

ACSM-EP® - Quiz Questions with Answers

Domain I: Health and Fitness Assessment

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1.

Which of the following is not one of the factors that would classify a client as moderate risk for a cardiac event?

Maximal functional capacity of at least 7.0 METs

Left ventricular ejection fraction = 40% - 50%

Signs and symptoms of angina at moderate levels of exercise

Mild to moderate silent ischemia

Correct answer: Maximal functional capacity of at least 7.0 METs

The greatest challenge of ACSM preparticipation physical screening is potentially overlooking a sign or symptom of ongoing cardiovascular disease, and this mistake leads to a client experiencing a cardiac event. This is why it's best to err on the side of caution, obtain as much medical history as possible, and make an educated decision based on minimizing risk.

If a client has any one or more of the following factors present, they are considered at moderate risk for a cardiac event:

- *Left ventricular ejection fraction = 40% - 50%*
- *Signs and symptoms of angina at moderate levels of exercise*
- *Mild to moderate silent ischemia*

Maximal functional capacity of at least 7.0 METs would classify the client as low risk.

2.

What is the standardized step height used during a Queens College Step Test?

16.25 inches

16.75 inches

15.25 inches

15.75 inches

Correct answer: 16.25 inches

The Queens College Step Test is a type of cardiorespiratory fitness test. You should instruct the client to step up and down on a standardized step height of 16.25 inches.

Adult females should step at a rate of 22 steps per minute. Adult males should step at a rate of 24 steps per minute.

After three minutes, instruct the client to stop. Within the first five seconds, palpate the pulse while the client stands. A 15-second pulse count is then taken and multiplied by four.

The subject's VO₂ max is determined from the recovery heart rate by the following formulas:

If you have a female participating in the assessment, you should use the following formula to determine the subject's VO₂ max:

- $VO_2 \text{ max (mL} \times \text{kg}^{-1} \times \text{min}^{-1}) = 65.81 - (0.1847 \times \text{HR})$

If you have a male performing the test, use the following formula:

- $VO_2 \text{ max (mL} \times \text{kg}^{-1} \times \text{min}^{-1}) = 111.33 - (0.42 \times \text{HR})$
-

3.

Hypertension is a cardiovascular risk factor. Which of the following best defines hypertension?

Having a resting blood pressure of > 130 mm Hg systolic and/or > 80 mm Hg diastolic

Having an exercise blood pressure of > 130 mm Hg systolic or > 80 mm Hg diastolic

Having a resting blood pressure of > 120 mm Hg systolic or > 60 mm Hg diastolic

Having an exercise blood pressure of > 120 mm Hg systolic or > 60 mm Hg diastolic

Correct answer: Having a resting blood pressure of > 130 mm Hg systolic and/or > 80 mm Hg diastolic

When performing an atherosclerotic cardiovascular disease risk factor assessment, there are multiple defining criteria that the exercise physiologist should review. One of those factors is hypertension. Hypertension is best defined as having a resting blood pressure of > 130 mm Hg systolic and/or > 80 mm Hg diastolic.

Another way to verify if a client is hypertensive is to confirm whether or not they are taking anti-hypertensive medications.

4.

Which of the following tools would be the most useful for measuring joint angles during a flexibility assessment?

Goniometer

Stethoscope

Measuring tape

Hydrodensitometry

Correct answer: Goniometer

The most useful method for measuring joint flexibility is using a goniometer. Similar to a protractor, a goniometer expresses the range of motion in degrees. When performing a flexibility assessment with a goniometer, be sure to follow these steps:

- 1. Have the client perform a short warm-up.*
 - 2. Place the goniometer at the center of the joint being measured. The fixed arm of the goniometer should be aligned with the appropriate bony landmark of the stationary body part.*
 - 3. The moveable arm of the goniometer should be aligned with the specific bony landmark that is going to be moving.*
 - 4. Record the range of motion in degrees.*
 - 5. It is recommended that you perform three measurements.*
-

5.

When a client has knee valgus, which of the following is the suggested corrective exercise?

Lateral band walks

Hip adduction with band

Hip internal rotation with band

Hip flexion with ankle weights

Correct answer: Lateral band walks

Knee valgus is caused by excessive femoral internal rotation and potentially adduction of the femur, usually caused by weakness in the external rotators and abductors of the hip. As a part of the trainer's duty to appraise the quality of movement during an exercise session, it will be necessary to observe any alignment faults that might present themselves.

When a client has knee valgus, the trainer should incorporate the lateral band walk exercise into the client's program until the alignment issue is corrected. The trainer can also utilize the clam shell exercise. From there, the client can be re-evaluated and progressed to the next exercise that is in line with their fitness goals.

6.

Inflammation of a small, fluid-filled sack best describes which of the following conditions?

Bursitis

Arthritis

Meningitis

Fasciitis

Correct answer: Bursitis

Bursitis is best described as the inflammation of a small, fluid-filled sac called the bursa, which acts like a cushion to reduce friction between muscles, tendons, and joints. Clients will usually describe symptoms occurring with bursitis as pain and swelling in the shoulders, hips, knees, and elbows.

Arthritis refers to inflammation of a joint. Meningitis refers to inflammation of the tissue surrounding the brain and spinal cord. Fasciitis is inflammation of the fascia surrounding muscles and other tissues.

7.

During the Astrand-Rhyming Cycle Ergometer test, after a proper warm-up, how many revolutions per minute should you have your client pedal?

50 rpm

45 rpm

70 rpm

60 rpm

Correct answer: 50 rpm

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The Astrand-Rhyming Cycle Ergometer test is one of the most recommended methods for fitness trainers to measure an adult client's cardiorespiratory fitness level. When the testing portion begins, you'll have your client pedal at 50 rpm.

Before that, you'll want to focus on the following:

After you set the seat on the cycle ergometer to ACSM guidelines, you will select the appropriate work rate based on the sex and self-reported fitness level of the client:

- **Females, unconditioned:** 300 or 450 kg-m x min⁻¹ (50 or 75 w)
- **Females, conditioned:** 450 or 600 kg-m x min⁻¹ (75 or 100 w)
- **Males, unconditioned:** 300 or 600 kg-m x min⁻¹ (50 or 100 w)
- **Males, conditioned:** 600 or 900 kg-m x min⁻¹ (100 or 150 w)

While you should have access to these formulas during the assessment through the ACSM textbook, it's still useful to memorize them as you progress in your field. Here is the rest of the process for the Astrand-Rhyming Cycle Ergometer test:

1. *After a proper warm-up, instruct your client to pedal at 50 rpm for six minutes at the work rate selected above.*
2. *Assess heart rate two times during minute 5-6 and average the values.*
3. *Estimate VO₂ max from a nomogram.*
4. *Because HR max decreases with age, the value from the monogram must be adjusted for age by multiplying VO₂ max value by the following correction*

factors:

Age / Correction Factor

15 / 1.10

25 / 1.00

35 / 0.87

40 / 0.83

45 / 0.78

50 / 0.75

55 / 0.71

60 / 0.68

65 / 0.65

8.

When your client has a forward head posture deviation, which of the following is not a muscle that should be a target of flexibility training?

Obliques

Pectoralis major

Pectoralis minor

Rectus abdominis

Correct muscle: Obliques

When a client has a forward head posture deviation, the trainer should implement a stretching program to loosen up the tight muscles contributing to the issue. These muscles will include the pectoralis major, pectoralis minor, latissimus dorsi, and rectus abdominis.

While the abdominals are a target muscle, the obliques are not.

9.

Which of the following total cholesterol levels would place a client at risk for cardiovascular disease?

240 mg/dL

130 mg/dL

185 mg/dL

There is no total cholesterol level associated with increased risk for cardiovascular disease

Correct answer: 240 mg/dL

A total cholesterol level greater than 200 mg/dL puts a person at risk for developing cardiovascular disease (CVD).

An HDL level lower than 40 mg/dL puts a client at increased risk for CVD. An LDL level higher than 130 mg/dL puts a client at increased risk for CVD.

10.

Which of the following is not a major sign or symptom suggestive of cardiovascular disease?

Rapid, unexplained weight loss

Heart murmurs

Dyspnea

Unusual fatigue

Correct answer: Rapid, unexplained weight loss

When conducting a preparticipation health screening, there are several outward signs or symptoms that suggest cardiovascular disease. The most common signs or symptoms include the following:

- *Pain or discomfort in the chest, neck, jaw, and/or arms*
- *Dyspnea (shortness of breath)*
- *Syncope (fainting)*
- *Orthopnea (trouble breathing while lying down)*
- *Ankle edema (swelling)*
- *Palpitations (rapid heart beat)*
- *Intermittent claudication (calf swelling)*
- *Heart murmurs*
- *Unusual fatigue*

Rapid weight loss is a concerning sign, but it is not typically indicative of heart disease.

11.

During the Astrand-Rhyming Cycle Ergometer test, you are working with a client who is male and unconditioned. What is the suggested formula to use?

