nerve is located more proximally than the peroneal nerve and does not innervate the anterior tibialis muscle. The femoral nerve innervates the anterior aspect of the thigh, which includes muscle groups such as the quadriceps. The radial nerve is in the dorsal side of your arm and innervates muscle groups such as the triceps.

46.

Which of the following statements best describes the primary objective of a Corrective Exercise Specialist?

Optimize movement quality

Decrease injury resistance

Improve strength

Enhance confidence

Correct answer: Optimize movement quality

The primary objective of the Corrective Exercise Specialist is to optimize the quality of movement. Overall, this enhances performance, results, injury resistance, movement efficiency, and recovery.

Improving strength and confidence are likely goals of every trainer, but are not specific to the Corrective Exercise Specialist.

47.

A client complains of pain in the upper extremity from performing a rowing motion and is referred back to their physical therapist before continuing with their exercise program. Which of the following muscles would you least likely expect to be affected by this injury?

Deltoid

Brachioradialis

Brachialis

Latissimus dorsi

Correct answer: Deltoid

The medial deltoid is a large muscle with fibers assisting in shoulder abduction. A rowing motion involves elbow flexion and shoulder extension, which is accomplished by the other answers listed.

The brachioradialis and brachialis muscles are primarily involved in elbow flexion. The latissimus dorsi is a powerful muscle involved in shoulder extension as well as shoulder internal rotation. Shoulder extension is a primary movement for a rowing exercise.

48.

Which of the following statements regarding the physical properties of muscles is false?

Muscles cannot simultaneously function as both agonists and antagonists in the same movement.

Muscles can act as agonists, antagonists, and synergists.

Agonist muscles are primarily responsible for initiating and carrying out a specific movement.

Muscles that act as synergists perform the same action as the agonist.

Correct answer: Muscles cannot simultaneously function as both agonists and antagonists in the same movement.

Muscles can function as both agonists and antagonists, but this depends on the specific phase of the movement. For example, in a bicep curl, the biceps are the agonist during elbow flexion, while the triceps act as antagonists. However, in the extension phase of the same movement, the roles reverse, with the triceps becoming the agonists and the biceps the antagonists. Muscles often switch roles throughout different phases of a movement to maintain control and balance.

While agonist muscles perform the primary movement, synergists assist in the same motion but are not the primary mover.

49.

A client trips over a misplaced dumbbell and immediately catches himself by grabbing a nearby handhold. Which of the following statements regarding this scenario about sensory information is true?

The sensation of tripping was received by an afferent neuron and transferred for reflexive motor behavior.

The sensation of tripping was received by an afferent neuron and transferred to higher cortical areas for processing.

The sensation of tripping was received by an efferent neuron and transferred for reflexive motor behavior.

The sensation of tripping was received by an efferent neuron and transferred to higher cortical areas for processing.

Correct answer: The sensation of tripping was received by an afferent neuron and transferred for reflexive motor behavior.

This scenario explains the process that occurs when sensory information (the sensation of tripping) is transmitted through the nervous system (afferent neuron) to produce an immediate, instinctive motor response (reflexive motor behavior) to prevent a fall or injury.

Efferent neurons, in contrast, are responsible for a motor response, not sensory integration.

The sensory information does not get transferred to higher cortical areas in this scenario. The sensory input typically bypasses higher cortical areas and, instead, goes through the afferent neurons to reach the spinal cord or lower brain regions that can initiate quick motor responses to maintain balance and prevent a fall. This is because relying on higher cortical processing would be too slow to avoid an immediate accident.

50.

Throughout the human body, when muscles work together to produce a coordinated movement, they create force-couples. These force-couples are essential for the stability and efficient functioning of joints.

Which of the following best exemplifies a force-couple relationship?

The biceps and triceps work together to flex and extend the elbow joint

The quadriceps and hamstrings work together to stabilize the ankle

The deltoid and pectoralis major muscles work together to flex the shoulder joint

The gastrocnemius and soleus muscles work together to flex the ankle joint

Correct answer: The biceps and triceps work together to flex and extend the elbow joint

The biceps and triceps are antagonistic muscle groups that work together to create coordinated movement at the elbow joint. When the biceps contract, the elbow flexes, and when the triceps contract, the elbow extends.

The quadriceps and hamstrings are an antagonistic muscle pair that work together to move and stabilize the knee, not the ankle joint. While the deltoid and pectoralis major are involved in moving the shoulder joint, they don't typically work as an antagonistic pair that creates a coordinated force-couple relationship. The gastrocnemius and soleus muscles are both plantarflexors of the ankle. In order for it to be an antagonistic pair, this answer would need to include a dorsiflexor.

51.

How can a Corrective Exercise Specialist help avoid movement impairments as it relates to their fitness clientele?

By providing tailored exercise programs that address individual movement limitations and imbalances

By encouraging clients to engage in high-intensity workouts to build strength and confidence

By assessing the origin of their pain and dysfunction and creating programs to address it

A Corrective Exercise Specialist is not qualified to assess movement impairments

Correct answer: By providing tailored exercise programs that address individual movement limitations and imbalances

Corrective Exercise Specialists specialize in identifying and addressing movement limitations and imbalances in their clients. By creating customized exercise programs, they can help clients improve their movement patterns and avoid impairments.

Encouraging high-intensity workouts alone may not be the best approach to avoid movement impairments. It's essential to consider individual limitations and imbalances. It is out of scope for a corrective exercise specialist to attempt to diagnose or treat pain. It is the responsibility of the Corrective Exercise Specialist to refer to the appropriate provider if there is a presence of pain or any medical condition.

52.

A client is instructed by a fitness professional to concentrically flex his foot up toward the ceiling and then inward towards the midline. Which of the following is the muscle being targeted by this exercise?

Anterior tibialis

Gastrocnemius

Posterior tibialis

Peroneus longus

Correct answer: Anterior tibialis

The tibialis anterior is located on the front of the shin and is responsible for dorsiflexion (lifting the foot up) and inversion (moving the foot inward toward the midline).

