1.5 Mile Run Test:

- Best for fitter clients
- It estimates aerobic fitness levels by scoring the individual's timed performance or their heart rate response, which is used to estimate VO2max.

Rockport Walk Test:

- 1 mile walking test to predict Vo2 max
- Appropriate for new exercisers
- Not as good for fit individuals
- Can be done on a treadmill

Queens 3 Minute Step Test:

-16.25in step

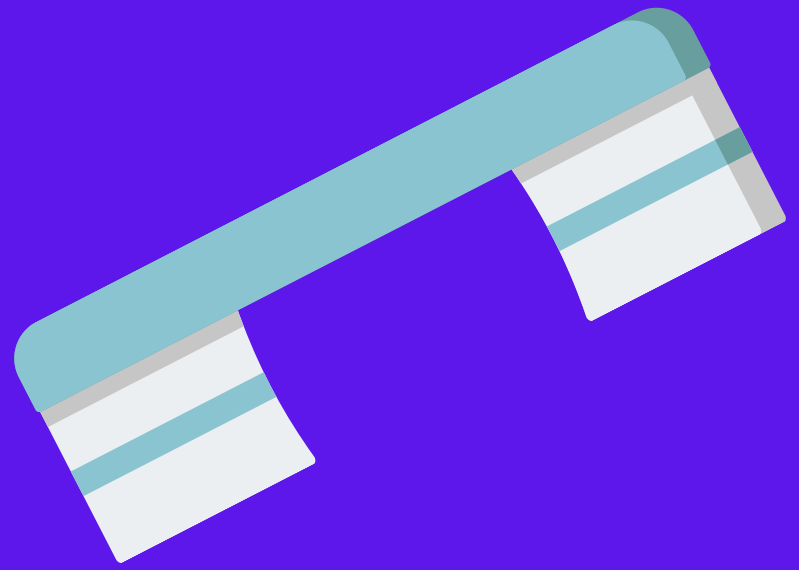
-Males go at 24 steps a min

-Females go at 22 steps a min

-After 3 mins HR is taken for 15s

-Multiply that # by 4

-Enter into formula for Est VO2M



Single Stage Treadmill Walking Protocol: Effective way to predict CRF in healthy people between 20-59 years old.

Single Stage Treadmill Jogging Protocol: Effective way to predict CRF in healthy people between 18-28 years old. Best used with experienced joggers.

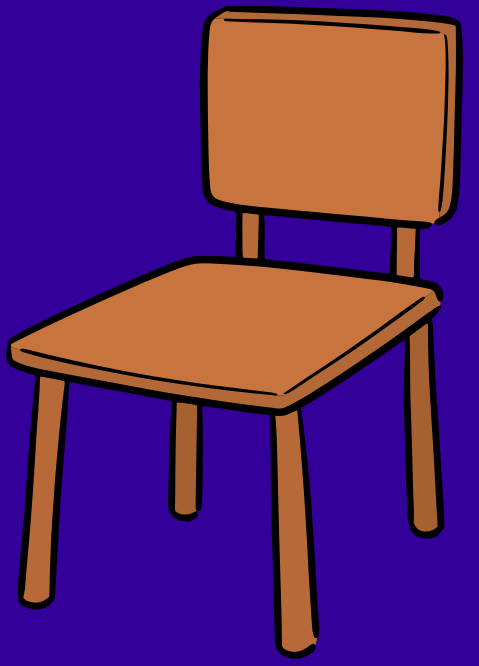
Both can predict VO2 Max | More on PG. 342

Astrand-Rhyming Submaximal Cycling Protocol: Created by Astrand and Rhyming. It's single stage, simple, lasts 6 mins, and uses HR response. Measures CRF.

Fox Single Stage Submaximal Cycling Protocol: 5 mins, single stage, Measures CRF. It can predict VO2 max.

More on PG. 343

Timed Get Up And Go: Helps determine fall risk for older individuals. Involves getting up from a chair, walking and sitting again.



Fullerton SFT: Most comprehensive functional assessment for older adults. Strength, endurance, flexibility, balance stuff included.

The Talk Test (A reliable way to test intensity)

-associated with the transition from aerobic energy systems to anaerobic

-how well a client can speak during exercise relates to intensity.

-RPE: 10-11 comfortable speech is possible

-RPE: 17-19 speech is limited to short phrases

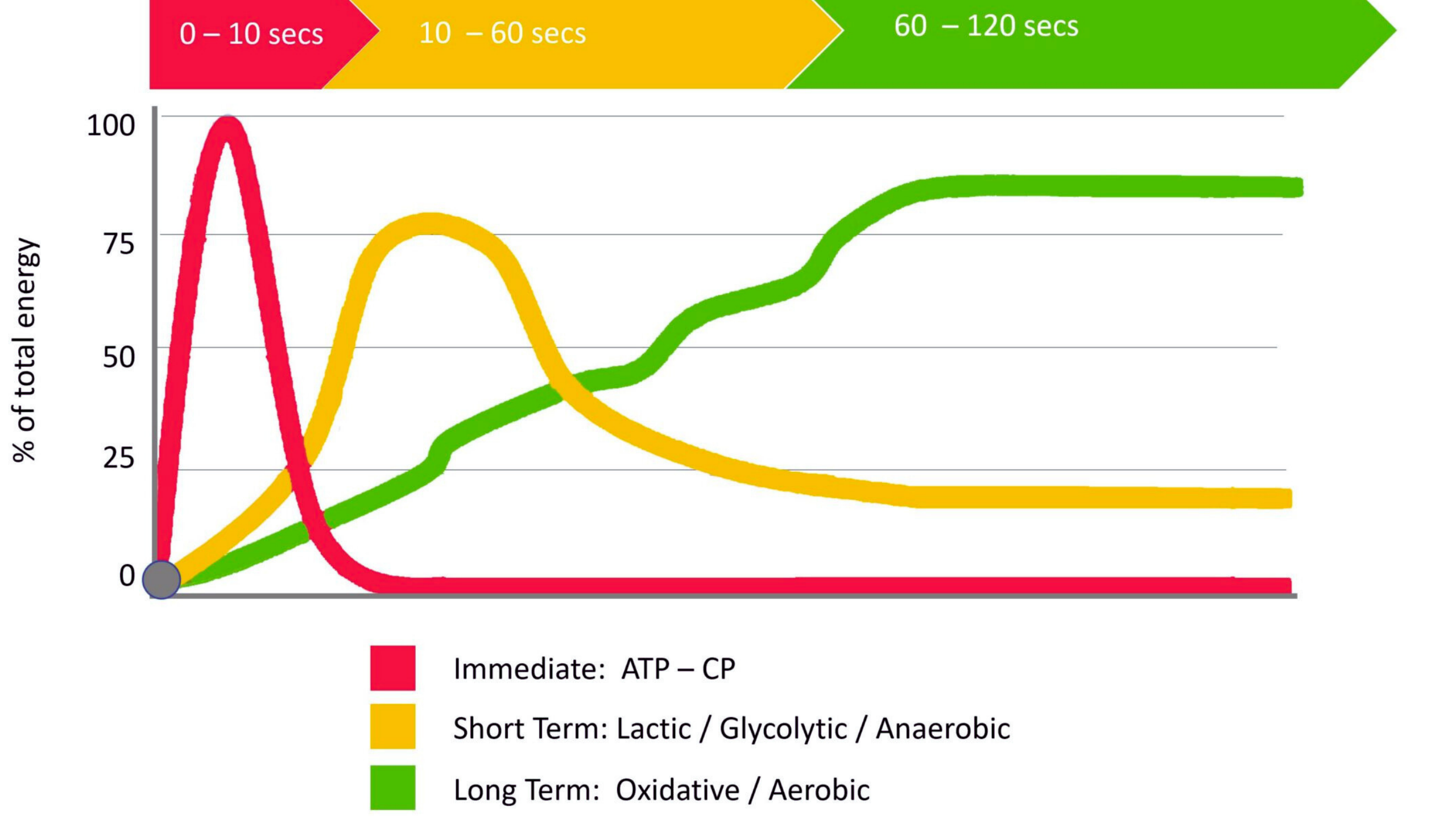
FMS™

FUNCTIONAL MOVEMENT SCREEN

Energy Systems

ATP or Adenosine Triphosphate molecules provide the body with energy. Breaking these ATP molecules down is how your body powers itself.

