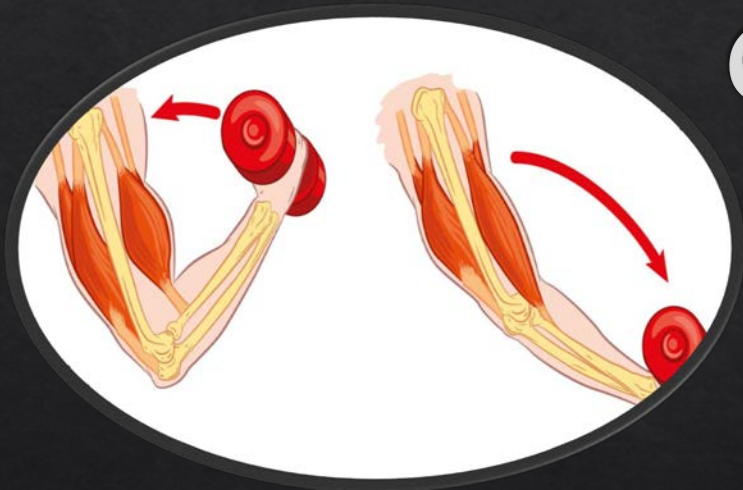


English Tutorial Classes Week 3

Resistance exercises – muscle contractions



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Resistance Exercise

Resistance training is an exercise that focuses on **the contraction of a muscle** against **resistance**. Resistance training helps for many different reasons.



Resistance Exercise

The main reasons is to increase one's **muscular endurance**, strength, and power of the active muscles.



Resistance Exercise

Resistance exercises can use any external resistance; a few examples are **dumbbells**, **elastic bands**, your **bodyweight**, and even **canned goods**.



Resistance Exercise

Canned goods?



Resistance Exercise

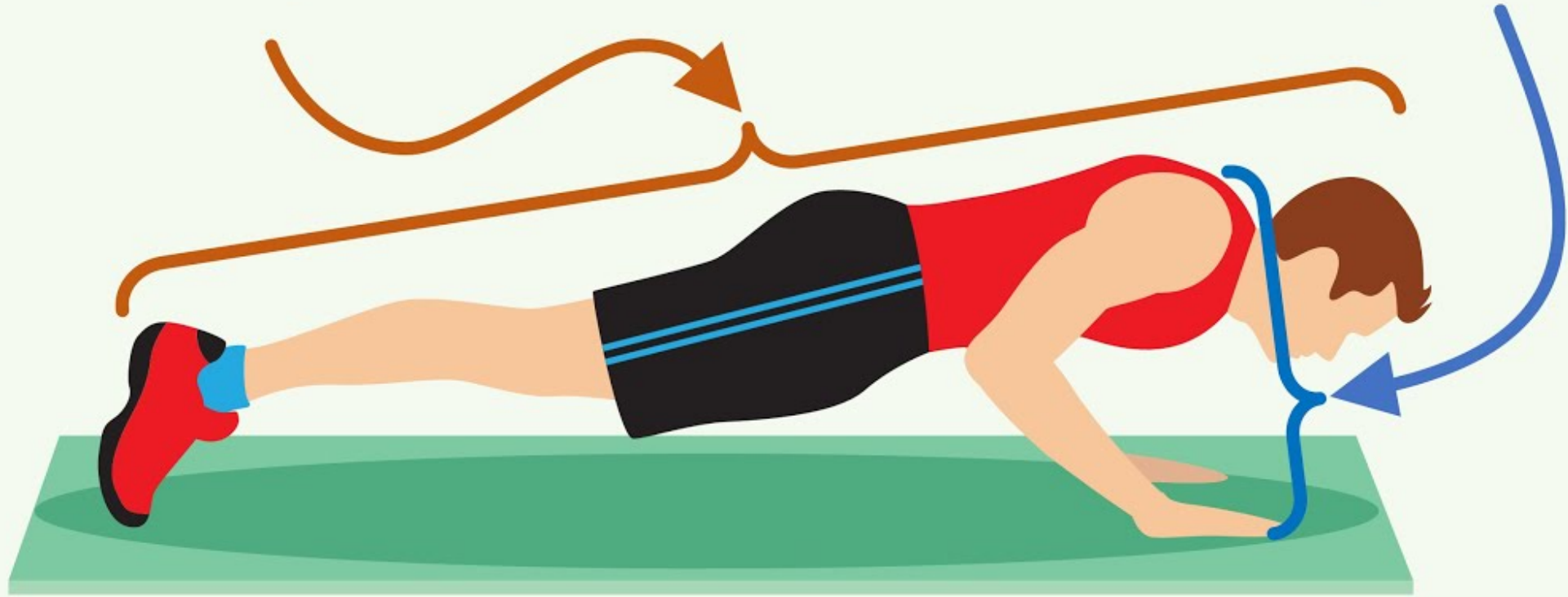
These exercises consist of **ISOMETRIC**, **ISOTONIC**, **ISOKINETIC**, and **PLYOMETRIC EXERCISES**.