The gastrocnemius is a calf muscle responsible for plantar flexion (pointing the foot down), not dorsiflexion (lifting the foot up), which is the primary action of the exercise described. The posterior tibialis concentrically is responsible for ankle plantarflexion and inversion of the foot. The peroneus longus muscle is responsible for eversion (moving the foot outward), not dorsiflexion or inversion.

53.

Which of the following exercises targets the posterior oblique subsystem and stabilizes the SIJ through forced closure?

Step up to contralateral single-arm row

Step up to ipsilateral single-arm row

Squat to bicep curl

Squat to overhead press

Correct answer: Step up to contralateral single-arm row

Forced closure of the SIJ occurs through the co-contraction of the contralateral gluteus maximum and latissimus dorsi. In a step-up, a contralateral single-arm row would activate the contralateral latissimus dorsi, making this answer correct.

A squat exercise does activate the gluteal muscle group; however, a bicep curl or a shoulder press does not activate the latissimus dorsi for forced-closure.

54.

A Corrective Exercise Specialist assesses a client's static posture and notices a postural deviation upon inspection of the feet and ankles. Which of the following is the fitness professional most likely to see?

Outward rotation of the feet

Neutral arch of the foot

Inability to perform a heel raise

Poor single-leg balance

Correct answer: Outward rotation of the feet

An assessment of static posture refers to an instance where the client is standing still with both feet parallel, about hip-to-shoulder width apart. The arch in ideal posture should be neutral with both feet pointing forward. Therefore, the outward rotation of the feet is the most likely postural deviation in this scenario.

Both heel raises and single-leg balance are dynamic assessments and are not relevant in a static posture analysis.

55.

What is the primary difference between structural and functional efficiency as it relates to the human movement system?

Structural efficiency refers to the body's alignment and posture, while functional efficiency concerns the body's ability to perform specific movements effectively.

Structural efficiency focuses on the appearance and aesthetics of the body, while functional efficiency emphasizes the body's ability to maintain stability during movement.

Structural efficiency is about the body's capacity for endurance, while functional efficiency is related to the body's strength and power.

Structural efficiency relates to the body's anatomical alignment, while functional efficiency is about the body's ability to adapt to different environments.

Correct answer: Structural efficiency refers to the body's alignment and posture, while functional efficiency concerns the body's ability to perform specific movements effectively.

Structural efficiency is about how the body is built in terms of its anatomical structure, alignment, and shape. In contrast, functional efficiency pertains to how effectively the body can perform various movements and tasks.

While aesthetics may be a part of structural considerations, it's not the main focus. Functional efficiency goes beyond stability to include the effectiveness of all movements. Endurance and strength are specific aspects of functional efficiency, and structural efficiency is broader, focusing on anatomical alignment. Functional efficiency relates to movement effectiveness, not adaptability to environments.

56.

A client has recently recovered from a tibial nerve injury and has just been cleared by her physical therapist to start working with the Corrective Exercise Specialist. Which of the following exercises would you most likely expect this client to have difficulty with?

Seated calf raises

Squats

Bicep curls

Seated rows

Correct answer: Seated calf raises

Seated calf raises primarily target the calf muscles and involve plantar flexion of the ankle. The muscles involved would include the soleus and gastrocnemius, which are both innervated by the tibial nerve. Since seated calf raises specifically involve the ankle's plantar flexion, we would expect the client to have the greatest difficulty with this movement.

The other exercises are less focused on the ankle's range of motion and so are less likely to be affected by an individual with a tibial nerve injury.

57.

A client reports that after a recent car accident, they have difficulty externally rotating their leg. Which of the following muscles is least likely affected by this injury?

Tensor fascia latae

Gluteus maximus

Piriformis

Gluteus medius posterior

Correct answer: Tensor fascia latae

The tensor fascia latae (TFL) is correct because it primarily functions as a hip flexor, abductor, and internal rotator, but it has little to no role in hip external rotation.

The gluteus maximus is a major muscle in the buttocks responsible for hip extension and external rotation. The piriformis is a small muscle deep in the buttocks that plays a significant role in external rotation of the hip. The gluteus medius posterior fibers is one of the external rotator muscles of the hip and contributes to the ability to externally rotate the leg.

58.

The current research on the existence of titin in sarcomeres may begin to explain which of the following strength training scenarios?

An athlete is able to eccentricly control more load than they can concentrically.

A client's flexibility and joint mobility improve after a structured mobility program.

Marathon runners focus on long, slow-distance training to improve muscular endurance.

Nutrition plays a major role in muscle recovery after strength training.

Correct answer: An athlete is able to eccentricly control more load than they can concentrically.

The leading hypotheses for the existence of titin include mechanisms that explain how the sarcomere filaments perform lengthening contractions that do not require cross bridges for optimal force to occur. In this example, eccentric contractions occur while a muscle is lengthening.

Flexibility and mobility are not directly related to the role of titin in sarcomeres and its impact on strength training. Titin primarily plays a role in muscle contraction and is not directly linked to flexibility and joint mobility. Marathon running training primarily focuses on endurance and cardiovascular fitness, which isn't influenced by titin. Nutrition plays a crucial role in muscle recovery, but it's not directly connected to the current research on titin.

59.

A client's movement patterns are being assessed during the first session with a Corrective Exercise Specialist. The Human Movement System is composed of three essential systems to produce appropriate movement patterns.

Which of the following is not a component of the Human Movement System?

The circulatory system

The skeletal system

The nervous system

The muscular system

Correct answer: The circulatory system

The three components of the Human Movement System are as follows:

- *The Skeletal System*
- *The Nervous System*
- *The Muscular System*

While the circulatory system is essential for optimal movement and blood flow, it is not a component that Corrective Exercise Specialists analyze in optimizing movement patterns.

60.

A Corrective Exercise Specialist creates a dynamic and functional exercise program for a new client. Which of the following statements best describes why functional training programs are not focused on a single, fixed pattern of motion?