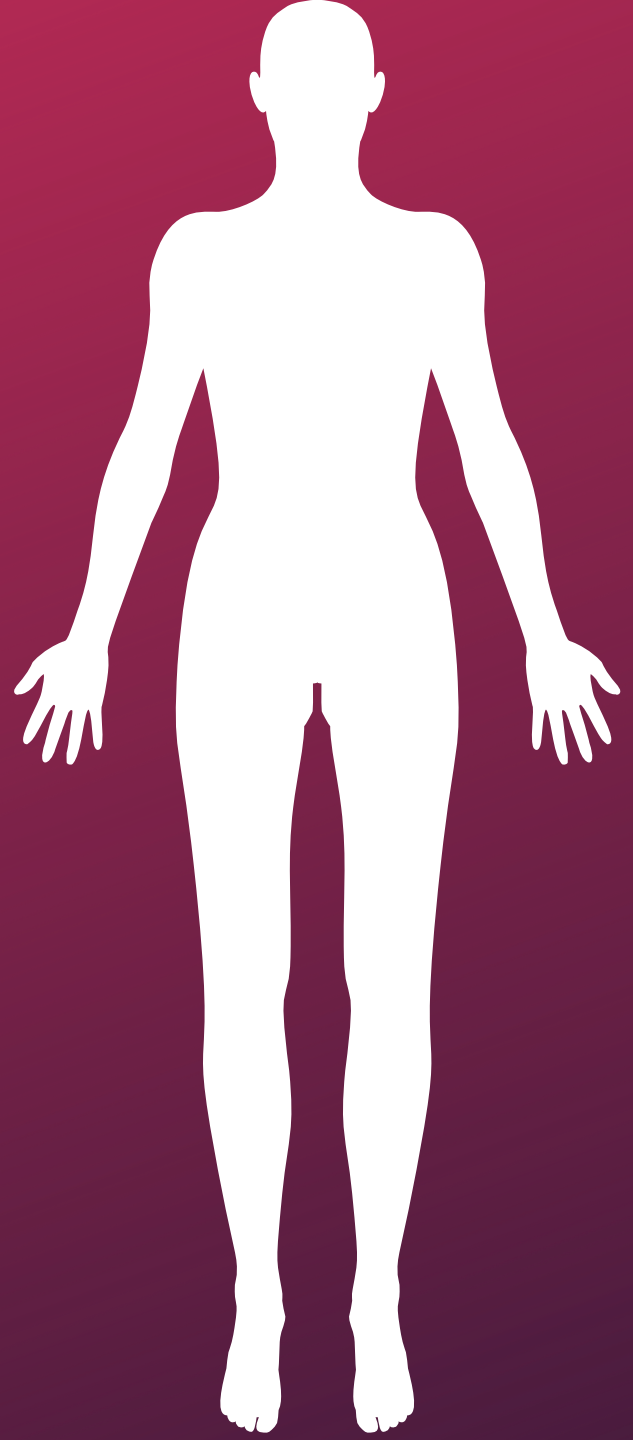
Try to understand the chart on the next page.


0 – 10 secs
10 – 60 secs
60 – 120 secs
100
75
50
25
0
% of total energy
Immediate: ATP – CP
Short Term: Lactic / Glycolytic / Anaerobic
Long Term: Oxidative / Aerobic

-The aerobic system that we just described has other components like the Krebs Cycle and Electronic Transport Chain. They can power the body for a long period of time. (endurance events)