Within these exercises, there are two types of muscular contractions, **ISOMETRIC** and **ISOTONIC CONTRACTIONS**.

Isometric
Contraction

vs

Isotonic
Contraction



Isometric Exercise

Isometric exercises consist of activities that focus on isometric contractions. This type of exercise involves the contraction of a muscle **without movement of the joint**.

Although **the joint doesn't move**, muscles still generate a force that can increase strength; the absence of shortening and lengthening joints makes this exercise a great starting point for those who lack the range of motion and are recovering from surgery.



Isometric Exercise

A few popular isometric exercises would be a **plank**, **glute bridge**, and **wall sits**. When performing a plank, the **isometric contraction** of your **core** can keep your body elevated off of the floor without changing length in a joint.



Isotonic Exercise

Isotonic exercises may be the most familiar exercise of the four.

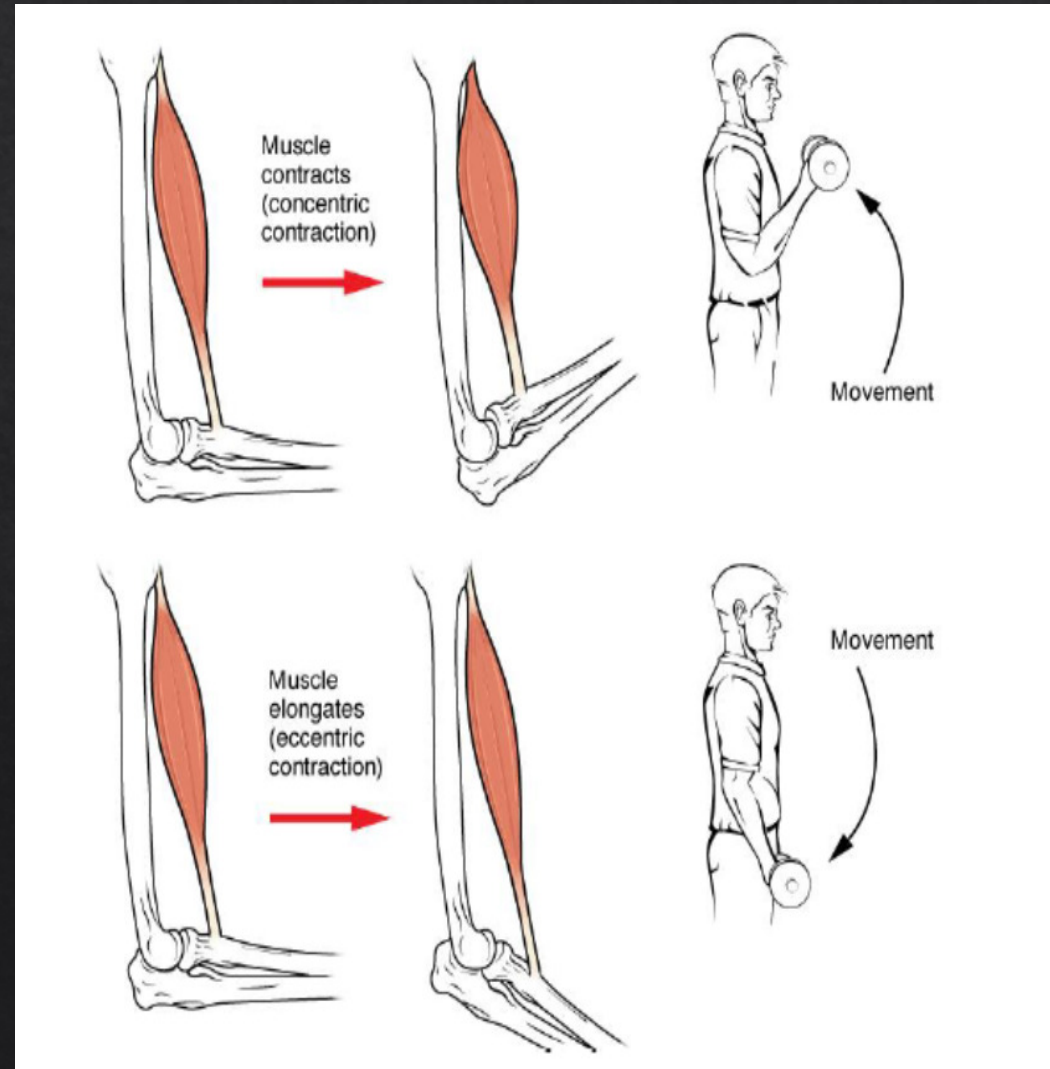
This type of exercise is dynamic and requires **movement in a joint**. An isotonic exercise consists of two types of contractions: **concentric and eccentric**.