In functional training, muscles must react to external stimuli such as gravity, momentum, ground reaction forces, and other muscles.

Functional training keeps clients engaged and motivated through a variety in exercise routines.

Functional training emphasizes consistency in exercise routines to achieve specific results.

Functional training prioritizes fixed patterns of motion to build muscle memory.

Correct answer: In functional training, muscles must react to external stimuli such as gravity, momentum, ground reaction forces, and other muscles.

Functional training focuses on the natural movement patterns of the human body, emphasizing integration and multidimensionality within workouts. It avoids fixating on a single, rigid plane of motion or isolating specific body parts. Muscles can play different roles based on the direction of resistance, body position, and movement pattern being performed.

Functional training can help keep clients engaged and consistent, and help build muscle memory. However, these options do not fully explain why the programs are not focused on a single fixed pattern of motion.

61.

A fitness professional is constantly assessing the state of their clients in order to keep them safe and injury-free. Which of the following observations is the best example of a dynamic misalignment?

During a squat, a client's knees tend to move inward, but they correct it after receiving feedback.

A client demonstrates mild genetic curvature in their spine.

A client's hip mobility limitations have improved significantly after a series of stretching exercises.

A client exhibits a permanent forward head posture after years of working a desk job.

Correct answer: During a squat, a client's knees tend to move inward, but they correct it after receiving feedback.

Dynamic misalignment refers to deviations in posture or movement that occur during exercise or physical activities. In this scenario, the client's knees moving inward during a squat is a dynamic misalignment because it represents a temporary or exercise-specific misalignment. The fact that the client can correct it after receiving feedback demonstrates that it's not a permanent structural issue but, rather, a movement pattern that can be improved.

Genetic curvature of the spine is a static or structural alignment issue that has remained consistent over time and is not a dynamic misalignment. The improvement of hip mobility is positive improvement, but doesn't directly relate to a dynamic misalignment. It focuses on the improvement of hip mobility, rather than the observation of a temporary misalignment during movement. Forward head posture is a static alignment issue, not a dynamic misalignment.

62.

Which of the following is not a reason why the Corrective Exercise Specialist should assess the body utilizing the kinetic chain checkpoints as recommended by NASM?

To help clients achieve their ideal body composition

To identify potential movement compensations and muscle imbalances

To maintain consistency from one assessment session to the next

To enhance the client's overall movement quality and prevent injury

Correct answer: To help clients achieve their ideal body composition

While aesthetics and body composition are essential in the fitness industry, the primary focus of Corrective Exercise Specialists is to address functional movement and reduce the risk of injury, not aesthetics.

Assessing the body through kinetic chain checkpoints is fundamental for designing effective corrective exercise programs. It helps in identifying areas that need attention and developing a targeted plan to correct imbalances and improve the quality of movement. Additionally, it establishes a system that achieves consistency from each session to the next to ensure nothing is overlooked.

63.

Which of the following types of workouts would best describe the utilization of muscle synergies?

A push-type workout

High-intensity interval training (HIIT)

Core exercises

Cardiovascular exercise

Correct answer: A push-type workout

Muscle synergies simplify movements by allowing muscles to operate as a functional unit for a specific movement. A push-type workout typically involves exercises that emphasize pushing movements, such as bench presses, chest presses, or tricep extensions. These exercises require the coordination of multiple muscle groups to execute pushing motions. Therefore, a push-type workout best describes the utilization of muscle synergies.

HIIT is a form of cardiovascular exercise that involves short bursts of intense activity followed by short periods of rest. It often incorporates a variety of exercises that engage multiple muscle groups simultaneously. While HIIT does require muscle groups to work together, it may not consistently focus on the coordinated utilization of muscle synergies.

Core training primarily targets the muscles in the abdominal and lower back regions, aiming to strengthen the core muscles. While it is essential for stability and posture, core training is more specific to these muscle groups and does not necessarily emphasize the coordinated utilization of muscle synergies for a coordinated movement.

Cardiovascular exercises, like running, swimming, or cycling, focus on improving cardiovascular health and endurance. These activities do engage various muscle groups to sustain physical activity but do not emphasize the same level of coordinated muscle synergies as a push-type workout.

64.

A client performs a heavy barbell squat with his trainer. During the concentric phase of the squat, which of the following best describes the main antagonist and agonist muscle groups of the legs?

Agonist: Quadriceps; Antagonist: Hamstrings

Agonist: Hamstrings; Antagonist: Calves

Agonist: Glutes; Antagonist: Quadriceps

Agonist: Calves; Antagonist: Glutes

Correct answer: Agonist: Quadriceps; Antagonist: Hamstrings

In this question, the agonist muscles are the quadriceps, which are responsible for extending the knee and providing the main force during the concentric phase of a squat. Antagonist muscle groups act in the opposite direction of the agonist. The hamstrings act to flex the knee and counteract the action of the quadriceps. As the quadriceps contract, the hamstrings must relax to allow the joint to move and the client to stand up fully.

The calves are responsible for ankle plantar flexion and are not involved in the concentric phase of the squat. The glutes are agonists in a squat as they work to move the hips into extension. However, the quadriceps are not the antagonist in the concentric phase of a squat.

65.

The Corrective Exercise Specialist instructs their client to "press the ground away" as they perform a heavy deadlift. This is an example of which of the following types of feedback?

External feedback

Internal feedback

Sensory feedback

Proprioceptive feedback

Correct answer: External feedback

External feedback is information provided by an external source, such as a coach or trainer, to guide an individual's performance during an activity. In this case, the Corrective Exercise Specialist gives verbal feedback to the client.

Internal, also known as sensory feedback, is the process by which sensory information is used by the body to monitor movement and the environment. Examples include heart rate monitors, perceived effort, and general muscular sensations.

Proprioceptive feedback is considered a type of internal feedback.

66.

A fitness professional incorporates exercises to target the Deep Longitudinal Subsystem (DLS) of a new client. Which of the following statements regarding this system is true?