- Know time frames for each system

Planes Of Motion And Movement



Superior - toward the head end of the body

Inferior- away from the head or lower

Anterior- front of the body

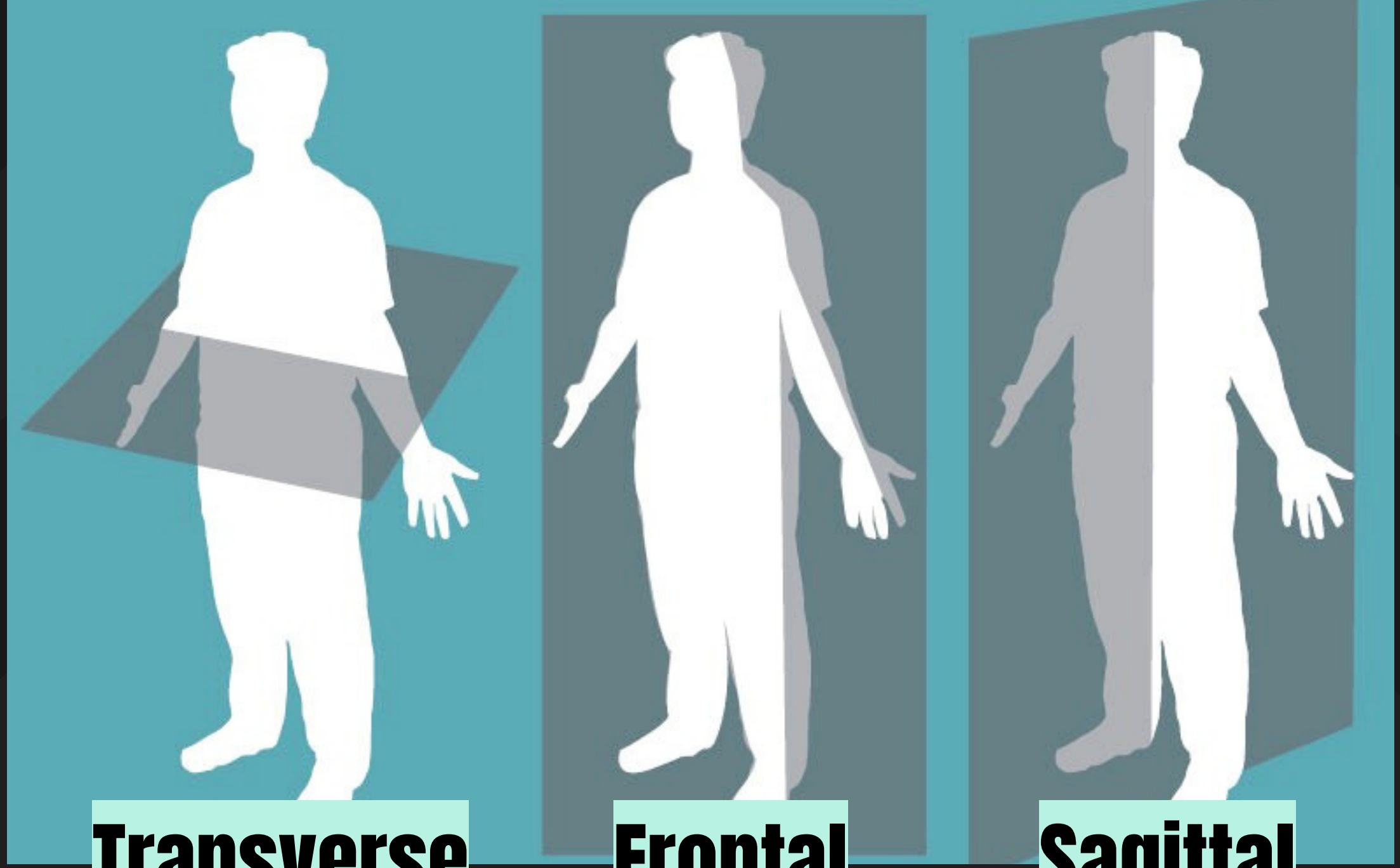
Posterior- back of the body

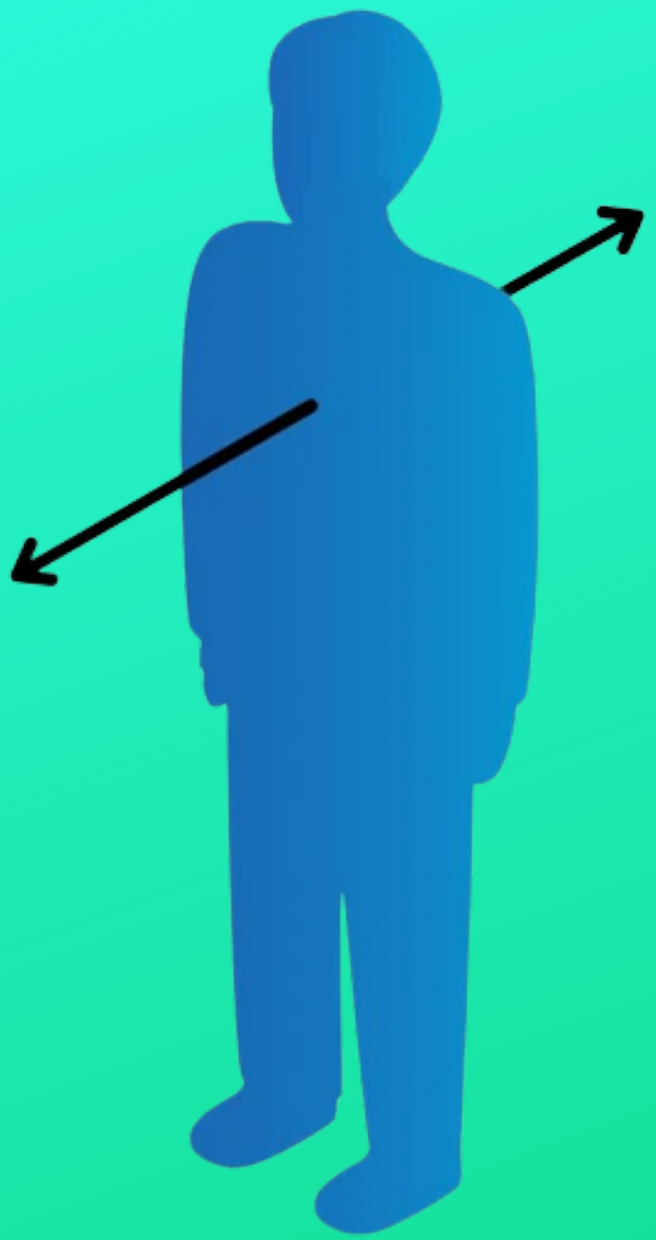
Medial - toward the midline of the body

Lateral - away from the midline of the body

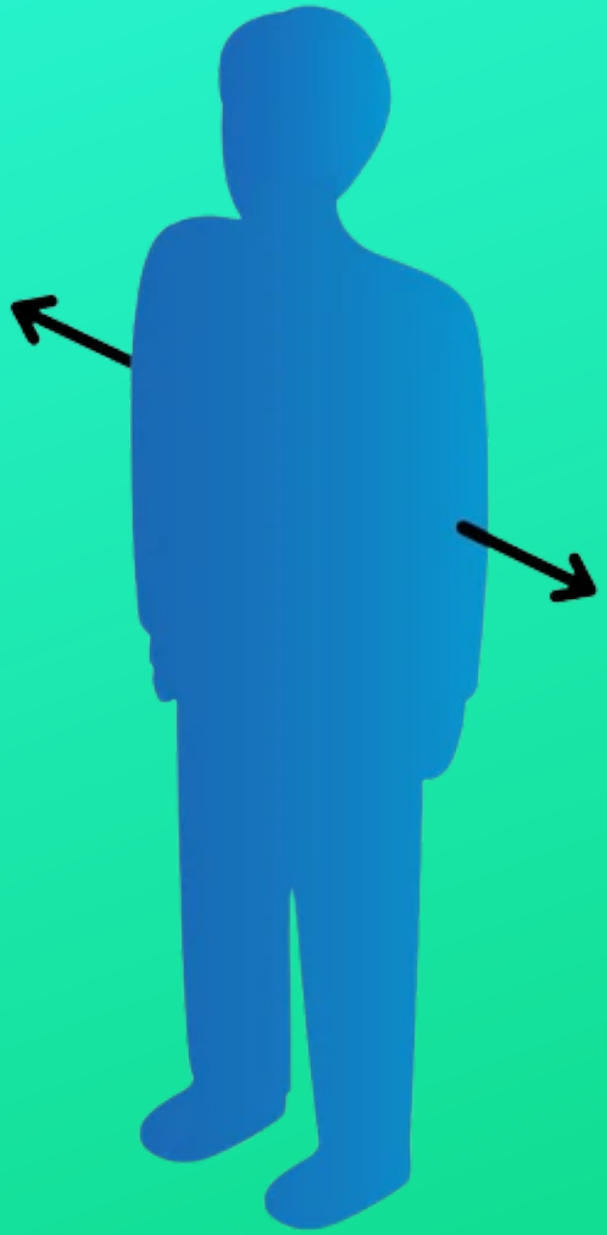
Proximal - nearest the trunk or the point of origin

Distal - farthest from the trunk or the point or origin

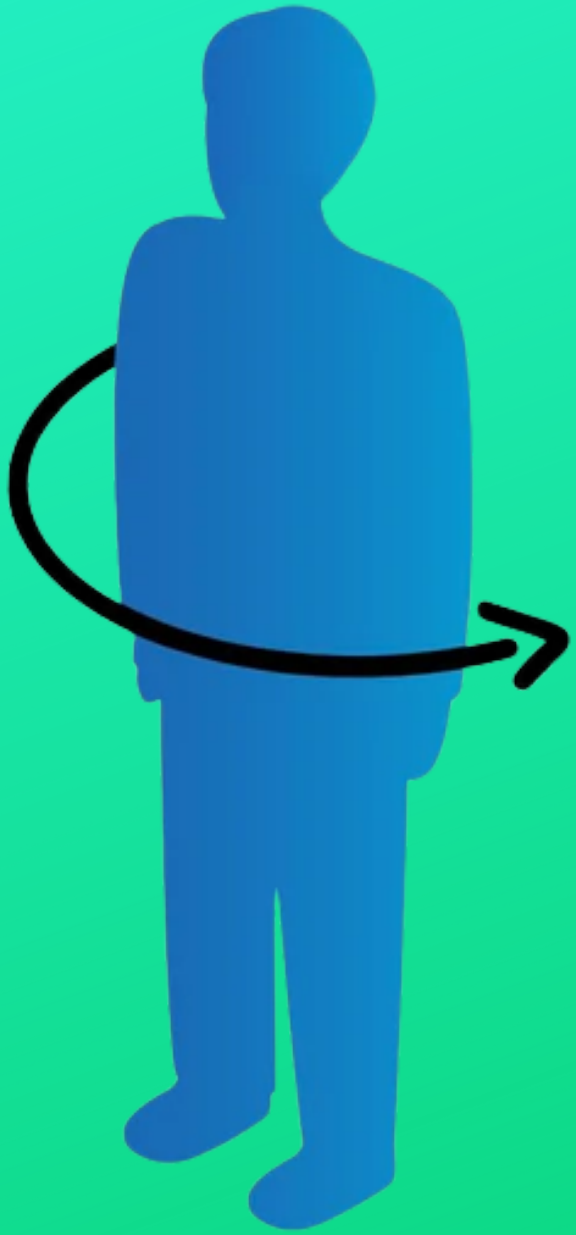

Transverse
Frontal
Sagittal



Sagittal



Frontal



Transverse

Movements In the Sagittal Plane

Flexion: Decreasing the joint angle

Extension: Increasing the joint angle

Dorsiflexion: Moving the top of the foot toward the shin (ankle only)

Plantarflexion: Moving the sole of the foot down towords the ground (pointing toes)

Movements In the Frontal Plane

Adduction: Movement toward the midline

Abduction: Movement away from the midline of the body

Elevation: Moving to a superior position (scapula)

Depression: Moving to an inferior position (scapula)

Inversion: Tilting the foot towards midline

Eversion: Tilting the foot away from the midline

Movements In the Transverse Plane

Rotation: When the torso or a limb moves around its vertical axis

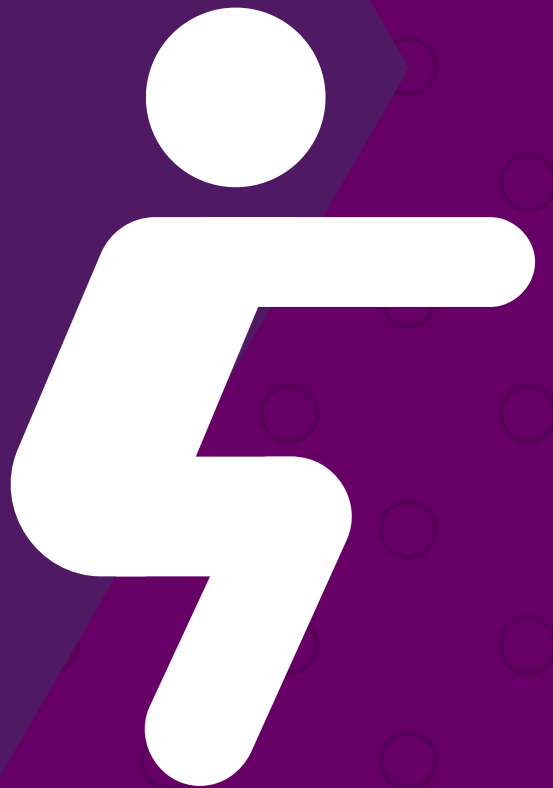
Pronation: Rotating the forearm or foot to a palm-side or foot-side down position

Supination: Rotating the forearm or foot to a palm-side or foot-side up position

Horizontal abduction: Moving the upper arm away from the midline of the body when it is elevated to 90 degrees

Horizontal adduction: Moving the upper arm towards the midline of the body when it is elevated to 90 degrees

It's possible that you'll get a question or two where you'll be shown an exercise, and you'll have to identify what movement is taking place. You will also have to identify what plane of motion the movement is occurring in.



Exercise Regressions, Progressions & Form

Let's look at the lunge. Let's say I have a client lunging, but they're wobbly. How should I regress the exercise?

A. Allow the client to support themselves against the wall

B. Decrease the number of reps that the client is doing

C. Have the client do a backflip

D. Make sure you like the video 😎

A. Allow the client to support themselves against the wall

B. Decrease the number of reps that the client is doing

C. Have the client do a backflip

D. Make sure you like the video 😎

Let's say I have a beginner client lunging, they're doing great, and I need to make the exercise harder. How should I progress the exercise?

A. Have the client do jumping lunges

B. Tell the client to perform the movement faster

C. Subscribe to the channel 😎

D. Give the client light dumbbells to hold onto while doing the exercise

A. Have the client do jumping lunges

B. Tell the client to perform the movement faster

C. Subscribe to the channel 😎

D. Give the client light dumbbells to hold onto while doing the exercise

Let's say I have a client who's squatting and leaning too far forward. Choose the best cueing advice to give this client.