300 or 600 kg-m x min⁻¹ (50 or 100 w)

600 or 900 kg-m x min⁻¹ (100 or 150 w)

300 or 450 kg-m x min⁻¹ (50 or 75 w)

450 or 600 kg-m x min⁻¹ (75 or 100 w)

Correct answer: 300 or 600 kg-m x min⁻¹ (50 or 100 w)

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The Astrand-Rhyming Cycle Ergometer test is one of the most recommended methods for fitness trainers to measure an adult client's cardiorespiratory fitness level. After you set the seat on the cycle ergometer to ACSM guidelines, you will select the appropriate work rate based on the sex and self-reported fitness level of the client:

- **Males, unconditioned:** 300 or 600 kg-m x min⁻¹ (50 or 100 w)
- **Males, conditioned:** 600 or 900 kg-m x min⁻¹ (100 or 150 w)
- **Females, unconditioned:** 300 or 450 kg-m x min⁻¹ (50 or 75 w)
- **Females, conditioned:** 450 or 600 kg-m x min⁻¹ (75 or 100 w)

While you should have access to these formulas during the assessment through the ACSM textbook, it's still useful to memorize them as you progress in your field. Here is the rest of the process for the Astrand-Rhyming Cycle Ergometer test.

1. *After a proper warm-up, instruct your client to pedal at 50 rpm for six minutes at the work rate selected above.*
2. *Assess heart rate two times during minute 5-6 and average the values.*
3. *Estimate VO₂ max from a nomogram.*
4. *Because HR max decreases with age, the value from the monogram must be adjusted for age by multiplying VO₂ max value by the following correction factors:*

Age / Correction Factor

15 / 1.10

25 / 1.00

35 / 0.87

40 / 0.83

45 / 0.78

50 / 0.75

55 / 0.71

60 / 0.68

65 / 0.65



12.

Which of the following best describes a relative contraindication in a fitness setting?

An increase in the risk associated with physical activity

An action or activity that should not be performed for a given client under any circumstances

An activity that a physician or other provider is unfamiliar with

A decrease in the risk associated with preparticipation assessments

Correct answer: An increase in the risk associated with physical activity

A relative contraindication is an increase in the risk associated with exercise and physical activity. For example, if your client has unpredictable or uncontrollable chest pain (angina), then this could trigger ischemia and that could lead to a heart attack. This is compared to an absolute contraindication, which is an activity which should not be performed under any circumstances, as the risks outweigh any potential benefits.

This is why fitness assessments are so important with new clients. The trainer has a responsibility of finding potential contraindications and suggesting the best work around.

13.

In regard to CMR diseases, what does paroxysmal nocturnal dyspnea mean?

Difficultly breathing while asleep

Dizzines with specific head movements

Trouble breathing while lying down

Occasional calf pain during activity

Correct answer: Difficultly breathing while asleep

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

One of the major signs and symptoms of CMR disease is paroxysmal nocturnal dyspnea. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, paroxysmal nocturnal dyspnea is difficulty breathing while asleep. This usually happens 2 to 5 hours after falling asleep and can be relieved by sitting up.

14.

Which of the following is a pathological change in the tendon due to repeated stress or microtraumas?

Tendinopathy

Strain

Sprain

Arthropathy

Correct answer: Tendinopathy

Tendinopathy is a pathological change in the tendon due to repeated stress or microtraumas. The most common examples of tendinopathy are tendinitis and tendinosis.

Tendinitis is a form of inflammatory tendinopathy, while tendinosis is a form of degeneration in the tendon.

15.

Which of the following is the best description of a heart murmur?

Unusual sounds of blood flowing through the heart

Feeling of dizziness upon transitioning from sitting to standing

Chest pain with exertion

Shortness of breath at rest

Correct answer: Unusual sounds of blood flowing through the heart

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

One of the major signs and symptoms of CMR disease is a heart murmur. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, a heart murmur refers to the unusual sounds of blood flowing through the heart.

16.

Which of the following is not considered a cardiovascular risk factor with regard to smoking?

Quit smoking 12 months ago

Smoking only 1 cigarette per day

Quit smoking within the last 6 months

Lives in an environment with second-hand smoke

Correct answer: Quit smoking 12 months ago

When performing an atherosclerotic cardiovascular disease risk factor assessment, there are multiple defining criteria that the exercise physiologist should review. One of those factors is smoking.

If a client is currently smoking, quit smoking within the last 6 months, or lives in an environment with second-hand smoke, they are at risk for a cardiovascular event.

17.

Which of the following variables is needed in order to use the Peak VO₂ Method formula?

VO₂ max

Maximum heart rate

Resting heart rate

Intensity desired

Correct answer: VO₂ max

As an ACSM exercise physiologist, you should have multiple options at your disposal to determine the appropriate exercise intensity when prescribing physical activity to improve a client's cardiorespiratory fitness.

One of those methods is the Peak VO₂ Method. This method requires the trainer to first measure or estimate the VO₂ max of the client in a laboratory or field setting. Once the trainer has that, they can use the following formula:

- *Target VO₂ = VO₂ max x % intensity desired*

For example, if your client has a measured VO₂ max of 60 mL x kg⁻¹ x min⁻¹ with an exercise prescription of 90% maximum, here's what the formula would look like:

- *60 x 90% = Target VO₂ max of 54 mL x kg⁻¹ x min⁻¹*
-

18.

When performing a skinfold measurement, on which side of the body should the measurements take place?

Right side

Left side

Whichever side the client prefers

Both sides, depending on the specific site in question

Correct answer: Right side

Skinfolds are always measured at standardized sites on the body, and these sites must be precisely located to ensure accuracy. What's more, all of the measurements should take place on the right side of the body with the client standing upright.

Try to let the client know ahead of time to avoid putting on lotions or skin creams as this can impact the measurements.

19.

During a client's first examination, how should resting blood pressure be taken?

In both arms

In standing, sitting, and lying down

In both the arms and the legs

While the client is walking on a treadmill or biking

Correct answer: In both arms

It is critical to assess a new client's resting blood pressure, as this is the first step to determining whether the client is at risk for a cardiac event. When performing this exam for the first time, be sure to assess both arms.

Here are the correct steps to follow when assessing resting blood pressure:

- 1. No smoking or caffeine 30 minutes before the assessment.*
- 2. Have your client sit quietly for five minutes before the assessment with their feet on the floor.*
- 3. Wrap the cuff firmly around the upper arm at heart level.*
- 4. Place the stethoscope chest piece below the antecubital space over the brachial artery.*
- 5. Quickly inflate cuff pressure 20 mm Hg above first Korotkoff sound.*
- 6. Slowly release pressure at a rate equal to 2 to 5 mm Hg x s-1.*
- 7. Systolic blood pressure is the point at which the first of two or more Korotkoff sounds is heard (phase 1).*
- 8. Diastolic blood pressure is the point before the disappearance of Korotkoff sounds (phase 5).*

The assessment should never begin as soon as the client arrives, as this will produce inaccurate test results. Let the client sit down quietly for five minutes before the assessment. On the day of, remind your client not to ingest caffeine or smoke until after the assessment.

20.

You are working with a client who experiences syncope, which is indicated on their medical history form. Based on this medical history, what would you expect to see if they experience an episode of syncope?

Dizziness during exercise and/or fainting

Ankle swelling

Trouble breathing while lying down

Shortness of breath

Correct answer: Dizziness during exercise and/or fainting

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

One of the nine signs and symptoms of CMR disease is syncope. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, syncope is dizziness during exercise and/or fainting.

Ankle swelling is a specific form of edema. Trouble breathing is known as dyspnea. Orthostatic dyspnea refers to the position in which one experiences the condition, such as while lying down.

21.

Which of the following is not a CMR disorder that is associated with syncope?

Orthopnea

Severe coronary artery disease

Hypertrophic cardiomyopathy

Aortic stenosis

Correct answer: Orthopnea

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

One of the nine signs and symptoms of CMR disease is syncope. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, syncope is dizziness during exercise and/or fainting. This could be caused by poor blood flow to the brain due to inadequate cardiac output. Serious disorders that are associated with syncope include severe coronary artery disease, hypertrophic cardiomyopathy, aortic stenosis, and malignant ventricular dysrhythmias.

Orthopnea refers to a condition in which the patient experiences difficulty breathing while lying down but the symptoms are relieved upon changing positions.

22.

When conducting the three-site skinfold measurement on a women, which of the following sites is not used?

Chest

Triceps

Abdominal

Suprailiac

Correct answer: Chest

When conducting a three-site skinfold measurement on a woman, the triceps, suprailiac, and thigh are used. Alternatively, the triceps, suprailiac, and abdominal folds can be used.

The chest fold is not used for the three-site measurement for a woman.

23.

Which of the following verbal cues would you give a client who has increased thoracic curvature in order to help them correct their posture?

"While tucking your chin, stand or sit as tall as possible."

"Tuck the chin."

"Create width between your shoulders."

"Shift your pelvis forward."

Correct answer: "While tucking your chin, stand or sit as tall as possible."

For postural deviations, it is suggested to provide verbal cues for postural correction. When a client has increased thoracic curvature, you will want to tell the client, "While tucking your chin, stand or sit as tall as possible."

It's also recommended to focus on stretching the pectoralis major and minor, latissimus dorsi, and abdominals.

24.

Which of the following heart rate measurement methods would provide the most accurate data?

Taking a heart rate for 1 minute

Taking a heart rate for 30 seconds

Taking a heart rate for 20 seconds

Taking a heart rate for 15 seconds

Correct answer: Taking a heart rate for 1 minute

Heart rate is measured in beats per minute. Therefore, the most accurate way to determine heart rate is to take it for a minute. This also allows the clinician or trainer to determine if the rate is irregular.

Taking heart rates for 30, 20, and 15 seconds are efficient ways to measure heart rate, and they are reliable. However, they are not as reliable as taking the measurement for the full minute.

25.