The DLS plays a key role in reciprocal force transmission from the trunk to the ground.

The DLS primarily consists of superficial, short muscles.

The DLS is responsible for lateral (side-to-side) movements of the body.

The DLS is composed of muscles such as the latissimus dorsi and gluteus maximus.

Correct answer: The DLS plays a key role in reciprocal force transmission from the trunk to the ground.

The Deep Longitudinal Subsystem (DLS) indeed plays a significant role in transmitting forces between the trunk and the ground, contributing to stability and efficient movement.

The Deep Longitudinal Subsystem (DLS) is characterized by deeper, longer muscles that run along the length of the body to provide stability and support. Lateral movements are typically associated with other muscular subsystems, such as the Lateral Subsystem. The DLS is more focused on maintaining stability in the sagittal plane (front-to-back movements). The latissimus dorsi and gluteus maximus are affiliated with the posterior oblique subsystem, not the DLS.

67.

It has been proposed that muscles can be categorized into two distinct systems that enable our bodies to maintain proper stabilization and distribution of forces. Which of the following options would be the best example of a local muscular system?

Multifidus

Latissimus dorsi

Gluteus maximus

Hamstrings

Correct answer: Multifidus

Local muscular systems are defined as muscles that are located centrally to the spine to provide intersegmental stability or support from vertebrae to vertebrae. The multifidus muscle group inserts directly into the spinous processes of the vertebrae; therefore, it would be considered a local muscular system.

In contrast, global muscular systems are more superficial and are responsible for generating forces for movement. These include the latissimus dorsi, glutes, and hamstrings.

68.

A Corrective Exercise Specialist aims to give their client Knowledge of Results after they finish performing a difficult exercise. Which of the following options would be the best example of Knowledge of Results in this scenario?

The Corrective Exercise Specialist informs the client that they performed the lift well.

The Corrective Exercise Specialist demonstrates the correct form for the exercise and asks the client to replicate it during the next session.

The Corrective Exercise Specialist discusses the history and origins of the exercise, providing context but not specific feedback on the client's performance.

The Corrective Exercise Specialist shares a detailed breakdown of the client's posture, highlighting areas of improvement.

Correct answer: The Corrective Exercise Specialist informs the client that they performed the lift well.

In this case, the Corrective Exercise Specialist is providing feedback to the client about the result of the exercise, specifically acknowledging that they performed the lift well. This feedback offers information about the outcome of the exercise, which is a key aspect of Knowledge of Results. It helps the client understand how they are doing and can be motivational and instructional.

While demonstrating the correct form is a form of feedback and can be valuable for the client's learning, it's not a direct example of Knowledge of Results. It typically involves feedback provided after the exercise is completed, such as information on performance metrics or outcomes. Explaining the origins of the exercise provides historical information about the exercise but does not give feedback on the client's performance. A detailed breakdown of posture and suggesting areas of improvement is more in line with Knowledge of Performance, where the feedback is more focused on the quality of the movement.

69.

A client performs a chest press with the supervision of a trainer. The trainer gives the client feedback after the set is completed. Which of the following would be the best example of Knowledge of Performance in this scenario?

The trainer tells the client that their elbows were positioned too wide during the set

The trainer tells the client how much weight they lifted during the chest press set

The trainer informs the client of the number of sets and repetitions they completed

The trainer discusses the client's dietary habits and nutritional choices before the chest press

Correct answer: The trainer tells the client that their elbows were positioned too wide during the set

Knowledge of Performance involves feedback regarding the execution, form, and technique of an exercise or movement. The trainer informs the client about their elbow positioning to improve the quality of the exercise.

Telling the client how much weight they lifted or the number of sets and repetitions completed is related to the client's knowledge of results. Knowledge of Performance typically focuses on the quality and technique of movement.

Discussing dietary habits and nutritional choices is not related to the client's chest press performance or Knowledge of Performance but may be important for other aspects of the client's fitness and health.

70.

Dysfunction of which of the following structures would most likely lead to SIJ instability and lower back pain with functional movement?

Intrinsic core stabilizers

Rectus abdominus

Fascia

Obliques

Correct answer: Intrinsic core stabilizers

The intrinsic core stabilizers are a group of muscles and connective tissues in the core region of the body that includes muscles like the transverse abdominis, multifidus, and the pelvic floor. These muscles play a crucial role in stabilizing the spine and pelvis during functional movements, such as walking, lifting, and bending.

The rectus abdominus plays a role in trunk flexion and is involved in maintaining posture and providing some support to the spine. While it does contribute to core stability to some extent, it is not a primary muscle responsible for the stability and support of the sacroiliac joint (SIJ).

Fascia plays a significant role in maintaining structural integrity and aiding in the transmission of forces throughout the body. However, in the context of the question about SIJ instability and lower back pain with functional movement, the term "fascia" is too broad and nonspecific.

The oblique muscles play an important role in core stability and trunk rotation. However, in the context of SIJ instability and lower back pain during functional movement, the obliques are not the primary muscles responsible for these issues.

71.

A client performs a deadlift exercise during their session. Which of the following correctly describes the synergist and agonist of this movement pattern?

Agonist: Gluteus maximus; Synergist: Hamstrings

Agonist: Erector spinae; Synergist: Gluteus maximus

Agonist: Gluteus maximus; Synergist: Quadriceps

Agonist: Biceps brachii; Synergist: Deltoids

Correct answer: Agonist: Gluteus maximus; Synergist: Hamstrings

Muscles categorized as a synergist assist the agonist but are not the primary source of force production. In a deadlift exercise, the primary movement is hip extension. The gluteus maximus is the primary agonist and the hamstrings act as synergists for hip extension.

The biceps brachii and deltoids are upper extremity muscles, not muscles primarily engaged in a deadlift. Similarly, the pectoralis major and latissimus dorsi are not directly involved in this movement. In a deadlift, the focus is on the muscles of the lower back, hips, and legs rather than the arms and shoulders.