A. Tell the client their squat is a mess
B. Tell the client to shift the weight back onto the ball of their foot, heels, and hips
C. Hand the client light weights for increased stability
D. Stop the squat immediately and don't have that client do them anymore

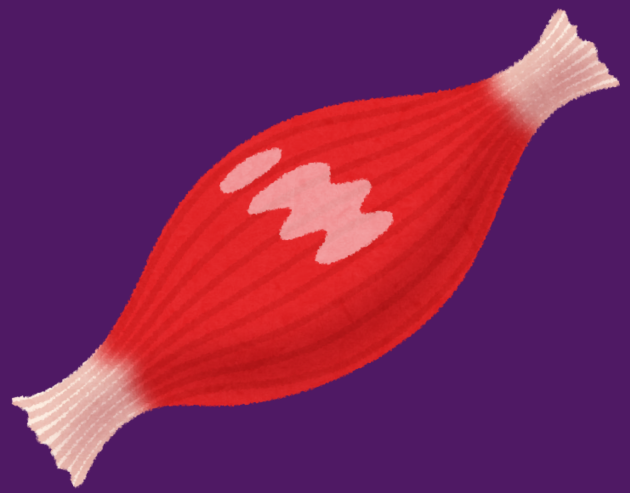
A. Tell the client their squat is a mess

B. Tell the client to shift the weight back onto the ball of their foot, heels, and hips

C. Hand the client light weights for increased stability

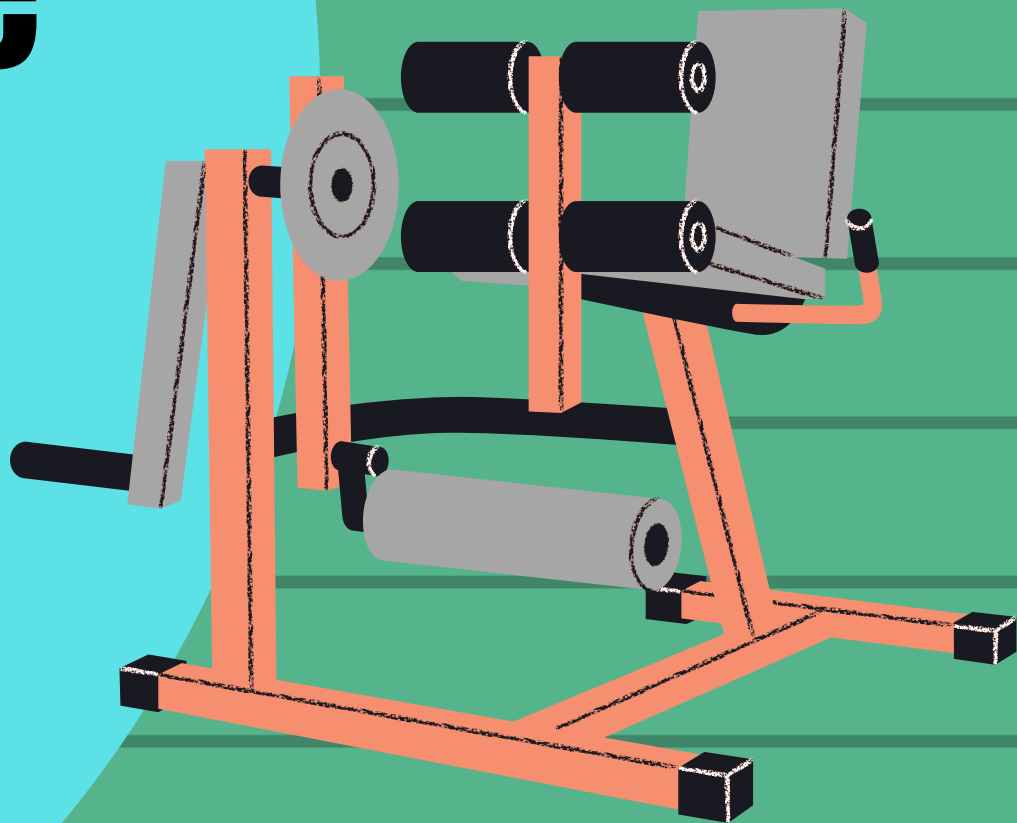
D. Stop the squat immediately and don't have that client do them anymore

Next up lets talk about agonists and antagonists. An agonist is the prime mover or muscle that does most of the work during a specific exercise. An antagonist is the muscle that opposes the agonist.

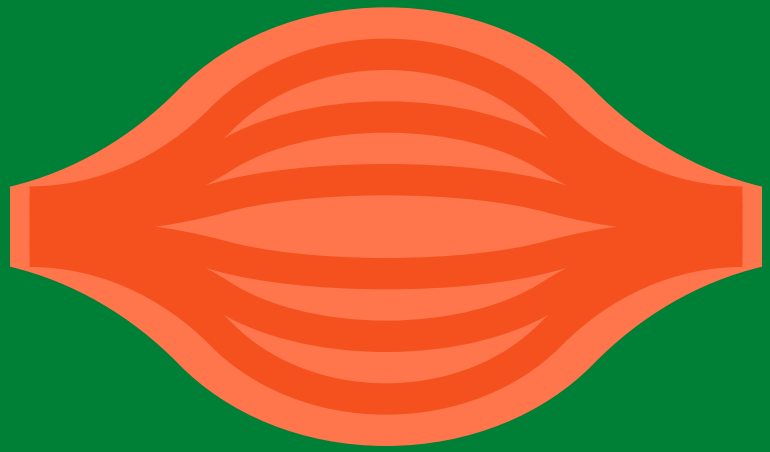


The easiest example of this is the biceps and triceps. When I'm doing a biceps curl the biceps are the agonist, meaning they do most of the work. The opposing muscle group, the triceps, would be the antagonist.

So, if I am doing a leg extension, what muscle group is the agonist and what muscle group is the antagonist?



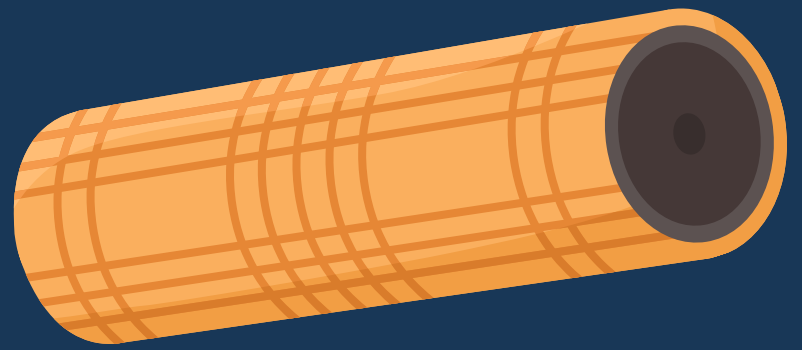
The agonist would be the quadricep muscles.



The antagonist would be the hamstring muscles.

You also have synergists which assist prime movers or agonists with movements.

Reciprocal Inhibition: The relaxation of muscles on one side of a joint to accommodate contraction on the other side.

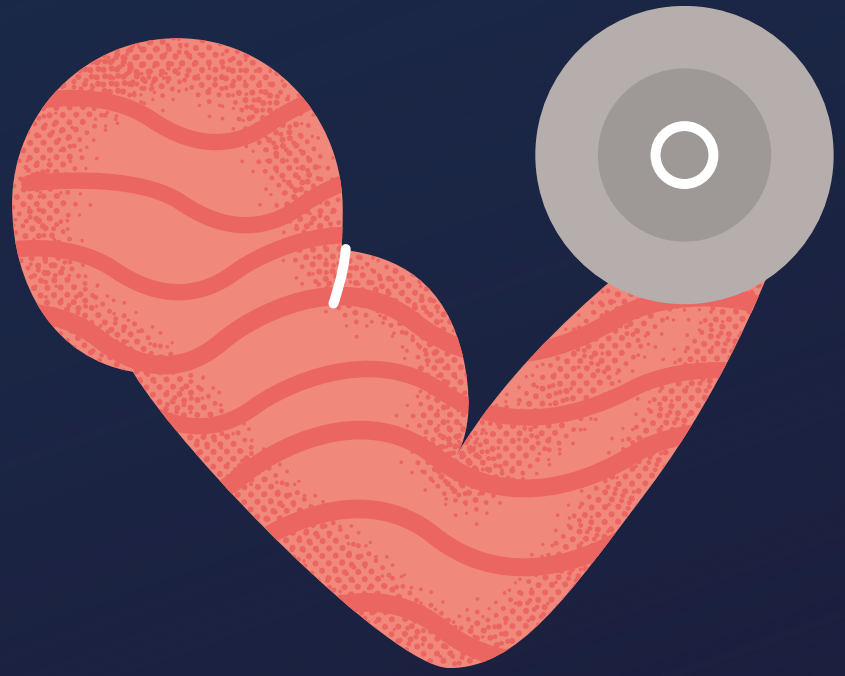


Autogenic Inhibition: The ability of a muscle to relax when it experiences a stretch or increased tension.

Golgi Tendon Organ (GTO): Located at the point where the muscle and tendon meet (musculotendinous junction). The GTO is sensitive to change in muscle tension and the speed of tension change.