Which of the following screening questionnaires acts as a physician-based clearance follow-up to a self-guided screening?

ePARmed-X

2021 PAR-Q+

Health History Questionnaire

Exercise Preparticipation Health Screening Questionnaire

Correct answer: ePARmed-X

A 2021 PAR-Q+ would be ideal as a self-guided screening, or a screening not involving an exercise professional supervising the screening. If the individual answers "yes" to one of the seven questions on the PAR-Q+, they will then be directed to use the ePARmed-X, which includes a physician follow-up to obtain permission to engage in a physical activity program.

A preparticipation physical activity screening is recommended for new clients for the following reasons:

- To identify those with medical contraindications for performing physical activity*
- To identify those who should receive a medical/physical evaluation exam and clearance prior to performing a physical activity program*
- To identify those who should participate in a medically supervised physical activity program*
- To identify those with other health/medical concerns such as orthopedic injuries*

There are two basic approaches to a preparticipation physical activity screening:

- **Self-guided:** This approach can be performed by an individual wishing to become more physically active without direct input from an exercise professional.*
- **Professionally supervised:** This approach involves interaction with an exercise professional.*

These approaches are not mutually exclusive, and one may follow the other.

26.

Which of the following muscles is not part of the global stabilization system?

Internal obliques

Quadratus lumborum

Erector spinae

Rectus abdominis

Correct answer: Internal obliques

The global stabilization system is comprised of muscles referred to as global stabilizers that attach from the pelvis to the spine. These muscles provide stability by moving stress from a load between the upper and lower extremities. During functional movements, these muscles contribute to stabilization.

The global stabilization system includes the following muscle groups:

- *Quadratus lumborum*
- *External obliques*
- *Erector spinae*
- *Rectus abdominis*

The internal obliques are considered a part of the local stabilization system (local stabilizers).

27.

A client reveals they have a known obstructive left main coronary artery stenosis. Which form of contraindication is this?

Relative

Dependent

Absolute

Unclear

Correct answer: Relative

There are certain clinical characteristics of an individual that make physical activity risky, or contraindicated. Most are related to cardiovascular health. Absolute contraindications refer to conditions that will absolutely not allow for exercise testing, while relative contradictions refer to conditions that might allow for testing, depending on the client's doctor's recommendations.

The following are relative contraindications:

- *Tachyarrhythmias with uncontrolled ventricular rates*
- *Recent stroke or transient ischemia attack*
- *Known obstructive left main coronary artery stenosis*
- *Moderate to severe aortic stenosis*
- *Acquired advanced or complete heart block*
- *Mental impairment with limited ability to cooperate*
- *Resting hypertension with systolic > 200 mmHg or diastolic > 110 mm Hg*
- *Uncorrected medical conditions, such as significant anemia, significant electrolyte imbalance, and hyperthyroidism*

This is a relative contraindication and testing would be appropriate as long as the trainer focused on low intensity tests and constantly checked in with the client.

28.

Within functional movement assessments, what is the purpose of the wall test?

To measure normal lumbar curvature and forward head posture by standing against the wall

To measure leg (specifically triple extensor) endurance

To measure sacro-coccygeal mobility

To determine upper body strength and/or endurance

Correct answer: To measure normal lumbar curvature and forward head posture by standing against the wall

The wall test can measure normal lumbar curvature and forward head posture, an important part of functional movement.

Have the client stand with their back to a wall. Have them place their feet 6 inches from the wall. The head should be against the wall, and the client should be able to fit their own hands between the wall and their lumbar spine. If this isn't possible, you've identified an issue in functional movement and proper posture.

29.

What is the best way to improve cardiorespiratory fitness?

Exercise at a level greater than accustomed to induce adaptation

Perform heavy resistance training exercise

Complete moderate intensity cardio exercise twice per week

Focus on low intensity exercise for short bouts

Correct answer: Exercise at a level greater than accustomed to induce adaptation

Progressive overload should be at the foundation of all exercise programs because studies show that the best way to improve cardiorespiratory fitness is to exercise at a level greater than accustomed to induce adaptation.

As a trainer, you can implement the principle of progressive overload by manipulating the frequency, intensity, or time of the exercise program.

30.

Which of the following is a risk factor criteria for a family history of a cardiovascular event?

Father had a heart attack at 48

Mother had a heart attack at 72

Brother died from sudden cardiac death at 59

Cousin had a heart attack at 37

Correct answer: Father had a heart attack at 48

When performing an atherosclerotic cardiovascular disease risk factor assessment, there are multiple defining criteria that the exercise physiologist should review. One of those factors is a family history of cardiovascular events, including heart attack, coronary revascularization, and sudden cardiac death. This only applies to first-degree relatives: parents, siblings, and children.

The risk factor criteria are met when at least one first-degree male relative has had one of the three specific events prior to the age of 55 or one first-degree female relative before the age of 65.

31.

Which of the following best captures the two basic approaches to a preparticipation physical activity screening?

Self-guided and professionally supervised screenings

Beginner and advanced screenings

Weight loss and muscle growth screenings

Athlete and general population screenings

Correct answer: Self-guided and professionally supervised screenings

A preparticipation physical activity screening is recommended for new clients for the following reasons:

- *To identify those with medical contraindications for performing physical activity*
- *To identify those who should receive a medical/physical evaluation exam and clearance prior to performing a physical activity program*
- *To identify those who should participate in a medically supervised physical activity program*
- *To identify those with other health/medical concerns such as orthopedic injuries*

There are two basic approaches to a preparticipation physical activity screening:

- **Self-guided:** *This approach can be performed by an individual wishing to become more physically active without direct input from an exercise professional.*
- **Professionally supervised:** *This approach involves interaction with an exercise professional.*

These approaches are not mutually exclusive, and one may follow the other.

32.

Which of the following is not a checkpoint for the sagittal view during the basic plumb line postural assessment?

Navel

Ear canal

Acromioclavicular joint

Tibial tuberosity

Correct answer: Navel

When performing a plumb line assessment, the trainer should view the client from the sagittal and anterior positions. For the sagittal view, clients should stand sideways to the plumb line with the line positioned slightly anterior to the client's ankle.

For the anterior view, clients should stand facing the plumb line with feet equidistant from the line. Align the plumb with the pubis.

All the following are checkpoints for the sagittal view during the basic plumb line postural assessment:

- *Ear canal*
- *Acromioclavicular joint*
- *Tibial tuberosity*

The navel is a checkpoint for the anterior view.

33.

During a blood pressure reading, to which pressure (described in mmHg) should you quickly inflate the cuff?

20 mmHg above the first Korotkoff sound

40 mmHg above the first Korotkoff sound

20 mmHg below the first Korotkoff sound

40 mmHg below the first Korotkoff sound

Correct answer: 20 mmHg above the first Korotkoff sound

It is critical to assess a new client's resting blood pressure, as this is the first step to determining whether the client is at risk for a cardiac event. During a blood pressure reading, you should quickly inflate the cuff pressure to 20 mmHg above the first Korotkoff sound.

Here are the correct steps to follow when assessing resting blood pressure:

- 1. No smoking or caffeine 30 minutes before the assessment.*
- 2. Have your client sit quietly for five minutes before the assessment with their feet on the floor.*
- 3. Wrap the cuff firmly around the upper arm at heart level.*
- 4. Place the stethoscope chest piece below the antecubital space over the brachial artery.*
- 5. Quickly inflate cuff pressure 20 mmHg above the first Korotkoff sound.*
- 6. Slowly release pressure at a rate equal to 2 to 5 mmHg x s-1.*
- 7. Systolic blood pressure is the point at which the first or two or more Korotkoff sounds are heard (phase 1).*
- 8. Diastolic blood pressure is the point before the disappearance of Korotkoff sounds (phase 5).*

The assessment should never begin as soon as the client arrives, as this will produce inaccurate test results. Let the client sit down quietly for five minutes before the assessment. On the day of, remind your client not to ingest caffeine or smoke until after the assessment.

34.

Which of the following best defines vigorous exercise?

Equal to or greater than 60% of your client's functional capacity

Equal to or greater than 70% of your client's functional capacity

Equal to or greater than 80% of your client's functional capacity

Equal to or greater than 50% of your client's functional capacity

Correct answer: Equal to or greater than 60% of your client's functional capacity

The decision tree for a preparticipation screening is a simplified algorithm for determining whether your client requires a medical clearance before continuing with a physical activity program.

While a medical clearance might be required if the client has no physical activity experience and plans to engage in vigorous or high-intensity exercise, a medical clearance is absolutely required if the client is showing signs and symptoms associated with CMR disease.

Vigorous activity is defined as 60% of your client's functional capacity. For example, > 6 METs or 14 on a 6-20 RPE scale.

35.

If a client has dyslipidemia, they are said to be at risk for a cardiac event. Which of the following best defines dyslipidemia?

Low-density lipoprotein cholesterol > 130 mg x dL-1 / High-density lipoprotein of < 40 mg x dL-1

Low-density lipoprotein cholesterol > 120 mg x dL-1 / High-density lipoprotein of > 30 mg x dL-1

Low-density lipoprotein cholesterol > 110 mg x dL-1 / High-density lipoprotein of > 20 mg x dL-1

Low-density lipoprotein cholesterol > 150 mg x dL-1 / High-density lipoprotein of < 60 mg x dL-1

Correct answer: Low-density lipoprotein cholesterol > 130 mg x dL-1 / High-density lipoprotein of < 40 mg x dL-1

When performing an atherosclerotic cardiovascular disease risk factor assessment, there are multiple defining criteria that the exercise physiologist should review. One of those factors is dyslipidemia.

Dyslipidemia is best defined as low-density lipoprotein cholesterol > 130 mg x dL-1 or high-density lipoprotein of < 40 mg x dL-1.

36.

