

# Sports Medicine – Muscular System

## Muscular System

- Over 600 muscles in the body
- Muscles are bundles of muscle fibers held together by connective tissue

## Characteristics of Muscles

- Excitability (Irritability)
- Elasticity
- Extensibility
- Contractibility

## Excitability (Irritability)

- Muscle responds to a stimulus such as a nerve impulse

## Contractibility

- Muscle fibers that are stimulated by nerves become short and thick
- Muscles “contract”, which causes movement

## Extensibility

- The ability to be stretched

## Elasticity

- Allows the muscle to return to its original shape after it has contracted or stretched

## Muscle Types

- Cardiac
- Skeletal
- Smooth (Visceral)

## Cardiac Muscle

- Forms the walls of the heart
- Contracts to circulate blood
- Involuntary – functions w/o conscious thought or control

## Smooth (Visceral) Muscle

- Found in the internal organs
- Contracts to cause movement
- Involuntary

## **Skeletal Muscle**

- Attached to bones
- Causes body movement
- Voluntary – person has control over action

## **Functions of Skeletal Muscle**

- Attach to bones to provide voluntary movement
- Produce heat and energy for the body
- Help maintain posture
- Protect internal organs

## **Tendons**

- Strong, tough cords of connective tissue
- Connect muscle to bone

## **Ligaments**

- Short, tough bands of fibrous connective tissue
- Connect bone to bone

## **Fascia**

- Tough sheet-like membrane
- Covers and protects tissues

## **Origin**

- Is the stable attachment; the end of muscle that does not move; usually the more *proximal* attachment
- Less moveable

## **Insertion**

- End of muscle that moves when muscle contracts; usually the more *distal* attachment
- More moveable

## **How do Muscles Get Their Names**

- Location
- Size
- Shape
  - **Trapezoid = trapezius**
  - **Triangular = deltoid**

- **Direction of Fibers**
  - Angled = oblique
- **Number of attachment points**
  - Bicep, Tricep, Quadricep
- **Action**
  - Flexor, extensor

### **Muscle Movement**

- Muscles work in pairs
  - Prime mover: performs movement
  - Antagonist: opposite movement
- Ex: Biceps Brachii contracts & Triceps Brachii relaxes

### **Muscle Tone**

- State of partial contraction
- Partially contracted at all time – “readiness to act”

### **Atrophy**

- Muscles shrink in size when not used for a long time

### **Contracture**

- Severe tightening of a flexor muscle, resulting in bending of a joint

### **Muscle Spasms (Cramps)**

- Sudden, painful, involuntary contractions of muscles
- Usually occurs in hands, legs or feet
- May result from over exertion, low electrolyte or fluid level, or poor circulation

### **Muscle Cramp – Treatment**

- First try stretching the contracted muscle
- Apply gentle pressure over the area of spasm
- May try ice to confuse the body and stop the spasm

### **Strains**

- Overstretching, twisting, pulling or injury to a muscle or tendon
- Can be either chronic or acute
- Seen mostly in the back, arms, legs

## **D.O.M.S**

- Delayed Onset Muscle Soreness
- Occurs 24 hours-7 days after a workout
- May last up to 7 days
- Active movement is one of the best treatments along with consistent stretching

## **Sprains**

- Injury that forces a joint out of its normal position
- Overstretching or tearing of a ligament supporting that joint
- Most common site of injury is the ankle
- Some MOI or Causes:
  - Fall on outstretched arm
  - Lands on side of foot
  - Twists knee from a planted foot

## **Sprain/Strain – Signs and Symptoms**

- Pain
- Localized swellings
- Bruising
- Loss of function
- Muscle spasm and weakness

## **Sprain/Strain – Grading Scale**

- Grade I (mild): muscle is over-stretched
- Grade II (moderate): partial tear
- Grade III (severe): complete tear

Will see ecchymosis beneath skin with a grade 3 strain

## **Sprain/Strain – Treatment**

- **First goal:** Reduce swelling and pain; R.I.C.E for the first 24 – 48 hours
- **Second goal:** Rehabilitation
  - Improve the condition of injured part and restore its function
  - Increase strength and regain flexibility
- **Third goal:** Return to full daily activities