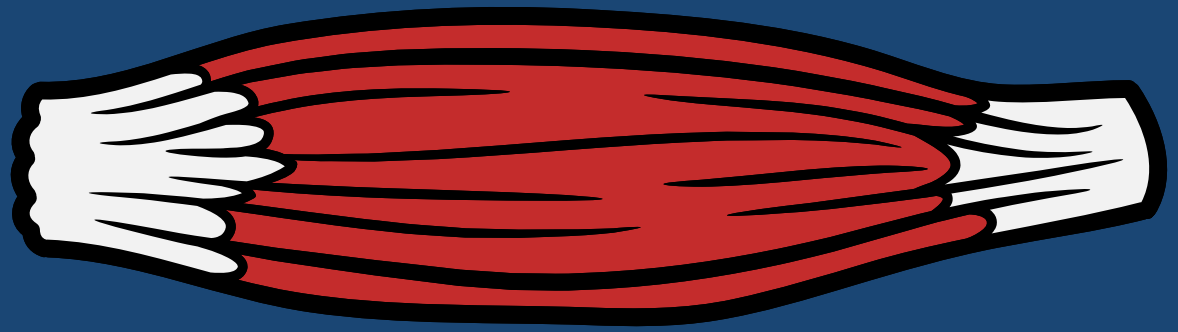
Muscle Spindle: Sensory organs that lie parallel to the muscle fibers. They detect muscle length and the speed/rate at which a muscle is stretching.

Muscle Contraction Types



First up we have static or isometric contractions. These contractions occur when there is no change in muscle length.

An concentric contraction is when a muscle shortens.

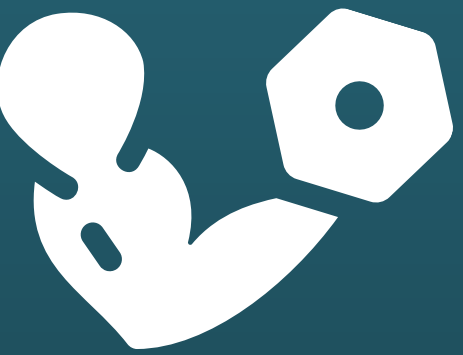


An eccentric contraction is when a muscle lengthens.

The eccentric phase is most responsible for DOMS.

Isotonic exercises are typically comprised of concentric and eccentric phases.

Curls, squats, rows, etc. are examples.

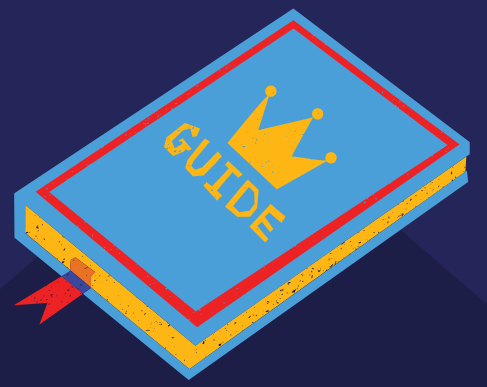


Isokinetic exercises have a muscular contraction that occurs at a constant speed. The speed of the movement is controlled, usually specialized stuff is used.


Nutrition Facts
Serving Size 1 package
Amount Per Serving
Calories 280
Calories from Fat 45
% Daily Value*
7%
7%
Total Fat 6g
Saturated Fat 1.6g
Trans Fat 0g
10%
18%
18%
Cholesterol 35mg
Sodium 420mg
24%
Total Carbohydrate 50g
Fiber 5g
82%

We are personal trainers, not dietitians. We don't develop meal plans for clients, and we don't do medical nutrition therapy. That being said, we can do things like help our clients to understand food labels, what certain nutrients do in the body, etc.

Also, we can use the dietary guidelines developed by the government and the recommendations from myplate.gov. If there is a question about what you can legally do as a personal trainer, nutrition wise, the answer most often will have to do with the US Dietary Guidelines or myplate.gov.



It won't be uncommon for a question to come up where the best thing for you to do would be to refer the client to a registered dietitian. For example, if a client has diabetes and they want to lose weight, even if it's something that you could help them with, the correct thing to do would be to refer them to a dietitian.

There are six basic nutrients: carbohydrates, proteins, fats, vitamins, minerals, and water.

One thing you need to memorize is...

1 gram of protein = 4 calories

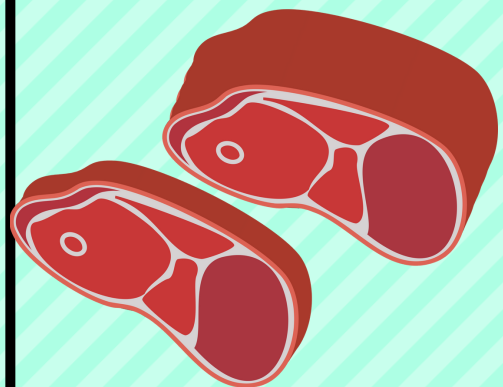
1 gram of carbohydrate = 4 calories

1 gram of fat = 9 calories

Micronutrients: Vitamins, minerals, and phytonutrients.

Complete Protein: Provides all essential amino acids. Animal and dairy proteins fall into this category.

Incomplete Protein: Missing one or more amino acids. Plant proteins fall into this category.



Macronutrient RDA's

Protein: .8 grams per kg of body weight for sedentary adults (higher for other populations)

Carbs: 3-5 grams per kg of body weight for lightly active adults (higher for other populations)

Fat: 20% to 35% of total calories. Satuated fats should only make up 10%, or less of total cals.

Higher amounts of protein and carbs could be useful. 6-10g per kg of bw or 45-65% of total calories of carbs is possible. Also, 1.2-2.0 grams of protein per kg or 10-35% of total calories is possible.

A caloric deficit of 300-400 calories a week is advisable for weight loss.

There is 3,500 calories in a pound of fat.

A 500 calorie daily deficit would get you roughly a pound of fat loss every week.

Also, although 25-30% of daily fat intake is acceptable, 25% of daily calories is the recommended max for most.

Monounsaturated Fats: Heart Healthy. (olive oil, avocado, peanuts)

Polyunsaturated Fats Omega 3: Heart Healthy. (fish, flaxseed, some dairy)

Polyunsaturated Fats Omega 6: Essential for growth/development. (vegetable oil, nuts, seeds)

Saturated Fats: Health benefits unclear. Limit consumption. (animal fat, full fat dairy, coconut)

Trans fats: Artificial (usually), bad

Fat Soluble Vitamins: A,D,E,K

Water Soluble Vitamins: C, B vitamins

Major Minerals: Calcium, phosphorus, magnesium, sodium, potassium, chloride, sulfur

Monosaccharides: They're simple and can't be broken down more (glucose, fructose, galactose)

Disaccharides: Two monosaccharides joined together (sucrose, maltose, lactose)

Polysaccharides: Long chains of glucose units. (glycogen, fiber, starch)

Hydration

Before Exercise: 5-10 ml per kg 2-4 hours before exercise

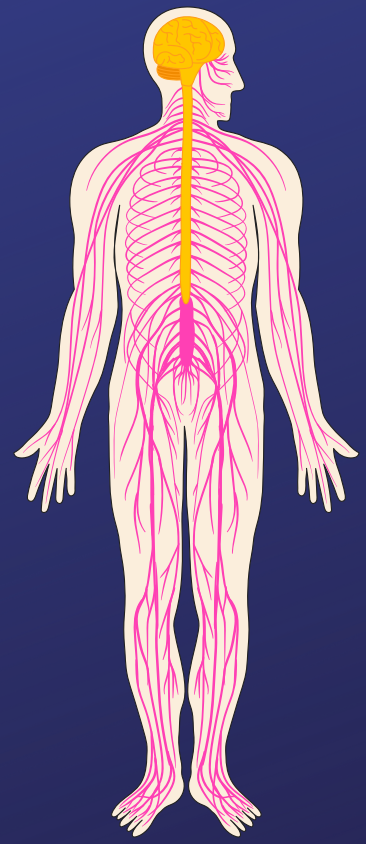
During Exercise: 0.4-0.8 L per hour of fluid. A 6-8% carb solution, with 100-200mg of sodium per cup is helpful.

After Exercise: Drink 1.25-1.5 times the amount of fluid lost, or 125-150% of the deficit. Losing 2-5% of bw (sweat) can have bad effects, >6% is severe dehydration.