In regard to a professionally supervised screening, which of the following should take place first?

Informed consent process

Health screening process

Anthropomorphic measurements

Blood pressure and heart rate measurements

Correct answer: Informed consent process

The informed consent process is the first step when working with a new client, and it must be completed prior to the collection of any personal and confidential information, as well as fitness testing or exercise participation. This is for the safety of both you and the client.

There are three main purposes of informed consent:

- 1. To inform the client of any personal and confidential information that will be collected*
- 2. To inform the client how personal information will be used*
- 3. To detail the risks involved with physical activity*

Again, fitness testing, anthropomorphic testing, and cardiorespiratory measurements are not performed until after the informed consent forms have been signed.

37.

Which of the following best describes the Peak Heart Rate Method formula for healthy clients when you are determining the appropriate exercise intensity for their workout program?

208 - (0.7 x age in years)

[(Maximum HR/Resting HR) x % intensity desired] + Resting HR

(% intensity desired) [(VO₂max in METs) - 1] + 1

207 - (0.7 x age in years)

Correct answer: 208 - (0.7 x age in years)

As an ACSM exercise physiologist, you should have multiple options at your disposal to determine the appropriate exercise intensity when prescribing physical activity to improve a client's cardiorespiratory fitness.

One of those methods is the Peak Heart Rate Method. This method requires the trainer to determine whether or not the client is conditioned. If they are, the trainer would use the following formula:

- *208 - (0.7 x age in years)*

For example, if a client is 40 years old and has opted to exercise at 75% of their maximum heart rate, you would do the following:

- *208 - (0.7 x 40) = 180*
 - *180 x 0.75 = 135 bpm is the target heart rate*
-

38.

If a client has a strength and/or mobility limitation with their gluteus maximus, which of the following exercises would be ideal as a corrective measure?

Bird dog

Modified cobra stretch

Seated marches with ankle weights

Side plank

Correct answer: Bird dog

If you have a client who is initially unable to perform rolling patterns due to a strength or mobility limitation, there are a number of corrections that you can recommend based on where the limitation is occurring.

If a client has a strength and/or mobility limitation with their gluteus maximus, it would be recommended to perform the bird dog exercise. The trainer can also assign the glute bridge exercise.

39.

During the Astrand-Rhyming Cycle Ergometer test, you are working with a client who is male and conditioned. What is the suggested formula to use?

600 or 900 kg-m x min⁻¹ (100 or 150 w)

300 or 600 kg-m x min⁻¹ (50 or 100 w)

300 or 450 kg-m x min⁻¹ (50 or 75 w)

450 or 600 kg-m x min⁻¹ (75 or 100 w)

Correct answer: 600 or 900 kg-m x min⁻¹ (100 or 150 w)

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The Astrand-Rhyming Cycle Ergometer test is one of the most recommended methods for fitness trainers to measure an adult client's cardiorespiratory fitness level. After you set the seat on the cycle ergometer to ACSM guidelines, you will select the appropriate work rate based on the sex and self-reported fitness level of the client:

- **Males, unconditioned:** 300 or 600 kg-m x min⁻¹ (50 or 100 w)
- **Males, conditioned:** 600 or 900 kg-m x min⁻¹ (100 or 150 w)
- **Females, unconditioned:** 300 or 450 kg-m x min⁻¹ (50 or 75 w)
- **Females, conditioned:** 450 or 600 kg-m x min⁻¹ (75 or 100 w)

While you should have access to these formulas during the assessment through the ACSM textbook, it's still useful to memorize them as you progress in your field. Here is the rest of the process for the Astrand-Rhyming Cycle Ergometer test.

1. *After a proper warm-up, instruct your client to pedal at 50 rpm for six minutes at the work rate selected above.*
2. *Assess heart rate two times during minutes 5-6 and average the values.*
3. *Estimate VO₂ max from a nomogram.*
4. *Because HR_{max} decreases with age, the value from the nomogram must be adjusted for age by multiplying VO₂ max value by the following correction factors:*

Age / Correction Factor

15 / 1.10

25 / 1.00

35 / 0.87

40 / 0.83

45 / 0.78

50 / 0.75

55 / 0.71

60 / 0.68

65 / 0.65



40.

Which of the following best describes the Peak VO₂ Method formula for when you are determining the appropriate exercise intensity for a client's workout program?

VO₂max x % intensity desired

(% intensity desired) [(VO₂max in METs) - 1] + 1

Maximum HR x % intensity desired

[(Maximum HR - Resting HR) x % intensity desired]

Correct answer: VO₂max x % intensity desired

As an ACSM exercise physiologist, you should have multiple options at your disposal to determine the appropriate exercise intensity when prescribing physical activity to improve a client's cardiorespiratory fitness.

One of those methods is the Peak VO₂ Method. This method requires the trainer to first measure or estimate the VO₂ max of the client in a laboratory or field setting. Once the trainer has that, they can use the following formula:

- *Target VO₂ = VO₂ max x % intensity desired*

For example, if your client has a measured VO₂ max of 60 mL x kg⁻¹ x min⁻¹ with an exercise prescription of 90% maximum, here's what the formula would look like:

- *60 x 90% = Target VO₂ max of 54 mL x kg⁻¹ x min⁻¹*
-

41.

During a maximal oxygen uptake VO₂ max test, what equipment would be best to use?

Cycle ergometer

Aerobic step bench

Outdoor track

Metronome

Correct answer: Cycle ergometer

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

When performing a maximal oxygen uptake (VO₂ max) test, you can use a treadmill, cycle ergometer, upper body ergometer, etc.

The rest of these measurement tools are for submaximal oxygen uptake, step tests, and field tests.

42.

Which of the phases of tissue repair is characterized by pain, edema, redness, and increased cell activity?

Inflammation

Repair

Cytoblastic

Remodeling

Correct answer: Inflammation

When a client experiences a sprain, the body goes through three phases of tissue repair: inflammation, repair, and remodeling.

The inflammation phase is characterized by pain, edema, redness, and increased inflammatory cell activity. This phase usually lasts 2 to 3 days and is followed by the repair phase, which lasts up to 2 months.

43.

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness.

If you want to select recreational sports as the activity that your client focuses on, which of the following would you not choose?

Jogging

Tennis

Downhill skiing

Soccer

Correct answer: Jogging

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

If you want to select a recreational sport, you can choose from the following examples:

- Racquet sports*
- Basketball*
- Soccer*
- Downhill skiing*
- Hiking*

Jogging is considered a low- to moderate-intensity activity that does not require skill to perform.

44.

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness.

If you choose jogging/running as a vigorous-intensity physical activity that requires minimal skill for your client, which of the following is not a potential benefit?

Low injury risk

Accessibility

Caloric expenditure

Bone health

Correct answer: Low injury risk

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no / minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

Jogging/running is a vigorous-intensity physical activity that requires minimal skill for your client and offers the following benefits:

- Easily accessibility*
- Large caloric expenditure*
- Promotes bone health*

One of the potential downsides is the increased risk of injury due to higher impact movements.

45.

Both orthopnea and paroxysmal nocturnal dyspnea are indicative of which of the following?

Poor left ventricular function

Advanced diabetes mellitus affecting the cardiovascular system

Anemia

Heart murmur

Correct answer: Poor left ventricular function

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

Two of the major signs and symptoms of CMR disease are orthopnea and paroxysmal nocturnal dyspnea. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, both orthopnea and paroxysmal nocturnal dyspnea are indicative of poor left ventricular function.

46.

Which of the following is an absolute contraindication to exercise testing?

Symptomatic severe aortic stenosis

Resting hypertension with systolic > 200 mm Hg or diastolic > 110 mm Hg

Uncorrected medical conditions, such as significant anemia, significant electrolyte imbalance, and hyperthyroidism

Recent stroke or transient ischemia attack

Correct answer: Symptomatic severe aortic stenosis

There are certain clinical characteristics of an individual that make physical activity risky or contraindicated. Most are related to cardiovascular health. Absolute contraindications refer to conditions that will absolutely not allow for exercise testing, while relative contradictions refer to conditions that might allow for testing, depending on the client's doctor's recommendations.

The following are relative contraindications:

- *Tachyarrhythmias with uncontrolled ventricular rates*
- *Recent stroke or transient ischemia attack*
- *Known obstructive left main artery stenosis*
- *Moderate to severe aortic stenosis*
- *Mental impairment with limited ability to cooperate*
- *Resting hypertension with systolic > 200 mm Hg or diastolic > 110 mm Hg*
- *Uncorrected medical conditions, such as significant anemia, significant electrolyte imbalance, and hyperthyroidism*

Symptomatic severe aortic stenosis is considered an absolute contraindication.

47.

If a client has a strength and/or mobility limitation with their thoracic spine mobility in extension, which of the following exercises would be ideal as a corrective measure?

Modified cobra stretch

Bird dog

Upper trap stretch

Abdominal crunches

Correct answer: Modified cobra stretch

If you have a client who is initially unable to perform rolling patterns due to a strength or mobility limitation, there are a number of corrections that you can recommend based on where the limitation is occurring.

If a client has a strength and/or mobility limitation with their thoracic spine mobility in extension, it would be recommended to perform the modified cobra stretch.

Bird dogs are a good choice for an unstable spine. Upper trap stretches are good for mobility limitations in sidebending and rotation of the cervical spine. Abdominal crunches can help to increase flexion of the lumbar and thoracic spine.

48.

Which of the following factors would classify a client as moderate risk for a cardiac event?