The erector spinae's primary movement is the extension of the lower back. In a deadlift, the lower body musculature such as the glutes and hamstrings are the primary focus. Therefore, the erector spinae would not be the agonist in this movement.

72.

A Corrective Exercise Specialist instructs their client to foam roll the anterior thigh in order to prep for the workout. Which of the following muscles would not be affected by this activity?

Semitendinosus

Vastus lateralis

Rectus femoris

Sartorius

Correct answer: Semitendinosus

The semitendinosus, also known as a part of the hamstrings, originates and inserts on the posterior aspect of the femur. Foam rolling the anterior thigh would not have a significant impact on this muscle group.

Both the vastus lateralis and rectus femoris are part of the quadriceps muscle group, situated on the anterior thigh. The sartorius originates on the anterior aspect of the pelvis, inserts into the medial surface of the tibia, and travels across the front aspect of the thigh. This foam rolling activity will affect the sartorius due to its location on the anterior surface of the body.

73.

If a client suffers from an injury to the intercostal nerve groups. Which of the following exercises would you most likely expect them to have difficulty with?

Leg raises and planks

Squats and deadlifts

Bench presses and push-ups

Recumbent bike

Correct answer: Leg raises and planks

The intercostal nerves play a role in maintaining abdominal muscle function. An injury to these nerves may affect the client's ability to perform exercises that target the abdominal muscles, such as leg raises and planks, due to their involvement in stabilizing and controlling the core.

Squats and deadlifts primarily target the lower body, including the leg muscles, and are not directly related to the intercostal nerves or abdominal muscles. While core stability may be impaired with this type of injury, it is not the most likely answer. Bench presses and push-ups are upper-body exercises that primarily focus on the chest and triceps muscles.

A recumbent bike involves the client being in a seated position that is supportive enough for someone with this type of injury to complete. Additionally, a recumbent bike mainly focuses on the lower extremities which would not be affected by this injury.

74.

Which of the following scenarios is the best example of motor development as it relates to the concept of motor behavior?

A child learns to ride a bicycle by practicing and improving their balance and control over time

An athlete successfully executes a complex gymnastics routine on his first attempt

A professional musician plays a challenging piece of music with great precision and skill

A person responds to a sudden, unexpected stimulus with a quick and coordinated reflex action

Correct answer: A child learns to ride a bicycle by practicing and improving their balance and control over time

Motor development is defined as the cumulative change in motor behavior over time throughout the entire life span. This scenario best exemplifies motor development as it shows how an individual, in this case, a child, acquires and refines a motor skill (riding a bicycle) through practice and experience over time. It reflects the developmental aspect of motor behavior.

The gymnastics scenario reflects motor control, focusing on executing a specific skill, but it doesn't emphasize the developmental aspect. The musician demonstrates motor learning and skill execution, but it doesn't specifically address the process of motor development. The sudden response illustrates a reflex action which is not primarily related to motor development. Reflexes are typically innate and not learned or developed over time.

75.

A trainer observes a client perform a forward lunge and notices a significant movement compensation with the front knee. Which of the following options would the trainer be most likely to observe?

The client's front knee moves medially during the eccentric phase of the lunge

The client maintains a strong and stable core throughout the lunge

The client's rear foot is firmly planted on the ground without any movement

The client's arms swing freely at their sides during the lunge

Correct answer: The client's front knee moves medially during the eccentric phase of the lunge

A movement compensation is defined as a suboptimal movement pattern in response to kinetic chain dysfunction. Commonly in a lunge, the front knee may cave inward, or medially, if there is the presence of glute or quad weakness.

While maintaining a strong and stable core is important in various exercises, it is not related to the specific compensation issue mentioned in the scenario. Having the rear foot firmly planted is a part of proper lunge technique and is not a compensation. The movement of the arms during a lunge is less relevant to the specific compensation mentioned in the scenario.

76.

Which of the following is not a concentric action of the gluteus minimus?

Hip external rotation

Hip abduction

Hip flexion

Hip internal rotation

Correct answer: Hip external rotation

The gluteus minimus is responsible for the following concentric actions: Hip abduction, flexion, and internal rotation.

Eccentrically, the gluteus minimus decelerates hip adduction, extension, and external rotation. This question concerns the concentric action of this muscle, not eccentric, making hip external rotation incorrect.

77.

Which of the following statements regarding sensory information is true?

Sensory information facilitates relearning existing movement patterns.

Sensory information only affects involuntary reflexes and not deliberate movements.

Sensory information is irrelevant to motor learning and movement patterns.

Sensory information only applies to new, unfamiliar movements.

Correct answer: Sensory information facilitates relearning existing movement patterns.

Sensory information applies to both new and existing movement patterns, and helps individuals refine and improve existing movement patterns, enhancing motor learning and control. Sensory information is essentially the data that our central nervous system receives in order to learn more about our environment and help modify behavior using adjustments ranging from simple reflexes to intricate movement patterns.

78.

Which of the following scenarios best describes reciprocal inhibition of muscle groups?

During a bicep curl exercise, the bicep muscle contracts while the tricep muscle relaxes to allow flexion of the elbow.

During a plank exercise, both the abdominal muscles and back muscles contract simultaneously to maintain a stable core.

While running, the quadriceps contract to extend the knee, and the hamstrings contract to flex the hip.

In a seated position, the hip flexor muscles contract to lift the leg, and the gluteal muscles contract to maintain balance.

Correct answer: During a bicep curl exercise, the bicep muscle contracts while the tricep muscle relaxes to allow flexion of the elbow.

Reciprocal inhibition is a neuromuscular interaction where, when one muscle group contracts (the agonist), the opposing muscle group (the antagonist) relaxes to allow for smooth and coordinated movement. In this scenario, when you perform a bicep curl, your bicep muscle (agonist) contracts to flex the elbow, and to allow this movement, the tricep muscle (antagonist) needs to relax. This reciprocal inhibition ensures that the muscles work together effectively, preventing resistance from the opposing muscle group to complete the movement.