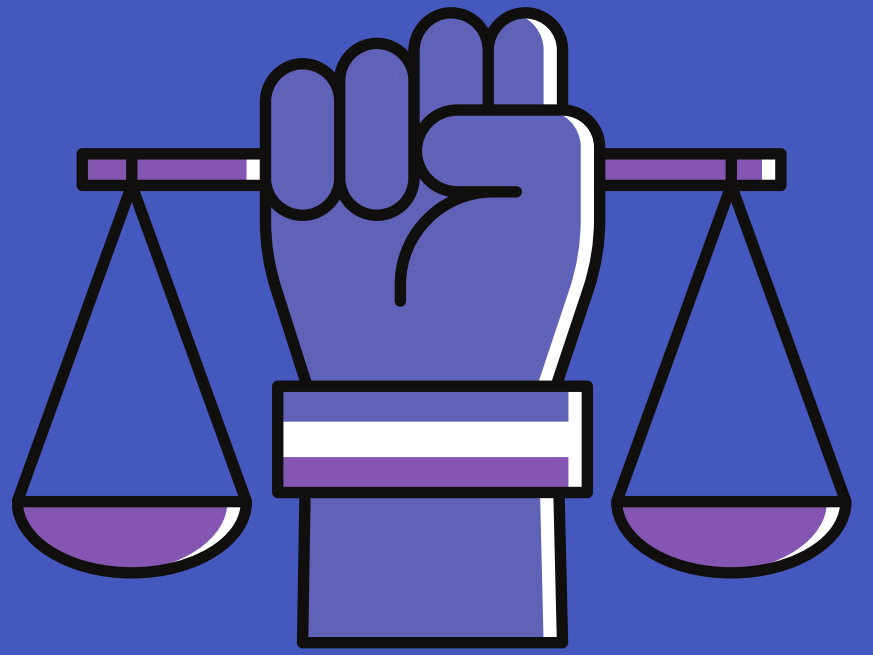
20 ounces of fluid should be consumed for each pound of sweat lost. There's 16 ounces in a pound.

Random Stuff Worth Knowing!

The nervous system has two main components: the somatic nervous system and the autonomous nervous system. The somatic nervous system is mostly under our control. It mostly involves skeletal muscles and things like that. The autonomous nervous system is automatic as the name would imply meaning it is not under our control.



The autonomous nervous system is split into two parts. The sympathetic nervous system which controls our fight and flight response, and the parasympathetic nervous system, which has to do with resting and digesting.



Type one muscle fibers are slow twitch meaning they have better endurance but produce lower power. Type two muscle fibers are fast twitch they generate more power but have less than deterrence capabilities.

When we're talking about scope of practice the least aggressive answer will usually be the correct one.

Ex. You have an injured tennis player client, what should you do?

Answer: Show the client some stretches

Static Stretching: Holding a stretch for roughly 30s

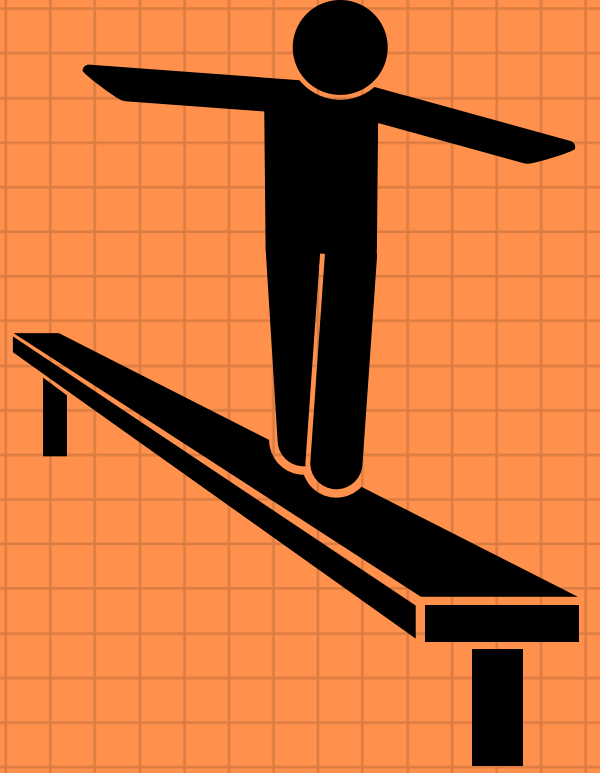
Dynamic Stretching: Movement pattern designed to mimic the workout

Ballistic Stretching: Repeated bouncing or swinging to stretch muscle group. Avoid this one.

Dynamic Balance Exercise

-Can be static or dynamic

-Involves transferring weight from one foot to the other

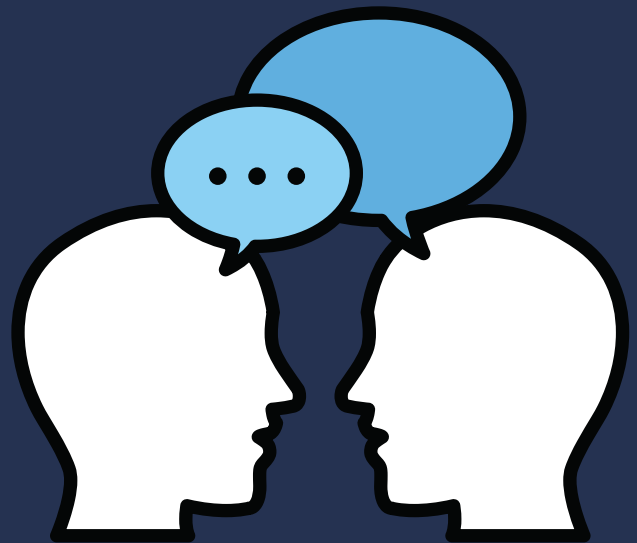


Liability Insurance

A personal trainer should carry liability insurance whether they're employed by some one else or self employed.

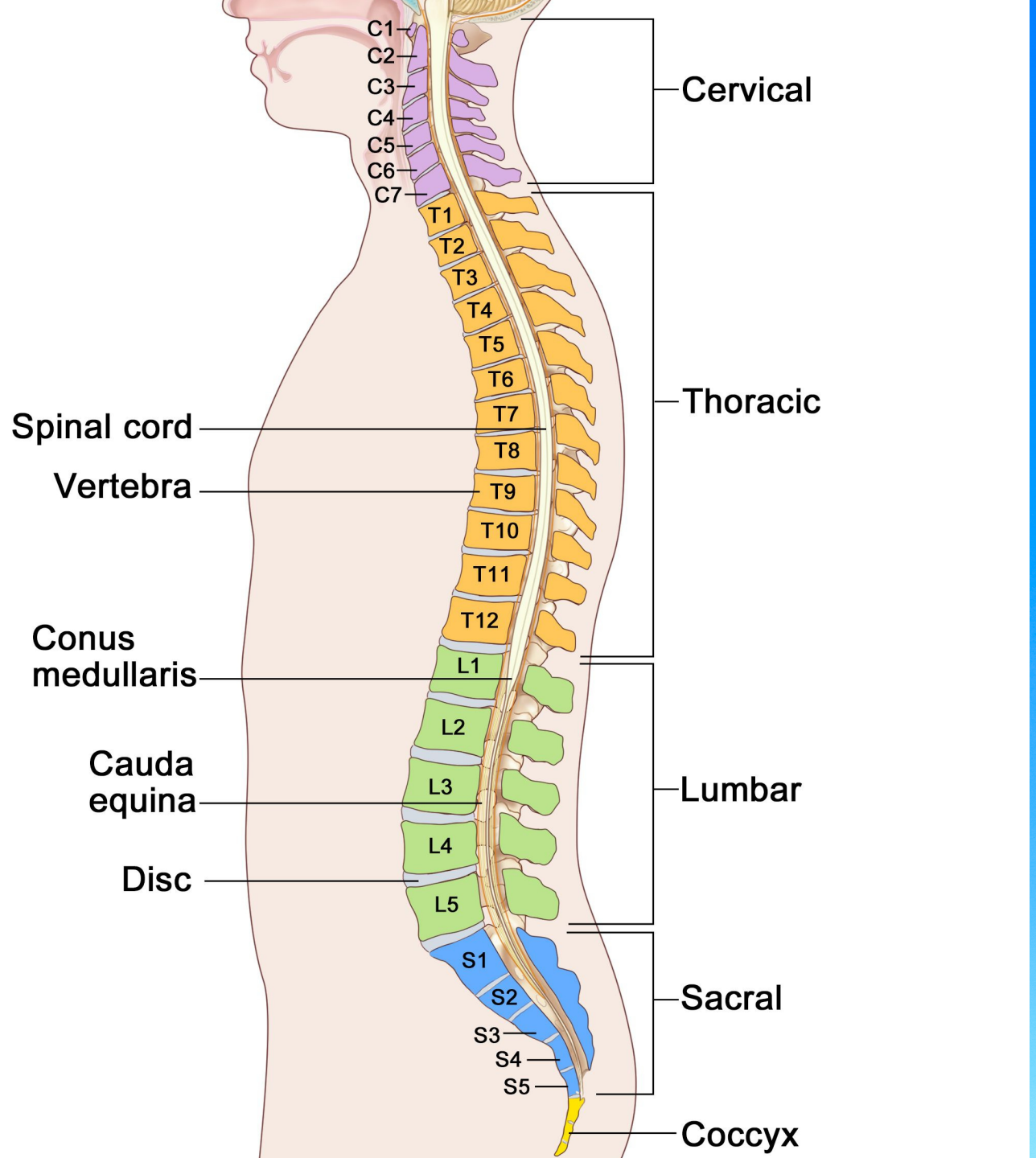
2 million dollars in coverage is recommended.

If something questionable comes up in a session, like your client sharing too much information about their divorce, the correct thing to do would be to redirect the focus of the conversation back to the workout.



Goals need to be positive!

Cueing also needs to be positive or at the very least not negative.