Signs and symptoms of angina when exercising at an RPE of 4-7/10

Survivor of cardiac arrest or sudden death

Left ventricular ejection fraction > 50%

Normal hemodynamic and ECG responses with exercise and in recovery

Correct answer: Signs and symptoms of angina when exercising at an RPE of 4-7/10

The greatest challenge of ACSM preparticipation physical screening is potentially overlooking a sign or symptom of ongoing cardiovascular disease, and this mistake leads to a client experiencing a cardiac event. This is why it's best to err on the side of caution, obtain as much medical history as possible, and make an educated decision based on minimizing risk.

If a client has any one or more of the following factors present, they are considered at moderate risk for a cardiac event:

- *Left ventricular ejection fraction = 40% - 50%*
- *Signs and symptoms of angina at moderate levels of exercise*
- *Mild to moderate silent ischemia*

All the other options would classify the client as either low or high risk for a cardiac event.

49.

Abduction of the shoulder occurs in which of the following movement planes?

Frontal

Sagittal

Transverse

Rotational

Correct answer: Frontal

The frontal plane allows for movements such as abduction and adduction.

The sagittal plane allows for flexion and extension. The transverse or rotational plane allows for rotational movements around an axis.

50.

A client reveals they have active endocarditis. Which form of contraindication is this?

Absolute

Subjective

Relative

Benign

Correct answer: Absolute

There are certain clinical characteristics of an individual that make physical activity risky, or contraindicated. Most are related to cardiovascular health. Absolute contraindications refer to conditions that will absolutely not allow for exercise testing, while relative contraindications refer to conditions that might allow for testing, depending on the client's doctor's recommendations.

The following are absolute contraindications:

- *Acute myocardial infarction within two days*
 - *Active endocarditis*
 - *Ongoing unstable angina*
 - *Uncontrolled cardiac arrhythmia with hemodynamic compromise*
 - *Symptomatic severe aortic stenosis*
 - *Decompensated heart failure*
 - *Acute pulmonary embolism, pulmonary infarction, or deep venous thrombosis*
 - *Acute myocarditis or pericarditis*
 - *Acute aortic dissection*
 - *Physical disability that precludes safe and adequate testing*
-

51.

If you want to select a vigorous-intensity endurance activity that requires minimal skill for your client, which of the following would you not choose?

Basketball

Stepping exercise

Fast dancing

Rowing

Correct answer: Basketball

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

If you want to select a vigorous-intensity endurance activity that requires minimal skill, you should choose from the following examples:

- Jogging*
- Running*
- Rowing*
- Aerobics*
- Spinning*
- Elliptical*
- Stepping exercise*
- Fast dancing*

Basketball is a vigorous activity, but it requires skill to perform.

52.

Which of the following is not one of the seven most important questions on the 2021 PAR-Q+?

Do you believe that exercise can improve many different health conditions?

Do you feel pain in your chest at rest, during daily activities, or when you do physical activity?

Has your doctor ever said that you should only do medically supervised physical activity?

Are you currently taking prescribed medications for a chronic medical condition?

Correct answer: Do you believe that exercise can improve many different health conditions?

A 2021 PAR-Q+ would be ideal as a self-guided screening, or a screening not involving an exercise professional supervising the screening. If the individual answers "yes" to one of the seven questions on the PAR-Q+, they will then be directed to use the ePARmed-X, which includes a physician follow-up to obtain permission to engage in a physical activity program.

The following are the foundation of the PAR-Q+ and the most important questions that determine which course of action to take next:

- 1. Has your doctor ever said that you have a heart condition or high blood pressure?*
 - 2. Do you feel pain in your chest at rest, during daily activities, or when you do physical activity?*
 - 3. Do you lose balance because of dizziness, or have you lost consciousness in the last 12 months?*
 - 4. Have you ever been diagnosed with another chronic medical condition?*
 - 5. Are you currently taking prescribed medications for a chronic medical condition?*
 - 6. Do you currently have a bone, joint, or soft tissue problem that could be made worse by becoming more physically active?*
 - 7. Has your doctor ever said that you should only do medically supervised physical activity?*
-

53.

During a resting blood pressure reading, you have to listen to Korotkoff sounds to determine both diastolic and systolic blood pressure. What is the cue that you are listening to in order to determine systolic blood pressure?

The point at which the first of two or more Korotkoff sounds is heard

The point at which the "pounding" noises turn into "whooshing" noises

The point before the disappearance of Korotkoff sounds

The point just after the disappearance of Korotkoff sounds

Correct answer: The point at which the first of two or more Korotkoff sounds is heard

It is critical to assess a new client's resting blood pressure, as this is the first step to determining whether the client is at risk for a cardiac event. When performing this exam, you have to listen to Korotkoff sounds to determine both diastolic and systolic blood pressure. You know that you are listening to systolic blood pressure at the point when you hear the first of two or more Korotkoff sounds.

Here are the correct steps to follow when assessing resting blood pressure:

- 1. No smoking or caffeine 30 minutes before the assessment.*
- 2. Have your client sit quietly for five minutes before the assessment with their feet on the floor.*
- 3. Wrap the cuff firmly around the upper arm at heart level.*
- 4. Place the stethoscope chest piece below the antecubital space over the brachial artery.*
- 5. Quickly inflate cuff pressure 20 mm Hg above first Korotkoff sound.*
- 6. Slowly release pressure at a rate equal to 2 to 5 mm Hg x s⁻¹.*
- 7. Systolic blood pressure is the point at which the first of two or more Korotkoff sounds is heard (phase 1).*
- 8. Diastolic blood pressure is the point before the disappearance of Korotkoff sounds (phase 5).*

The assessment should never begin as soon as the client arrives, as this will produce inaccurate test results. Let the client sit down quietly for five minutes before the assessment. On the day of, remind your client not to ingest caffeine or smoke until after the assessment.

54.

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness.

If you choose outdoor cycling as a moderate- to vigorous-intensity physical activity that requires minimal skill for your client, which of the following is a potential benefit?

Reduced impact

Cost

Weather

Safety

Correct answer: Reduced impact

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

Cycling is a moderate- to vigorous-intensity physical activity that requires minimal skill for your client and offers the benefits of having low impact on bones and joints.

The potential disadvantages of cycling include the following:

- Cost of bicycle*
 - Weather*
 - Safety of cycling environment*
-

55.

If you want to select an endurance activity for your client that requires skill to perform, which of the following would you not choose?

Spinning

Swimming

Cross-country skiing

Jumping rope

Correct answer: Spinning

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

If you want to select an endurance activity that requires skill to perform, you should choose a similar exercise to the following:

- Swimming*
- Cross-country skiing*
- Skating*
- Jumping rope or other similar skill-based movements*

Spinning is a vigorous-intensity activity that does not require skill to perform.

56.

All the following cardiorespiratory fitness assessments involve stairs except:

Rockport

Queens College

Harvard

Astrand-Rhyming

Correct answer: Rockport

Cardiorespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The following are all examples of step tests:

- *Queens College*
- *Harvard*
- *Astrand-Rhyming*

Rockport is a type of walk test.

57.

For the Ebbeling Single-Stage Submaximal Treadmill Walking Test, the exercise physiologist should extend the testing time by one minute if the client's heart rate differs by more than which of the following?

5 beats per minute

3 beats per minute

7 beats per minute

The heart rate should not differ, as a heart rate monitor is being used

Correct answer: 5 beats per minute

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The Ebbeling Single-Stage Submaximal Treadmill Walking Test is an assessment to help the exercise physiologist determine VO₂ max.

The exercise physiologist should extend the testing time by one minute if the client's heart rate differs by more than five beats per minute.

Here is the protocol:

- 1. Warm up for 4 minutes at a 0% grade and a walking speed between 2.0 and 4.5 mph that elicits a heart rate between 50% to 70% of age-predicted heart rate max, adjusting speed after first minute as needed.*
- 2. Following the warm-up, elevate the treadmill to a 5% grade and continue walking for an additional 4 minutes at a speed of 2.0, 3.0, 4.0, or 4.5 mph. Record the steady-state HR (SS HR) from the average of the final 30 seconds of the last two minutes at the 5% grade. If HR differs for more than 5 beats per minute, extend the test by an additional minute and record the SS HR from the new final 2 minutes.*
- 3. Enter the SS HR into this equation: $VO_2 \text{ max (mL} \times \text{kg}^{-1} \times \text{min}^{-1}) = 15.1 + (21.8 \times \text{speed in mph}) - (0.327 \times \text{SS HR in bpm}) - (0.263 \times \text{speed in mph} \times \text{age in years}) + (0.00504 \times \text{SS HR in bpm} \times \text{age in years}) + (5.98 \times \text{gender: female} = 0, \text{ male} = 1).$*

58.

Which of the following types of muscles is more centrally located and largely functions to create stiffness across joints?

Stabilizing muscles

Mobilizing muscles

Type II muscles

Type I muscles

Correct answer: Stabilizing muscles

Some experts have classified muscles as two distinct yet interdependent systems; a muscle is either a stabilizer or a mobilizer. Stabilizing muscles are more centrally located and largely function to create stiffness across joints.

Mobilizers, on the other hand, are considered global muscles, as they comprise long lever arms and allow for greater force production, torque, and gross multiplanar movements.

59.

How long does the working portion of the Astrand-Rhyming Cycle Ergometer test last?

6 minutes

4 minutes

9 minutes

8 minutes

Correct answer: 6 minutes

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The Astrand-Rhyming Cycle Ergometer test is one of the most recommended methods for fitness trainers to measure an adult client's cardiorespiratory fitness level, and the working portion only lasts six minutes.