In a plank exercise, both the abdominal muscles and back muscles work together to stabilize the core and maintain the body's position. Reciprocal inhibition typically involves the relaxation of the antagonist muscle to allow the agonist muscle to contract.

When running, the quadriceps and hamstrings work together and contract simultaneously. Either is not relaxed to allow each other to contract more effectively.

To lift the leg when seated, both the hip flexor and gluteal muscles are contracted simultaneously to perform their respective functions. There is no reciprocal inhibition happening because both muscle groups are not relaxing to allow the other to contract more efficiently.

79.

Which of the following options does not use mechanoreceptors to collect information about proprioception?

Blood

Fascia

Muscles

Tendons

Correct answer: Blood

Blood itself does not have mechanoreceptors. However, the blood vessels, such as arteries and veins, contain stretch-sensitive receptors that can detect changes in blood pressure and vessel distension.

Muscles, tendons, and fascia all contain mechanoreceptors that provide information about static and dynamic positions, movements, and sensations related to movement.

80.

A Corrective Exercise Specialist notices an instance of relative flexibility while observing a client with a latissimus dorsi restriction performing an overhead press. Which of the following statements would best describe this scenario?

The client demonstrates an overly arched lower back in order to fully extend the weight overhead.

The client's latissimus dorsi restriction has no impact on their ability to perform the overhead press.

The client demonstrates knee valgus throughout the exercise.

The client demonstrates excessive shoulder flexion overhead.

Correct answer: The client demonstrates an overly arched lower back in order to fully extend the weight overhead.

A latissimus dorsi restriction would limit shoulder flexion range of motion. With relative flexibility, the body will find another path to achieve the task. In this scenario, the client must move a weight overhead. However, with a restriction in shoulder flexion, clients will commonly compensate by overly arching the lower back to push the weight higher overhead.

Knee valgus is a movement impairment resultant of muscle imbalances, but is not relevant in this scenario as it relates to the shoulder. Excessive shoulder flexion is incorrect because a latissimus dorsi restriction would limit the amount of shoulder flexion range of motion.

81.

Which of the following muscles does not function to move the knee joint?

Adductor longus

Sartorius

Rectus femoris

Semimembranosus

Correct answer: Adductor longus

The adductor longus' primary function is to flex the hip joint, bringing the thigh forward, inward, and in internal rotation. However, its primary action is at the hip, not the knee.

The sartorius functions to flex the hip joint, bringing the thigh forward, and it also assists in flexing the knee joint. The rectus femoris is one of the four muscles that make up the quadriceps muscle group and is the prime mover for knee extension. The semimembranosus is one of the hamstring muscles located at the back of the thigh. It functions to flex the knee joint, meaning it bends the knee, and it also plays a role in extending the hip joint.

82.

Which of the following is the best example of the Regional Interdependence Model?

Foot pain caused by hip weakness

Elbow pain that occurs at the same time as knee pain

Knee pain from tripping and falling down the stairs

Knee valgus observed with squatting

Correct answer: Foot pain caused by hip weakness

The Regional Interdependence Model describes the relationship of how a region of a patient's primary complaint is affected by other parts of the body or factors. Foot pain that is caused by hip weakness is a common biomechanical issue caused by internal rotation of the limb.

Concurring elbow and knee pain are not related to each other and would not be an example of this model. Knee pain resulting from a direct fall is not a good example of interdependence because the knee pain is directly caused by the fall. Knee valgus while squatting is a movement dysfunction. This scenario is not a complaint and does not explain the causation of the dysfunction.

83.

Which of the following professions do Corrective Exercise Specialists share an identical scope of practice with?

Fitness professionals

Physical therapists

Nurses

Athletic trainers

Correct answer: Fitness professionals

Fitness professionals and Corrective Exercise Specialists are currently not required to register for state licensure. In contrast, physical therapists, nurses, and athletic trainers are all professions that require medical licensure. Therefore, fitness professionals share an identical scope of practice.

84.

A Corrective Exercise Specialist instructs their client in an exercise that targets the local musculature system. Which of the following exercises best represents this scenario?

Dead bugs

Crunches

Seated row

Supine bridge

Correct answer: Dead bugs

A dead bug exercise specifically targets the stabilizing capabilities of the transverse abdominus, which is a component of the local musculature system.

Crunches, while they are a core exercise, specifically target the rectus abdominus, which is a component of the global muscular system. Seated rows target the latissimus dorsi, which is a muscle of the globular muscular system. A supine bridge may be beneficial for core stability but primarily targets the glutes, which is a component of the global muscular system.

85.

A trainer integrates flexibility training, core, balance, and a dynamic warm-up into a client program. Which of the following best explains why these choices might reduce the incidence of injury?

Improves force absorption

Improves joint range of motion

Improves strength

Improves confidence

Correct answer: Improves force absorption

Improving flexibility, core strength, balance, targeted strengthening, and a dynamic warm-up all biomechanically improve force absorption. Improving force absorption can reduce the likelihood of injury in a workout program.

Improving joint range of motion does not directly correlate with reducing the likelihood of injury. The activities mentioned do not directly improve muscle strength. Improving confidence is important in athlete development. However, it is not mentioned as a factor that decreases likelihood of injury.

86.

A client is referred back to his physical therapist after reporting reoccurring symptoms during exercise. Which of the following is not a potential factor that contributes to the cumulative injury cycle?

Mental health

Muscle weakness

Decreased neuromuscular control

Muscular tightness

Correct answer: Mental health

Mental health is an important component in understanding a client and their injury. It is considered more in line with the biopsychosocial model of health.

The cumulative injury cycle refers to a process through which repetitive stress or trauma to the body can lead to the development and exacerbation of injuries over time. An injury leads to decreased neuromuscular control, muscle weakness, inflammation, muscle imbalances, and tightness/adhesions.

87.

Which of the following scenarios best describes sensorimotor integration?