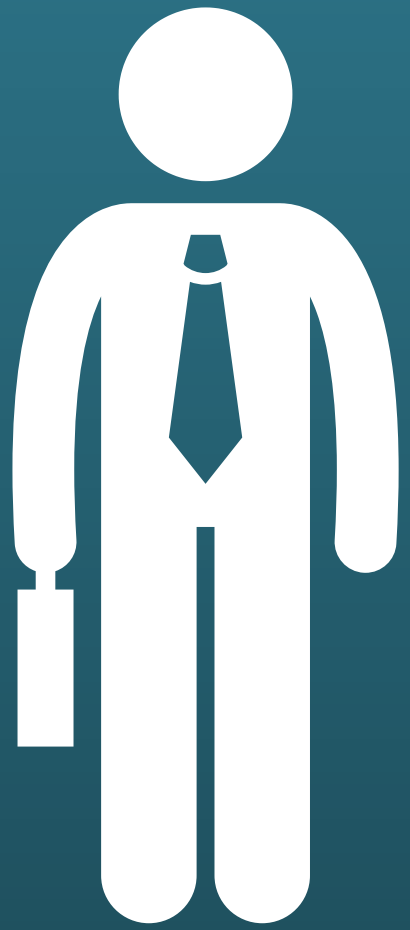
Remember breakfast (7 cervical) lunch (12 thoracic) and dinner (5 lumbar) for vertebrae. You also have 5 fused sacral vertebrae.

Sole proprietorship: Business is owned by an individual. No protection for the owner.

LLC: Provides protection. Forms are required but they are relatively simple (compared to S-Corp)

Independent contractor: A self-employed person or entity contracted to perform work for–or provide services to–another entity as a non-employee. As a result, independent contractors must pay their own social security and medicare taxes.

A worker is an employee when the business has the right to direct and control the work performed by the worker. This includes hours worked, uniforms, etc.

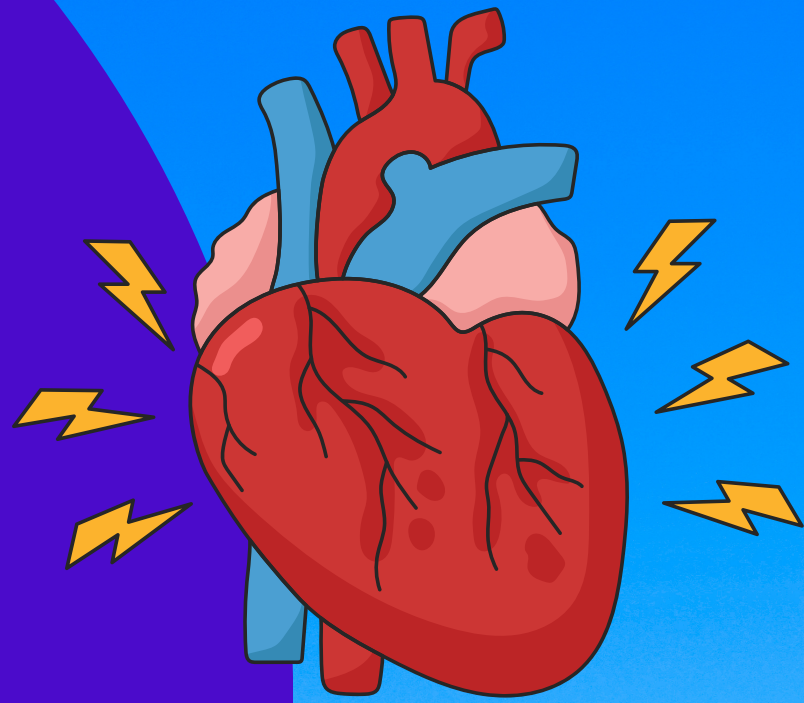


Stroke Volume

Volume pumped out of the left ventricle

Cardiac Output

HR x SV=CO



THREE PARTS OF A PLYOMETRIC EXERCISE

Part 1: Eccentric Phase

THE DECELERATION OR LOADING PHASE.

MUSCLES ARE LENGTHENING.

THREE PARTS OF A PLYOMETRIC EXERCISE

Part 2: Amortization Phase

THE TRANSITION PHASE. THE DELAY BETWEEN THE ECCENTRIC AND CONCENTRIC PHASE.

THREE PARTS OF A PLYOMETRIC EXERCISE

Part 3: Concentric Phase

SHORTENING PHASE. ENERGY IS RELEASED (EX. LIFT OFF IN A JUMP)

THE SAID PRINCIPLE

THE BODY WILL ADAPT TO THE SPECIFIC DEMANDS PLACED ON IT.

S pecific

A daptation

I mposed

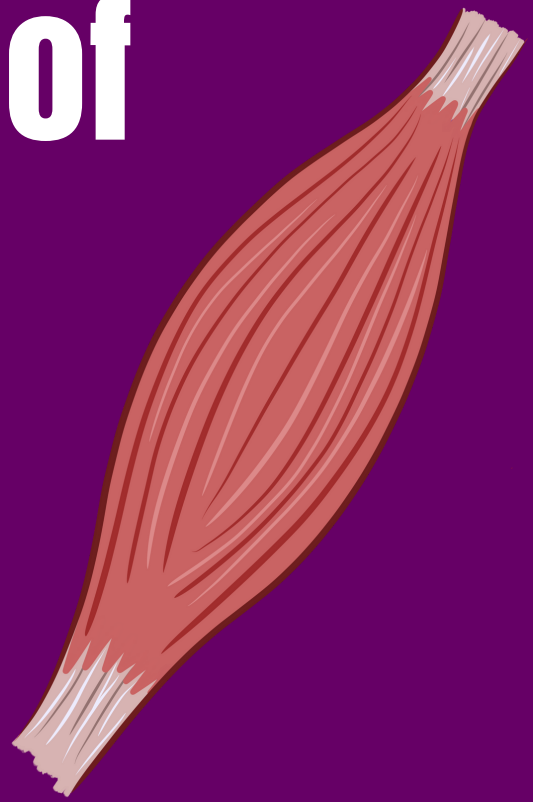
D emands

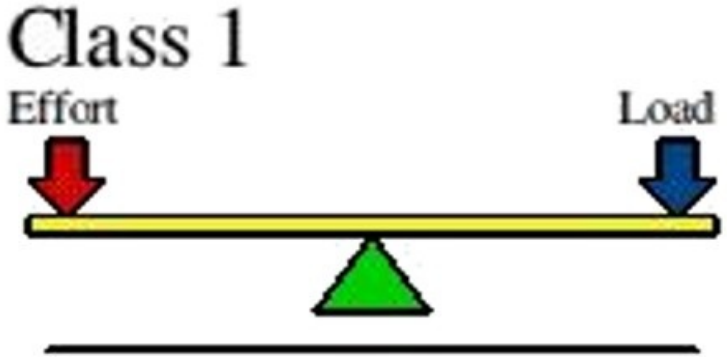
Over Training

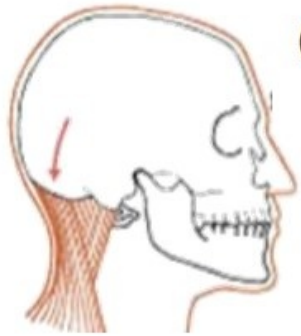
Excessive frequency, volume, or intensity of training, resulting in reduction of performance, which is also caused by a lack of proper rest and recovery.

Rhabdomyolysis

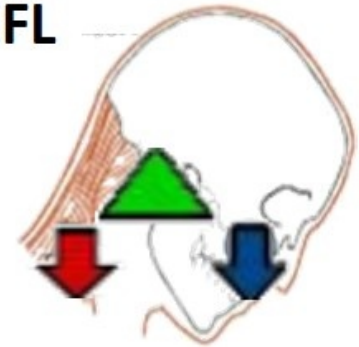
The rapid breakdown of muscle, resulting in high amounts of intramuscular proteins. Dangerous to kidneys.