After you set the seat on the cycle ergometer to ACSM guidelines, you will select the appropriate work rate based on the sex and self-reported fitness level of the client:

- **Females, unconditioned:** 300 or 450 kg-m x min⁻¹ (50 or 75 w)
- **Females, conditioned:** 450 or 600 kg-m x min⁻¹ (75 or 100 w)
- **Males, unconditioned:** 300 or 600 kg-m x min⁻¹ (50 or 100 w)
- **Males, conditioned:** 600 or 900 kg-m x min⁻¹ (100 or 150 w)

While you should have access to these formulas during the assessment through the ACSM textbook, it's still useful to memorize them as you progress in your field. Here is the rest of the process for the Astrand-Rhyming Cycle Ergometer test.

1. *After a proper warm-up, instruct your client to pedal at 50 rpm for six minutes at the work rate selected above.*
2. *Assess heart rate two times during minutes 5-6, and average the values.*
3. *Estimate VO₂ max from a nomogram.*
4. *Because HR_{max} decreases with age, the value from the nomogram must be adjusted for age by multiplying VO₂ max value by the following correction factors:*

Age / Correction Factor

15 / 1.10

25 / 1.00

35 / 0.87

40 / 0.83

45 / 0.78

50 / 0.75

55 / 0.71

60 / 0.68

65 / 0.65

60.

Which degree of ligament sprain usually requires surgical repair?

Third degree

All sprains require surgery, regardless of degree

Second degree

Fourth degree

Correct answer: Third degree

Ligaments are collagenous fibrous structures that connect bone to bone and provide passive soft-tissue restraint of bone-to-bone contact. When a client has a third degree ligament sprain, surgical repair may be required.

In the meantime, you can advise your client to follow the PRICE acronym and immobilize the area.

61.

Which of the following is not a purpose of informed consent?

To inform the client about their current exercise capacity

To inform the client of which personal information will be collected

To inform the client how personal information will be used

To detail the risks involved with physical activity

Correct answer: To inform the client about their current exercise capacity

Informed consent is collected before any personal information is obtained, fitness tests are conducted, and exercise participation begins. There are three main purposes of informed consent:

- 1. To inform the client of any personal and confidential information that will be collected*
- 2. To inform the client how personal information will be used*
- 3. To detail the risks involved with physical activity*

Fitness testing is not performed until after the informed consent forms have been signed.

62.

Which of the following is considered the standard for muscular strength assessments?

One-repetition maximum

Functional movement screen

Ten-repetition maximum

Max squats and pushups in a minute

Correct answer: One-repetition maximum

The standard muscular strength assessment would be the one-repetition maximum (1-RM), which is when the client attempts to lift the heaviest weight they can only once with perfect technique and form.

With that said, due to the higher risk for injury, it is possible to use other assessments such as the 5-RM or 10-RM assessment. The latter would be especially useful if the client is training within an 8 to 12 repetition range.

63.

Which of the following resting heart rates would be classified as tachycardia?

110 BPM

40 BPM

70 BPM

Tachycardia is used to describe blood pressure, not heart rate

Correct answer: 110 BPM

Tachycardia means high heart rate. At rest, this means greater than 100 BPM (or greater than 80 BPM, based on some sources).

A normal resting heart rate is generally considered to be between 60 and 100 BPM. Lower than 60 BPM is considered bradycardia.

64.

You determine that a client should receive a medical evaluation prior to completing an exercise program. Which of the following terms best describes the process of identifying clients who should be seen by a physician before initiating exercise?

Screening

Pre-testing

Motivational interviewing

Collaboratively evaluating

Correct answer: Screening

All clients should be screened to ensure that they are healthy enough to start an exercise program. This process is known as a preparticipation activity screening.

A preparticipation physical activity screening is recommended for new clients for the following reasons:

- To identify those with medical contraindications for performing physical activity*
- To identify those who should receive a medical/physical evaluation exam and clearance prior to performing a physical activity program*
- To identify those who should participate in a medically supervised physical activity program*
- To identify those with other health/medical concerns such as orthopedic injuries*

Motivational interviewing is used to help clients set and determine their goals. Pre-testing is used to determine a client's starting point. Collaboratively evaluating is not a recognized term in this field.

65.

Which of the following would not affect flexibility?

Beta blocker medication

Excess adipose tissue

Laxity of muscles

Being over the age of 60

Correct answer: Beta blocker medication

A person's range of motion is determined by several factors, including the following:

- **Muscle properties:** *The current flexibility status of your muscle tissue. This is able to be improved through flexibility training.*
- **Physical activity and exercise:** *The degree to which the client is engaging in physical activities that promote a full range of motion.*
- **Anatomical structures:** *The degree of flexibility in your joints and tissues.*
- **Age and gender:** *Older adults have less collagen, and this can impact flexibility. Females tend to be more flexible than males.*

While certain medications can cause symptoms, they will not impact the degree of flexibility within a client.

66.

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness.

If you choose swimming as a moderate- to high-intensity physical activity that requires skill to perform for your client, which of the following is not a potential benefit?

Environment

Low impact

Total body exercise

Potential for high caloric expenditure

Correct answer: Environment

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

Swimming is a moderate- to high-intensity physical activity that requires skill to perform and offers the following benefits:

- Low impact—great for joints*
- Total body exercise*
- Potential for high caloric expenditure*

A pool's chlorinated environment may aggravate respiratory conditions.

67.

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness.

If you want to select an endurance activity that requires minimal skill, which of the following would you not choose?

Lap swimming with various strokes

Slow dancing

Aqua-aerobics

Leisurely cycling

Correct answer: Lap swimming with various strokes

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

If you want to select an endurance activity that requires minimal skill, you should choose from the following examples:

- Walking*
- Leisurely cycling*
- Aqua-aerobics*
- Slow dancing*

Swimming, while it is a low-impact activity, does require the necessary skills to perform it.

68.

Which of the following assessments is designed to test muscular endurance?

Push-up test

Squat jump test

1-RM barbell back squat

Rockport Walking test

Correct answer: Push-up test

Muscular endurance is the ability to perform repeated contractions over a period of time, and it is typically assessed with field measures, most commonly the push-up test. The push-up test can be used independently or in combination with other muscular endurance tests to assess strengths and weaknesses.

The squat jump test is a test for muscular power. The 1-RM barbell back squat is a test for muscular strength. The Rockport Walking test is a general cardiovascular fitness assessment.

69.

For the Ebbeling Single-Stage Submaximal Treadmill Walking Test, what is the target heart rate you want for the warm-up portion of the assessment?

50% to 70% of age-predicted heart rate max

30% to 50% of age-predicted heart rate max

There is no guidance specified on heart rate during the warm-up for this test

60% to 80% of age-predicted heart rate max

Correct answer: 50% to 70% of age-predicted heart rate max

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The Ebbeling Single-Stage Submaximal Treadmill Walking Test is an assessment to help the exercise physiologist determine VO₂ max.

Here is the protocol:

- 1. Warm up for 4 minutes at a 0% grade and a walking speed between 2.0 and 4.5 mph that elicits a heart rate between 50% to 70% of age-predicted heart rate max adjusting speed after first minute as needed.*
- 2. Following the warm-up, elevate the treadmill to a 5% grade and continue walking for an additional 4 minutes at a speed of 2.0, 3.0, 4.0, or 4.5 mph. Record the steady-state HR (SS HR) from the average of the final 30 seconds of the last two minutes at the 5% grade. If HR differs for more than 5 beats per minute, extend the test by an additional minute and record the SS HR from the new final 2 minutes.*
- 3. Enter the SS HR into this equation: $VO_2 \text{ max (mL} \times \text{kg}^{-1} \times \text{min}^{-1}) = 15.1 + (21.8 \times \text{speed in mph}) - (0.327 \times \text{SS HR in bpm}) - (0.263 \times \text{speed in mph} \times \text{age in years}) + (0.00504 \times \text{SS HR in bpm} \times \text{age in years}) + (5.98 \times \text{gender: female} = 0, \text{ male} = 1).$*

70.

Which of the following is encouraged before a resting blood pressure test during an initial fitness consultation?

Sitting quietly

Exercising at low intensity

Consuming coffee or tea

Lying down with eyes closed

Correct answer: Sitting quietly

It is critical to assess a new client's resting blood pressure, as this is the first step to determining whether the client is at risk for a cardiac event. Make sure the client avoids caffeine, exercise, and smoking no less than 30 minutes before the exam.

Here are the correct steps to follow when assessing resting blood pressure:

- 1. No smoking or caffeine 30 minutes before the assessment.*
- 2. Have your client sit quietly for five minutes before the assessment with their feet on the floor.*
- 3. Wrap the cuff firmly around the upper arm at heart level.*
- 4. Place the stethoscope chest piece below the antecubital space over the brachial artery.*
- 5. Quickly inflate cuff pressure 20 mm Hg above first Korotkoff sound.*
- 6. Slowly release pressure at a rate equal to 2 to 5 mm Hg x s-1.*
- 7. Systolic blood pressure is the point at which the first or two or more Korotkoff sounds are heard (phase 1).*
- 8. Diastolic blood pressure is the point before the disappearance of Korotkoff sounds (phase 5).*

The assessment should never begin as soon as the client arrives, as this will produce inaccurate test results. Let the client sit down quietly for five minutes before the assessment. On the day of, remind your client not to ingest caffeine or smoke until after the assessment.

The client should rarely have their blood pressure tested while lying down; this would be reserved for special cases, such as for a client for whom sitting is contraindicated.

71.