Isotonic Exercise

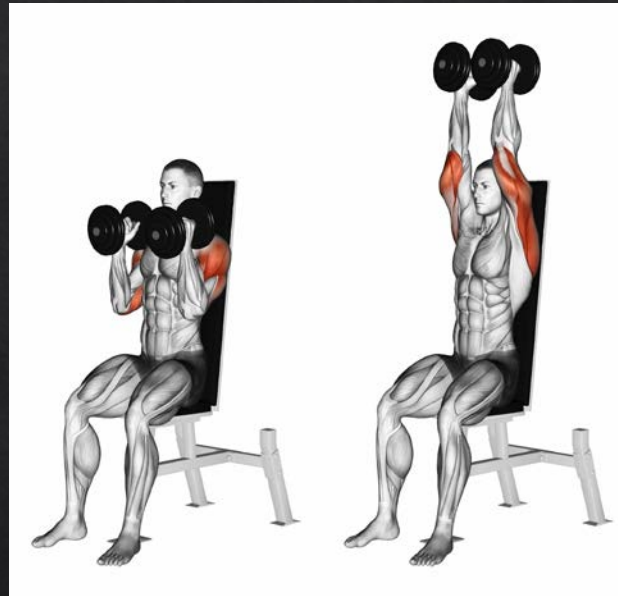
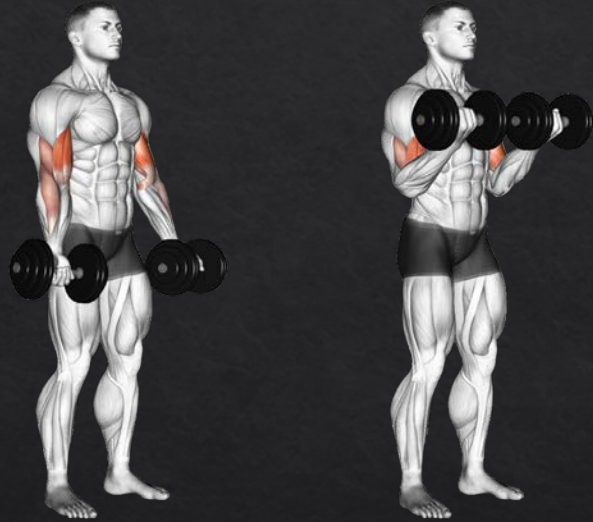
In a **concentric contraction**, a muscle **tightens** as it pulls against some form of resistance. On the other hand, an **eccentric contraction** occurs when a muscle **lengthens** while it still exerts force to manage or resist an external load.