An athlete uses a mirror to help practice a neutral lower back during a deadlift

A musician plays a complex piece of music with great precision

A person experiences a sudden drop in temperature and shivers to generate heat

An athlete successfully executes a high-jump technique during a competition

Correct answer: An athlete uses a mirror to help practice a neutral lower back during a deadlift

Sensorimotor integration involves the coordination of sensory input with motor output. In this scenario, the athlete uses a mirror to visually assess and adjust their lower back position during a deadlift. This demonstrates the integration of sensory information (visual feedback) with motor output (adjusting the lower back position) to improve technique, which is a form of sensorimotor integration.

The musician scenario involves motor skills and precision but does not primarily illustrate sensorimotor integration. Shivering in response to cold is a physiological reflex rather than a sensorimotor integration. High-jump techniques involve motor skills, but sensorimotor integration typically involves a more explicit connection between sensory input and motor output, such as adjusting one's technique based on visual or proprioceptive feedback.

88.

According to the Care and Performance Continuum, which of the following best describes the discipline that includes Athletic Trainers?

Therapists

Health and Fitness Specialties

Alternative Medicine Practitioners

Ancillary facilities

Correct answer: Therapists

The Care and Performance Continuum incorporates the following disciplines:

- *Hospitals: Emergency Clinics and Trauma Centers*
- *Ambulatory Care Centers: Personal Physicians and Specialists*
- *Therapists: Physical Therapists, Cardiac Rehab Professionals, Massage Therapists, and Athletic Trainers*
- *Ancillary Facilities: Dentists and Optometrists*
- *Behavioral Health Specialties: Psychiatrists and Psychologists*
- *Alternative Medicine Practitioners: Chiropractors and Acupuncture Physicians*
- *Long-Term Care: Home Health and Hospice*
- *Health and Fitness Specialties: Personal Trainers, Corrective Exercise Specialists, Nutrition Coaches, and Group Exercise Instructors.*
- *Athletic Performance Specialties: Strength and Conditioning Coaches and Performance Specialists*

It is important for Corrective Exercise Specialists to understand their role along the continuum and to refer to other disciplines whenever a situation arises that is out of their scope of practice.

89.

A client begins to experience sharp knee pain during a squat. The Corrective Exercise Specialist observes knee valgus during the initial portion of the squat. The client asks, "Can you tell me what is causing my knee pain?"

What is the best response in this scenario?

Stop doing the exercise and advise the client to see their physical therapist

Place a band around the client's knees to promote a neutral knee posture and advise the client to see their physical therapist

Explain to them that their knee valgus posture is causing their sharp knee pain

Stop performing the exercise and assess the client's glute strength

Correct answer: Stop doing the exercise and advise the client to see their physical therapist

It is the Corrective Exercise Specialist's professional responsibility to refer to the licensed provider when the client reports symptoms or conditions that fall outside of their skill set.

In this situation, assessing, and diagnosing the cause of the client's pain, and implementing corrections to treat it are outside the scope of the Corrective Exercise Specialist. It is only appropriate to apply corrective exercise techniques after the client's complaint/injury has been cleared by a medical professional.

90.

A Corrective Exercise Specialist observes instances of relative flexibility while a client performs a barbell squat exercise. Which of the following observations is most indicative of relative flexibility?

The client easily achieves a deep squat position but has difficulty maintaining an upright torso.

The client has tight hip flexors and experiences discomfort when attempting deep squats.

The client's knees consistently cave inwards during the descent of the squat.

The client exhibits an excessive arch in the lower back when performing the squat.

Correct answer: The client easily achieves a deep squat position but has difficulty maintaining an upright torso.

Relative flexibility refers to a situation where one joint or muscle group compensates for a lack of mobility or stability in another joint or muscle group. In this case, the client is able to achieve a deep squat position but struggles to maintain an upright torso, indicating relative flexibility. The hips' increased range of motion compensates for muscle and joint imbalances such as a lack of ankle dorsiflexion.

The client's hip flexors' tightness and discomfort describe a general lack of flexibility in the hip flexors but do not necessarily indicate relative flexibility. Knee valgus (knees caving inward) is a movement pattern issue related to the knees but does not directly relate to relative flexibility. An excessive arch in the lower back is more likely indicative of an issue with lumbar spine stability or form during the squat, not necessarily relative flexibility.

91.

A trainer performs multiple tests on a client who demonstrates difficulty squatting and keeping his chest up. Which of the following statements would best describe the reasoning for an integrated assessment process?

To identify what tissues need to be inhibited and lengthened and what tissues need to be activated and strengthened

To identify areas of improvement for their physical therapist to target

To identify movement and strength inefficiencies

To identify postural deficiencies

Correct answer: To identify what tissues need to be inhibited and lengthened and what tissues need to be activated and strengthened

The Corrective Exercise Continuum exists as a framework for the trainer to target tissues for flexibility and strength training tailored to an individual's posture and movement quality.

A Corrective Exercise Specialist is allowed to target areas of improvement and it does not strictly need to be performed by a physical therapist as long as the client is cleared for exercise.

Determining movement and strength inefficiencies are a portion of the assessment process. However, the trainer still needs to determine what tissues need to be inhibited and lengthened.

Postural deficiencies are only a small portion of the assessment process. An integrated assessment process must include other factors including tissue length, strength, and flexibility.

92.

Which of the following functional movements least likely demonstrates the lateral subsystem's (LS) ability to control the pelvis and femur in the frontal plane?

Double leg hop

Walking

Lunges

Stair climbing

Correct answer: Double leg hop

The LS helps to control the pelvis and femur in the frontal plane during single-leg functional movements. During a double-leg hop, both legs are always on the ground at the same time. Therefore, the LS is least likely to contribute to lateral stability.

Walking, lunging, and stair climbing are all instances where there is one leg on the ground while the other leg is swinging forward, which makes these single-leg functional movements.

93.

A client exhibits poor form during a bench press exercise but does not report pain. Based on the concept of sensorimotor integration, which of the following statements is true?

The client's sensorimotor integration system has been interpreting improper sensory information, leading to poor form.

The client's pain tolerance is very high.

The client's form will improve naturally over time without intervention.