All the following are considered inappropriate weight loss methods except:

HIIT training

Sweat suits

Extended fasts

Dietary supplements

Correct answer: HIIT training

The focus on weight loss and overall fitness should be a long-term lifestyle and not short-term solutions. Many people try to use the following inappropriate weight-loss methods, sometimes with very bad consequences:

- *Saunas*
- *Vibrating belts*
- *Body wraps*
- *Overexercising*
- *Electric muscle stimulators*
- *Sweat suits*
- *Dietary supplements*
- *Very low calorie diets*
- *Fad diets*

When paired with a diet that reasonably restricts calories, high intensity interval training can contribute to a caloric deficit which will lead to weight loss.

72.

If an individual is pregnant, which of the following options is not recommended upon completing a 2021 PAR-Q+ self-guided screening?

The individual should initiate a low-intensity exercise program

The individual should complete the ePARmed-X+

The individual should talk with their physician

The individual should talk with a qualified exercise professional

Correct answer: The individual should initiate a low-intensity exercise program

Upon completing a 2021 PAR-Q+ self-guided screening, a pregnant individual should move forward with the following:

- *The individual should talk to a health care practitioner (e.g., second opinion).*
- *The individual should talk with their physician.*
- *The individual should talk with a qualified exercise professional.*
- *The individual should complete the ePARmed-X+.*

After these steps have been completed, the individual can begin with an expert-recommended physical activity program.

A preparticipation physical activity screening is recommended for new clients for the following reasons:

- *To identify those with medical contraindications for performing physical activity*
 - *To identify those who should receive a medical/physical evaluation exam and clearance prior to performing a physical activity program*
 - *To identify those who should participate in a medically supervised physical activity program*
 - *To identify those with other health/medical concerns such as orthopedic injuries*
-

73.

If you're going by the ACSM preparticipation screening algorithm, which of the following is considered moderate-intensity exercise?

40%-59% heart rate reserve (HRR) / 3-5.9 metabolic equivalents (METs) / rating of perceived exertion (RPE): 12-13

40%-59% heart rate reserve (HRR) / 2-2.9 metabolic equivalents (METs) / rating of perceived exertion (RPE): 9-11

50%-60% heart rate reserve (HRR) / 6 metabolic equivalents (METs) / rating of perceived exertion (RPE): 14

60%-70% heart rate reserve (HRR) / 1-2 metabolic equivalents (METs) / rating of perceived exertion (RPE): 16

Correct answer: 40%-59% heart rate reserve (HRR) / 3-5.9 metabolic equivalents (METs) / rating of perceived exertion (RPE): 12-13

According to the ACSM preparticipation screening algorithm, there are three levels of intensity:

- 1. **Light:** 30%-39% heart rate reserve (HRR) / 2-2.9 metabolic equivalents (METs) / rating of perceived exertion (RPE): 9-11*
- 2. **Moderate:** 40%-59% heart rate reserve (HRR) / 3-5.9 metabolic equivalents (METs) / rating of perceived exertion (RPE): 12-13*
- 3. **Vigorous:** 60% heart rate reserve (HRR) / 6 metabolic equivalents (METs) / rating of perceived exertion (RPE): 14*

If you are creating a program for a client based on moderate-intensity exercises, you would want to follow the guidelines of 40%-59% heart rate reserve (HRR) / 3-5.9 metabolic equivalents (METs) / rating of perceived exertion (RPE): 12-13.

74.

How far should the client walk during the Rockport Walking Test?

1 mile

3 miles

1.5 miles

The distance can vary but the incline is always kept at 5%

Correct answer: 1 mile

The Rockport Walking Test is a type of cardiorespiratory fitness field test. The client will be asked to walk one mile as fast as possible without jogging, running, or sprinting.

When instructing a client to perform the test, it's important to review the following:

- *Locate a level surface and determine the distance or lap that is equivalent to one mile.*
 - *After the client warms up, instruct the client to walk one mile as fast as possible without jogging or running.*
 - *Immediately after one mile has been completed, record the walk time in minutes.*
 - *If the client is wearing a heart rate monitor, record the heart rate achieved immediately upon reaching the one-mile mark.*
 - *If the client doesn't have a heart rate monitor, take the client's pulse for 15 seconds and multiply by 4 to determine peak heart rate.*
-

75.

When attempting to create a program that will be most effective for helping a client reach their goals, which of the following factors is not considered one of the most important factors when creating a resistance training program for a client?

Personal interests

Training experience

Number of available days

Health status

Correct answer: Personal interests

When a trainer creates a program for a new client, it must be tailored to that client's specific needs. Programs should always be based on the following:

- *Health status*
- *Current fitness level*
- *Training experience*
- *Individual goals*
- *Number of available days*

While it is important for the client to be heard when expressing personal interests and preferences for exercise, there might be more effective exercises that are ideal for the client. For example, if a client has always used exercise machines, they might prefer those instead of free weights, limiting their potential for progression.

76.

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness.

If you choose walking outside as a low-to-moderate physical activity for your client, which of the following is not a potential benefit?

Safety concerns

Cost

Equipment

Skill

Correct answer: Safety concerns

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low-to-moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

Walking is a great low-to-moderate physical activity that offers the following benefits:

- Does not require expensive equipment*
- Does not require special skills*
- Does not require special facilities*
- Can be performed indoors and outdoors*

The one downside to walking is potential safety concerns of the walking environment.

77.

Which of the following is not a type of field test for cardiorespiratory fitness?

YMCA Cycle Ergometer Test

Rockport Walk Test

12-Min Walk/Run Test

1.5 Mile Run Test

Correct answer: YMCA Cycle Ergometer Test

CardioRespiratory Fitness (CRF) can be assessed through a variety of step tests, field tests, and submaximal VO₂ prediction tests. The advantage of having a wide variety of available tests is that it allows you as the trainer to select an appropriate assessment that provides the desired physiological information while adhering to the needs of the client.

The Rockport Walk Test, 12-Min Walk/Run Test, and 1.5 Mile Run Test are all examples of cardiorespiratory field tests. The YMCA Cycle Ergometer Test is an example of a submaximal oxygen uptake test.

78.

Which of the following is not a characteristic of a mobilizer muscle?

Slow-twitch

Superficial

Gross movement

High force production

Correct answer: Slow-twitch

Some experts have classified muscles as two distinct yet interdependent systems; a muscle is either a stabilizer or a mobilizer. Stabilizing muscles are more centrally located and largely function to create stiffness across joints.

Mobilizers, on the other hand, are considered global muscles, as they comprise long lever arms and allow for greater force production, torque, and gross multiplanar movements. Additional characteristics of mobilizers include the following:

- *Fast twitch*
- *Fatigues easily*
- *Superficial*
- *Relatively small proprioceptive role*
- *High force production*
- *Prone to hold excess tension / shorten*
- *Concentric*
- *Gross movement*

Slow twitch is a characteristic of stabilizers.

79.

Which of the following is an important consideration for the use of bodyweight exercises with inactive and overweight clients?

They might not be able to perform a single repetition

They are not as effective as free weights

Clients will not prefer bodyweight exercises

Bodyweight exercises burn fewer calories than free-weight and machine exercises

Correct answer: They might not be able to perform a single repetition

Bodyweight training is the oldest form of exercise. Not only is it effective, but also convenient because you don't need additional equipment. With that said, when you are working with inactive or overweight clients, it is possible that they might not be able to do a single repetition. Obviously, this can compromise a workout in terms of both progression and safety. In this case, you might need to start with machines or free weights and build up to bodyweight movements like pull-ups and push-ups.

80.

Which of the following is not a CMR (cardiovascular, metabolic, renal) disease that would place a client at a higher risk for complications during exercise testing and participation?

Osteosarcoma

Congenital heart disease

Heart surgery

Pacemaker

Correct answer: Osteosarcoma

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The following cover the major CMR diseases that the trainer should be aware of:

- *Heart attack*
- *Heart surgery*
- *Pacemaker*
- *Heart valve disease*
- *Heart failure*
- *Heart transplantation*
- *Congenital heart disease*
- *Diabetes*
- *Renal failure*

Osteosarcoma is a disease, but it should not place the client into a high-risk category, especially if the client is undergoing treatment. With that said, you will probably have to adjust the intensity of that program on days the client is receiving cancer treatment.

81.

When a client has loss of thoracic extension, which of the following is the suggested corrective exercise?

Scapular retraction (no weight)

Bench press

Side plank

Sit ups

Correct answer: Scapular retraction (no weight)

As a part of the trainer's duty to appraise the quality of movement during an exercise session, it will be necessary to observe any alignment faults that might present themselves.

When a client has loss of thoracic extension, the trainer should incorporate the scapular retraction (with no weight) exercise into the client's program until the alignment issue is corrected.

From there, the client can be re-evaluated and progressed to the next exercise that is in line with their fitness goals. In this case, seated rows might be an ideal option.

82.

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness.

If you choose an exercise bike as your mode of choice for the client, which of the following is not a potential benefit when compared to performing aerobic exercise by running outside?

Cost

Low impact

Weather

Controlled external elements

Correct answer: Cost

As an exercise physiologist, you'll be expected to perform a thorough fitness assessment to determine which type of exercises are ideal for your client. In general, there are four modes of aerobic exercise to improve physical fitness:

- 1. Low- to moderate-intensity endurance activities requiring no/minimal skill*
- 2. Vigorous-intensity endurance activities requiring minimal skill*
- 3. Endurance activities requiring skill to perform*
- 4. Recreational sports*

Aerobic machines are a moderate-intensity physical activity that requires minimal skill to perform and offers the following benefits:

- Weather doesn't matter*
- Low-impact options available*
- Supports all types of fitness goals (e.g., muscle growth and fat loss)*

Having an at-home aerobic machine might be costly. If the client prefers to use one in a facility, they have to pay the member fee.