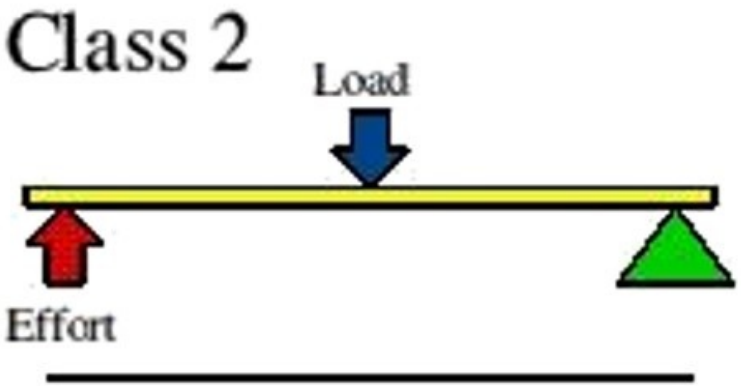




C1: EFL

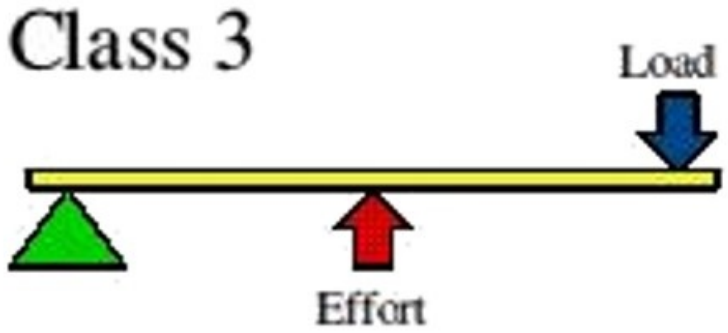


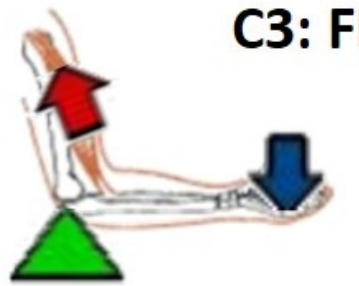
Action Completed
Flexion & Extension



C2: ELF

Action Completed
Plantarflexion & Dorsiflexion





C3: FEL

Action Completed
Flexion & Extension

It's common to be asked about two kinds of blood pressure meds.

Beta blockers & Diuretics

Beta blockers: these lower your heart rate at rest and during exercise. A client's heart rate won't raise the same way during exercise when they're on a beta blocker.

Type 1 Diabetes: These people have to inject insulin, they are insulin dependent. People usually develop this early.

Type 2 Diabetes: These people are insulin resistant. This one usually comes from poor lifestyle choices. It's also more common.

Diuretics: increase the excretion of water from the body through the kidneys. This could increase the liklihood of dehydration.

Terminal Feedback: feedback provided after an event or performance in order for the athlete to review and make adjustments prior to the next event or performance.

Intrinsic Feedback: Intrinsic feedback is the physical feel of the movement as it is being performed.

Extrinsic Feedback: Provided by external sources, during or after a performance. It includes things that the performer can hear or see.

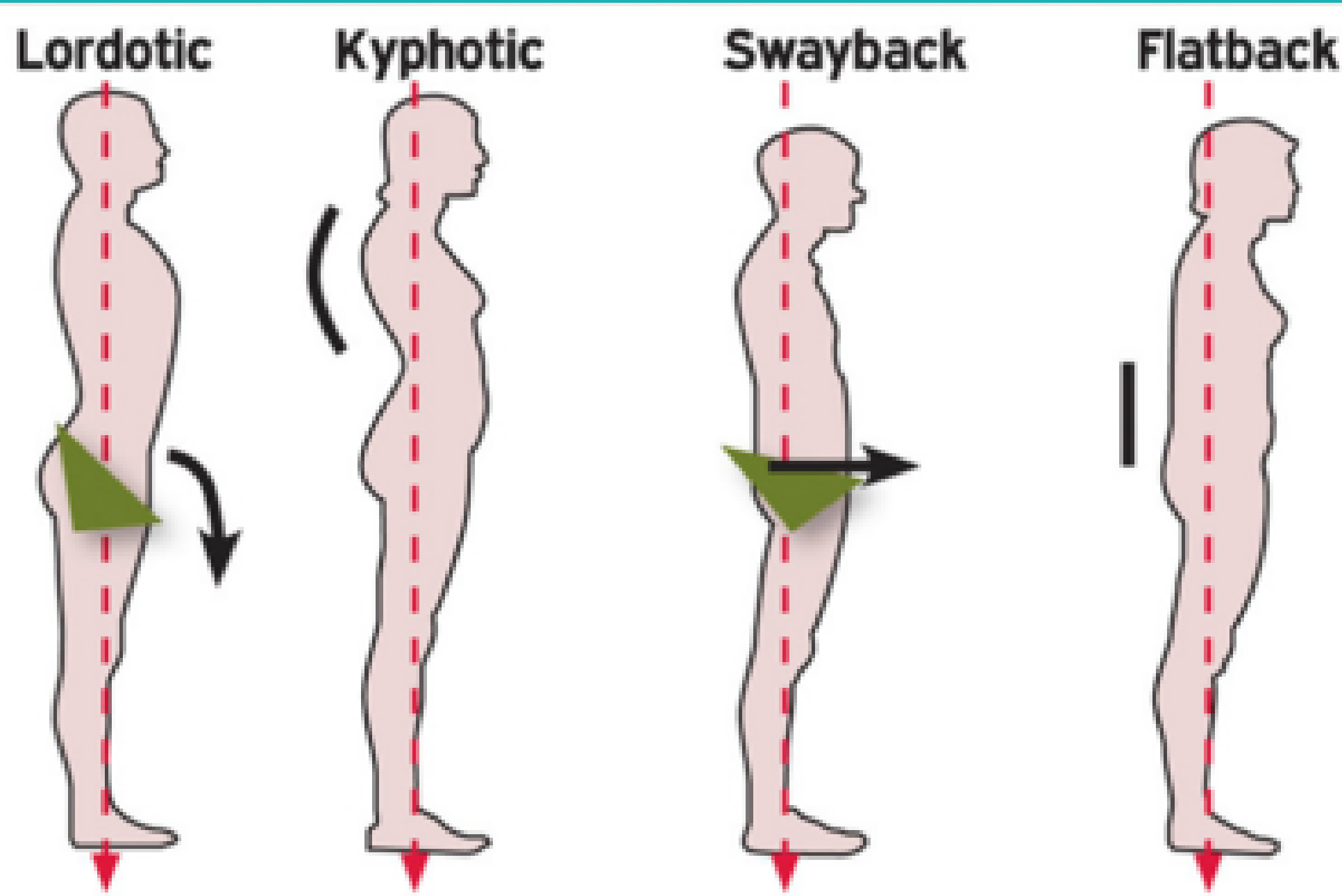
Dyspnea: difficult or labored breathing.

Syncope: fainting

Orthopnea: the sensation of breathlessness in the recumbent position, relieved by sitting or standing.

No physical assessments are needed for children.

Falling is the number one claim made against fitness facilities and professionals.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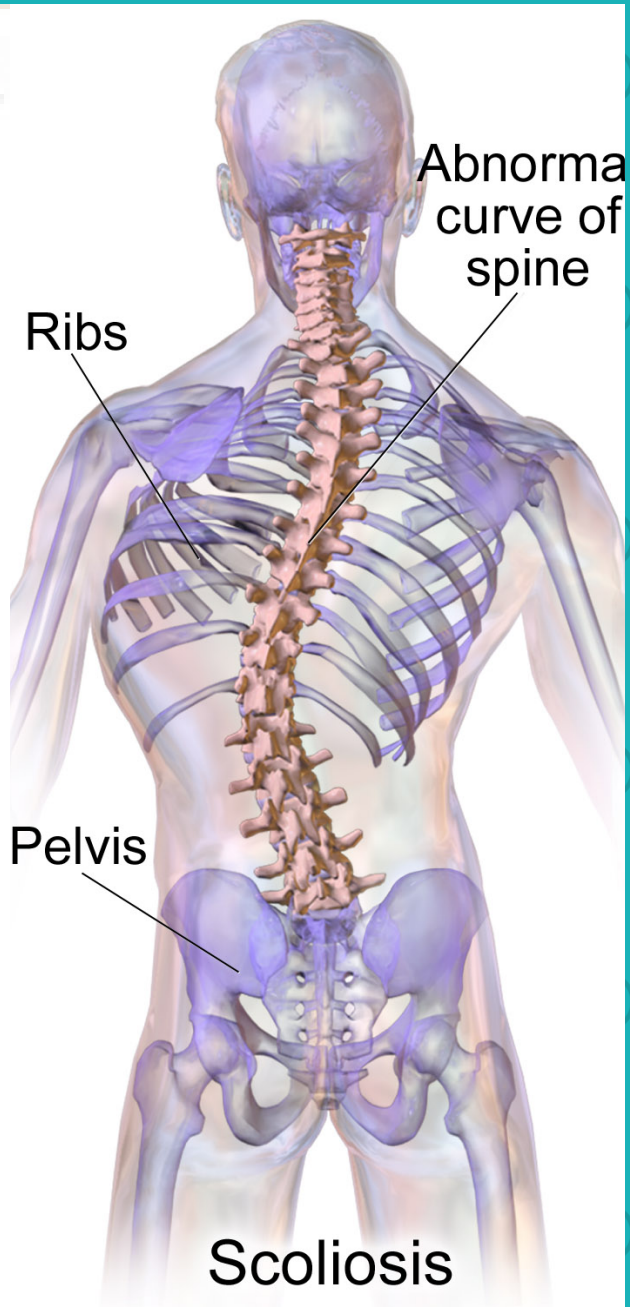
Abnorma
curve of
spine
Ribs
Pelvis
Scoliosis

The hip flexors and lumbar extensors are too tight and short.

Your hip extensors (glutes,hams), and your core muscles are lengthened and weakened.

The anterior chest, shoulder muscles, lats and neck extensors are too tight and shortened.

The rhomboids, lower and mid traps, and neck flexors are lengthened and weak.