The client's sensorimotor integration system has not been correctly interpreting sensory information, leading to poor form.

Correct answer: The client's sensorimotor integration system has been interpreting improper sensory information, leading to poor form.

Sensorimotor integration is the ability of the central nervous system (CNS) to gather and interpret sensory information in order to execute a proper motor response. In this scenario, the client has trained with improper form and continued to deliver improper sensory information to the CNS, further cementing this movement pattern. Sensorimotor integration has been occurring properly. However, it is the sensory input that has led to poor form over time.

Pain tolerance suggests that the lack of reported pain is due to a property in the client's pain receptors which is not directly related to sensorimotor integration. The concept of sensorimotor integration focuses on the coordination of sensory and motor systems during movement and doesn't necessarily involve pain receptors.

Poor form during an exercise can result from various factors beyond just strength, such as improper technique or muscle imbalances. Without intervention, this will likely lead to additional movement compensation and potentially injury.

94.

Which of the following would not be considered an inhibitory technique?

Trainer-assisted mobility

Foam rolling

Massage gun

Sustained pressure on a trigger point

Correct answer: Trainer-assisted mobility

Inhibitory techniques include activities that fall into the category of myofascial release. Foam rolling, massage guns, and sustained pressure are all techniques to reduce pressure and inhibit overactive neuromyofascial tissues.

Trainer-assisted mobility is a way to increase tissue extensibility and range of motion. This would fall under lengthening techniques.

95.

Which of the following strength training scenarios best describes the length-tension relationship of a muscle?

A client can't generate as much force at the bottom range of a bicep curl as compared to mid-range.

A client performs high-repetition squats with heavy weights to increase leg muscle size.

A client practices low-repetition, high-intensity deadlifts and fails during their last set.

A client follows a training program emphasizing cardiovascular endurance.

Correct answer: A client can't generate as much force at the end range of a bicep curl as compared to mid-range.

The length-tension relationship refers to the testing length of a muscle and the tension a muscle can produce at that length. If the resting muscle is shorter than it should be, the amount of available actin-myosin cross-bridging becomes limited and reduces the available force output. If the resting muscle length is longer, then they will also have limited force generating capacities.

Muscle hypertrophy does not specifically address the length-tension relationship, which relates to the optimal muscle length for force generation. Low-repetition, high-intensity exercises primarily aim to build maximal strength but may not directly address the length-tension relationship. Cardiovascular endurance does not primarily target the length-tension relationship of muscles.

96.

A Corrective Exercise Specialist gave his client feedback on how much weight he lifted on the last set of barbell rows and recommended a few changes to the client's form to improve performance.

Which of the following statements regarding the importance of external feedback is false?

External feedback is the sole source of feedback for individuals during exercise.

External feedback is an important component in motivation.

External feedback gives the client supplemental sensory input.

External feedback in excess can detract from the individual's own responsiveness to internal sensory input.

Correct answer: External feedback is the sole source of feedback for individuals during exercise.

While external feedback is essential, individuals also receive intrinsic feedback, which is the information they gather from their own sensory experiences during exercise, such as the feeling of muscle engagement or joint alignment. Both external and intrinsic feedback play important roles in exercise guidance and improvement and neither is the sole source.

All other options are true. External feedback is important for client motivation, and supplementary sensory input can, in excess, detract from the individual's own responsiveness if they become too reliant on external feedback.

97.

A Corrective Exercise Specialist relies on their client to utilize internal feedback during a squat in order to allow for optimal sensorimotor integration, while they simultaneously receive external feedback.

Which of the following options is the best example of internal feedback in this scenario?

The client focuses on their breathing pattern to maintain stability and control during the squat

The client observes their reflection in a mirror to ensure they are squatting correctly

The client adjusts their foot posture after receiving a cue from the trainer

The client is cued to "stand up tall" during the concentric portion of the squat

Correct answer: The client focuses on their breathing pattern to maintain stability and control during the squat

This option represents internal feedback, as it involves the client's own physiological response. Focusing on breathing is essential for maintaining stability and controlling intra-abdominal pressure during the squat, which helps with core engagement and proper form.

Correcting squat form based on a mirror reflection or verbal cues from a trainer are examples of external feedback as the client is receiving guidance from an external source.

98.

A client suffers from a chronic injury to the femoral nerve after a serious car accident over 10 years ago. Which of the following deficits would the Corrective Exercise Specialist most likely observe in an exercise session?

Difficulty in flexing the hip or raising the thigh

Difficulty in plantar flexion of the ankle

Limited range of motion in the shoulder joint

Difficulty in bending the wrist

Correct answer: Difficulty in extending the hip or raising the thigh

A chronic injury to the femoral nerve can result in weakness or paralysis of the quadriceps muscles and difficulty in flexing the hip or raising the thigh. This is a common deficit associated with femoral nerve injuries and is likely to be observed during exercise sessions, especially when activities involve hip flexion.

Difficulty in plantar flexion of the ankle is more related to issues with the sciatic nerve or other nerves that control the muscles in the lower leg and foot, not the femoral nerve. Limited shoulder range of motion is not directly related to a femoral nerve injury. A femoral nerve injury primarily affects the muscles in the thigh and hip region, not the shoulder. Difficulty in wrist bending is usually related to issues with the median or ulnar nerves, which control the muscles in the forearm and hand, not the femoral nerve.

99.

Which of the following muscles is primarily a type-2, or fast-twitch muscle fiber?

Rectus abdominis

Transverse abdominus

Internal obliques

Psoas

Correct answer: Rectus abdominis

The muscles of the global muscular system are primarily type 2, or fast-twitch muscles. The global muscles are muscles that originate from the pelvis to the rib cage, the lower extremities, or both. These muscles include the rectus abdominis.

In contrast, muscles of the local muscular system are primarily type 1, or slow-twitch muscle fibers. These muscles include the transverse abdominus, internal obliques, and the psoas. These muscles are most suitable for long duration, light resistance, low load, and slow velocity.