83.

During the Queens College Step Test, when should the heart rate be taken?

After three minutes

After two minutes

After four minutes

After five minutes

Correct answer: After three minutes

The Queens College Step Test is a type of cardiorespiratory fitness test. Specifically, as the name implies, it is a type of step test.

This test lasts for three minutes before the client's heart rate is measured.

You should instruct the client to step up and down on a standardized step height of 16.25 inches. Adult females should step at a rate of 22 steps per minute. Adult males should step at a rate of 24 steps per minute.

After three minutes, instruct the client to stop. Within the first five seconds, palpate the pulse while the client stands. A 15-second pulse count is then taken and multiplied by four.

The subject's VO₂ max is determined from the recovery heart rate by the following formulas:

If you have a female participating in the assessment, you should use the following formula to determine the subject's VO₂ max:

- $VO_2 \text{ max (mL x kg}^{-1} \text{ x min}^{-1}) = 65.81 - (0.1847 \times HR)$

If you have a male performing the test, use the following formula :

- $VO_2 \text{ max (mL x kg}^{-1} \text{ x min}^{-1}) = 111.33 - (0.42 \times HR)$
-

84.

What does the pain from intermittent claudication indicate?

Lack of oxygenated blood flow

The presence of varicose veins

Heart murmur

Lymph system blockage

Correct answer: Lack of oxygenated blood flow

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

One of the major signs and symptoms of CMR disease is intermittent claudication. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, intermittent claudication refers to severe calf pain when walking. This pain indicates a lack of oxygenated blood flow to the working muscles.

85.

Which of the following best describes how moderate-intensity aerobic exercise compares to vigorous-intensity aerobic exercise?

Two minutes of moderate-intensity exercise equals one minute of vigorous-intensity exercise

Three minutes of moderate-intensity exercise equals one minute of vigorous-intensity exercise

Four minutes of moderate-intensity exercise equals one minute of vigorous-intensity exercise

Five minutes of moderate-intensity exercise equals one minute of vigorous-intensity exercise

Correct answer: Two minutes of moderate-intensity exercise equals one minute of vigorous-intensity exercise

The acronym FITT provides the framework to establish an exercise prescription in healthy individuals. In regard to exercise intensity, two minutes of moderate-intensity exercise equals one minute of vigorous-intensity exercise.

FITT stands for the following:

- **Frequency:** Aerobic exercise is recommended to be performed on at least 3 days per week. This should consist of both moderate- and high-intensity exercises.
 - **Intensity:** A combination of moderate-intensity exercise and vigorous-intensity exercise is recommended for most healthy individuals.
 - **Time:** Most adults are recommended to accumulate 30 to 60 minutes per day of moderate-intensity exercise, 20 to 60 minutes per day of vigorous-intensity exercise, or a combination of both.
 - **Type:** All types of physical activity are beneficial so long as they are of sufficient duration and intensity. Rhythmic, continuous exercise that involves major muscle groups is the most typical choice, but for advanced clients, consider other forms of exercise such as interval training or stop-and-go sports.
-

86.

Volume of air inhaled and exhaled per minute best defines which of the following terms?

Pulmonary ventilation

Pulmonary output

VO₂

Inspiration-expiration difference

Correct answer: Pulmonary ventilation

Pulmonary ventilation is an indicator of performance and training intensity. It is described as the volume of air inhaled and exhaled per minute. It is a big part of cardiorespiratory fitness assessments, and it tends to be measured in response to graded intensity exercise.

Pulmonary ventilation is calculated by multiplying the frequency of breathing by the volume of air moved per breath (tidal volume). It increases linearly with the client's work rate until it reaches 50% to 80% VO₂ max. This is when it reaches the ventilatory threshold, and ventilation begins to increase exponentially.

87.

You are conducting a preparticipation physical activity screening with a client. Which of the following would you not consider during the evaluation?

A history of having a male relative who smoked regularly

Past physical activity history

Any known CMR disease

Signs or symptoms of CMR diseases

Correct answer: A history of having a male relative who smoked regularly

Essentially, there are only three things that need to be considered to complete the process of the screening:

- 1. The trainer should consider the client's past physical activity history.*
- 2. The client should be questioned about any known cardiac magnetic resonance (CMR) disease.*
- 3. The trainer should ask about any signs or symptoms of the CMR diseases discussed in step 2.*

A history of having a male relative who smoked regularly should not significantly affect the preparticipation screening.

88.

Which of the following is not necessary during a professionally guided health screening for a new client?

Completed food journal

Informed consent process

Preparticipation physical activity screening

Cardiovascular risk factor analysis

Correct answer: Completed food journal

While an individual can use the 2021 PAR-Q+ to run through a self-guided screening, many people will seek the knowledge and expertise of an exercise professional. Under the guidance of an ACSM exercise physiologist, a professionally supervised screening should include the following:

- *Informed consent process*
- *Preparticipation physical activity screening*
- *Health history*
- *Cardiovascular risk factor analysis*

A client might also need a medical clearance based on this screening.

89.

All the following are proven factors for alterations in movement except:

Motivation

Poor posture

Obesity

Joint structure

Correct answer: Motivation

Alterations in movement can stem from the following factors:

- *Obesity/Overweight*
- *Sedentary behavior*
- *Poor posture*
- *Unvaried movement*
- *Joint structure*
- *Propensity for certain muscles to become inhibited*
- *Age*

Motivation is not considered a primary factor for triggering alterations in movement. You, as the fitness expert, should consider all these factors during a fitness assessment to ensure proper programming.

90.

Which of the following is the most important component of ACSM preparticipation physical screening?

Identifying a sign or symptom of ongoing cardiovascular disease

Selecting the appropriate screening method for those with no physical activity experience

Correctly grouping a client into a demographic category

Taking into account client preferences for exercise methods

Correct answer: Identifying a sign or symptom of ongoing cardiovascular disease

The greatest challenge of ACSM preparticipation physical screening is potentially overlooking a sign or symptom of ongoing cardiovascular disease, and this mistake leads to a client experiencing a cardiac event. This is why it's best to err on the side of caution, obtain as much medical history as possible, and make an educated decision based on minimizing risk.

91.

Which of the following is true of the calculations for determining energy expenditure during walking exercise?

The formula is most accurate for speeds between 50-100 m/min

The formula for determining energy expenditure during walking is less accurate than the one for arm cycling

The formula is based solely on speed

The formula is based solely on slope

Correct answer: The formula is most accurate for speeds between 50-100 m/min

Calculating VO₂, or energy expenditure, can be a helpful way to measure progress, determine a client's starting point, and generally help clients get a picture of their cardiovascular health.

The walking formula is most accurate when used for speeds between 50-100 m/min. However, it is not necessarily less accurate overall when compared to arm cycling. The formula is based on both speed and slope.

92.

Which of the following is not a recommended guideline that will assist in attaining an accurate prediction of the percentage of body fat using bioelectrical impedance?

Perform the test with no or minimal clothing on

No alcohol consumption within 48 hours of the test

No eating or drinking within 4 hours of the test

No exercise within 12 hours of the test

Correct answer: Perform the test with no or minimal clothing on

Bioelectrical Impedance Analysis (BIA) is a rapid, noninvasive body composition assessment tool that should be used alongside skinfold measurements. There are certain guidelines that the client should follow that will assist in attaining an accurate prediction of the percentage of body fat.

- *No eating or drinking within 4 hours of the test*
- *No exercise within 12 hours of the test*
- *Empty the bladder within 30 minutes of the test*
- *No alcohol consumption within 48 hours of the test*
- *No diuretic medication within 7 days of the test*

It is also important to complete the test in a thermoneutral environment as the elements can impact the test.

93.

Intermittent claudication usually presents in which of the following ways?

Severe calf pain when walking

Pain or discomfort in the chest

Shortness of breath

Fainting or dizziness

Correct answer: Severe calf pain when walking

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

One of the major signs and symptoms of CMR disease is intermittent claudication. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, intermittent claudication refers to severe calf pain when walking.

94.

In regard to CMR diseases, what does dyspnea mean?

General difficulty with breathing

Ankle swelling

Trouble breathing while lying down

Fainting

Correct answer: General difficulty with breathing

Clients with any of the CMR diseases are at a higher risk for an untoward event during exercise testing and/or participation. The major CMR diseases that the trainer should be aware of include heart attack, heart surgery, pacemaker, heart valve disease, heart failure, heart transplantation, congenital heart disease, diabetes, and renal failure.

One of the nine signs and symptoms of CMR disease is dyspnea. If a client has any of these signs or symptoms, they are considered a higher risk and should get medical clearance before continuing with the test and physical activity.

In regard to CMR diseases, dyspnea is the abnormally uncomfortable awareness of breathing.

95.

Self-myofascial release can significantly improve range of motion. If a client has hyperextension of the lumbar spine, which muscle would not be a target for SMR and stretching?

Rectus abdominis

Quadrates lumborum

Quadriceps

Iliopsoas

Correct answer: Rectus abdominis

Self-Myofascial Release (SMR) has been shown to improve range of motion without negatively affecting performance. If you have a client who has hyperextension of the lumbar spine, the muscles that you should target for SMR and stretching would be quadrates lumborum, quadriceps, and iliopsoas.

The abdominals would be the target muscle for posterior pelvic tilt.