It's optimal to focus more time on an eccentric contraction rather than a concentric contraction. When doing so, you are increasing the potential of **strength** and **motor control**.



Isotonic Exercise

Examples of isotonic exercises are **bicep curls**, **shoulder presses**, and **squats**.



You **concentrically contract** your bicep as you bring a dumbbell up towards your shoulder, and you **eccentrically contract** your bicep as you control the dumbbell back down to your side.

Isokinetic Exercise

An isokinetic exercise involves **shortening and lengthening a muscle at a constant speed**. These exercises **require machines** that help produce a constant speed and resistance in which they are performed.

The consistent velocity and resistance lower the risk of injury while still increasing strength and flexibility in a muscle.



Isokinetic Exercise

Isokinetic exercises are great for individuals who **lack balance, coordination, and experience.** **Stationary bikes and treadmills** focus on isokinetic resistance.

Stationary bikes manage your velocity and resistance while concentrically and eccentrically contracting your leg muscles.



Plyometric Exercise

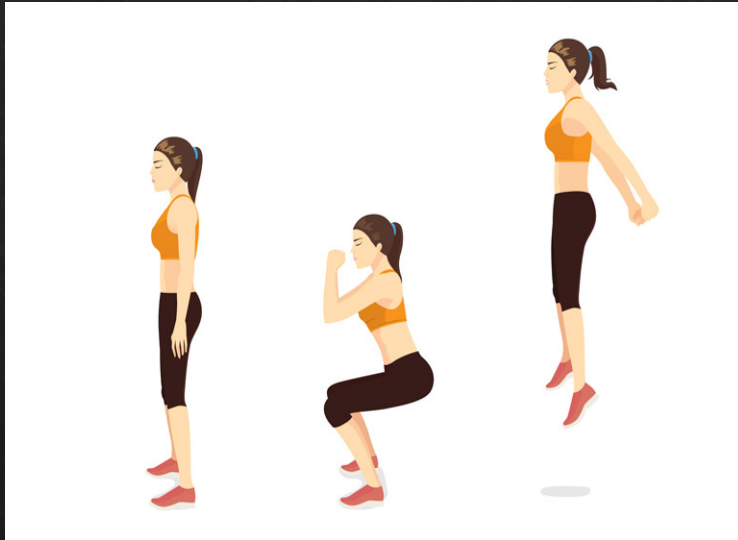
Plyometric exercises involve **rapid concentric and eccentric contractions** of a muscle. This type of exercise helps to yield the best results in increasing muscular endurance and power.

Engaging in certain sports-related activities, which involve plyometric exercises, can positively impact one's **coordination**.



Plyometric Exercise

Most of these exercises involve a type of **explosive or jumping movement**. Examples of plyometric exercises are **jump squats**, **box jumps**, and **burpees**.



A jump squat involves an **explosive concentric and eccentric contraction** to allow you to jump up and squat down.

Why should I know all of this?

Understanding the information on resistance exercise can be highly beneficial in real-life situations, especially for individuals aiming to improve their overall fitness and well-being.



Here's how this knowledge can be applied:

1. Personalized Workout Routines:

Individuals can design personalized workout routines based on their fitness goals.

If someone wants to enhance **muscular endurance** what type of exercises would you recommend they do?

2. Rehabilitation and Recovery:

What type of exercises are an excellent starting point for those recovering from surgery or lacking range of motion?

Example: A person rehabilitating from knee surgery.

3. Safe and Effective Training for Specific Conditions:

Isokinetic exercises, performed on machines, provide constant speed and resistance, reducing injury risk.

Individuals with balance or coordination issues may benefit from using which exercise machines?

4. Enhanced Athletic Performance:

A basketball player can incorporate jump squats and box jumps to enhance explosive movements and coordination on the court.

Jump squats and box jumps are what exercise type?



5. Accessible and Cost-Effective Resistance Options:

Remember the example with the canned goods?

Thank you for your
attention!