Key Medical Terms Associated with the Muscular System

Myalgia: Pain in or associated with muscles

Myoma: A tumor consisting of muscular tissue.

Ptosis: A drooping of the upper eyelid. It may be seen in myasthenia gravis and botulism or it may follow damage to cranial nerve III, which innervates the upper eyelid muscle (levator palpebrae superioris).

Sprain. A sprain is an injury in a joint, caused by the ligament being stretched beyond its own capacity. A muscular tear caused in the same manner is referred to as a strain. Ligaments are tough, fibrous tissues that connect bones to other bones. Sprains can occur in any joint but are most common in the ankle and wrist. Although this is not a muscle disorder I have included it here to for you to be able to distinguish between a sprain and a muscle strain.

Muscle Strain: Tearing or pulling of a muscle or tendon in which the muscle fibers tear as a result of over stretching or forceful impact, accompanied by bleeding due to damage to blood vessels and severe pain. Also known as a pulled muscle. The condition is treated by RICE therapy; rest (R) ice (I) immediately after the injury, compression (C) via a supportive wrap, and elevation (E) of the limb.

Muscle cramp: Muscle cramps also known as a “Charley horse” or muscle spasm, are sudden, involuntary contractions or spasms in one or more of your skeletal muscles. They often occur after exercise or at night, lasting a few seconds to several minutes.

Cause: The exact cause of muscle cramps is unknown (idiopathic). Muscle cramps can be caused by nerves that malfunction. In addition, inadequate stretching, muscle fatigue, and not enough blood getting to your muscles can lead to abnormalities in mechanisms that control muscle contraction and can cause cramps. Poorly conditioned muscles: When your body is poorly conditioned, you are more likely to experience muscle fatigue, which can alter spinal neural reflex activity. Overexertion depletes a muscle’s oxygen supply, leading to build up of waste product and spasm. When a cramp begins, the spinal cord stimulates the muscle to keep contracting. Heat, Dehydration, and Electrolyte Depletion: Muscle cramps are more likely when you exercise in hot weather because sweat drains your body’s fluids, salt and minerals (i.e., potassium, magnesium and calcium). Loss of these electrolytes may also cause a muscle to spasm.

Treatment: Stretching or gently massaging the muscle can relieve this pain. Rest and replacing lost electrolytes.

Eye twitch or Tic: Involuntary spasm of the eyelid muscles. Eye twitching is believed to be caused by an abnormal functioning of certain nerve areas located at the base of the brain which controls the coordination of muscle movements. The most common things that make the muscle in your eyelid twitch are fatigue, stress, and caffeine. Once spasms begin, they may continue off and on for a few
days. However, in the majority of people it appears without any real known cause. Frequently, the signs and symptoms of dry eye occur right before or along with the appearance of eye twitching.

Fibromyalgia (*fibro-*:, fibrous tissues, *myo-*: muscle, *algos-*: pain): Fibromyalgia is a disorder characterized by long-term, body-wide pain and tenderness in the joints, muscles, tendons, and other soft tissues. Fibromyalgia is most common among women aged 20 to 50. Cause is unknown. Fibromyalgia is thought to amplify painful sensations resulting in a lower threshold for pain because of increased sensitivity in the brain to pain.

**Symptoms:** Pain is the main symptom of fibromyalgia. It may be mild to severe.
- Painful areas are called tender points. Tender points are found in the soft tissue on the back of the neck, shoulders, chest, lower back, hips, shins, elbows, and knees. The pain then spreads out from these areas.
- The pain may feel like a deep ache, or a shooting, burning pain.
- The joints are not affected, although the pain may feel like it is coming from the joints.
People with fibromyalgia tend to wake up with body aches and stiffness. For some patients, pain improves during the day and gets worse at night. Some patients have pain all day long. Pain may get worse with activity, cold or damp weather, anxiety, and stress.

Tetanus: (Also called lockjaw) Is an infection of the nervous system with the potentially deadly bacteria *Clostridium tetani*. Often associated with deep puncture wounds from a rusty nail. However, the problem is not necessarily the rust or the nail but the possibility of infection by *C. tetani*, which can cause tetanus. Although they have the same name, the disease tetanus has no relation to the normal muscle response to neural stimulation of muscle tetany. The Clostridium bacterium occurs virtually everywhere in the environment, but it can thrive only in tissues that contain low amounts of oxygen. For this reason, a deep puncture wound, such as that from a nail, carries a much greater risk of producing tetanus than does a shallow, open cut that bleeds freely.

When active in body tissues, these bacteria release a powerful toxin that affects the central nervous system. **How does the tetanus neurotoxin get to the central nervous system?** Tetanus neurotoxin binds to the presynaptic membrane of the neuromuscular junction, is internalized and transported retroaxonally to the spinal cord. The spastic paralysis induced by the toxin is due to the blockade of neurotransmitter release from spinal inhibitory interneurons. Motor neurons, which control skeletal muscles throughout the body, are particularly sensitive to it. The toxin suppresses the mechanism that regulates motor neuron activity. Specifically, Tetanus toxin stops the affected neurons from releasing the inhibitory neurotransmitters GABA (gamma-aminobutyric acid) and/or glycine, which is a neurotransmitter that inhibits motor neurons. **GABA and glycine** activates GABA and
glycine receptors respectively that allow chloride (Cl-) ions to enter the dendrites/cell body of the motor neuron. This results in hyperpolarization and therefore drives the membrane potential away from the threshold for firing an action potential - it causes an IPSP in the motor neuron that is ultimately manifested as a relaxation of the muscle. Since the motor neurons do not have the normal inhibition, the result is a sustained, powerful contraction of skeletal muscles throughout the body.

The incubation period (the time from exposure to the development of symptoms) is generally less than 2 weeks. The most common complaints are headache, muscle stiffness, and difficulty in swallowing. Because it soon becomes difficult to open the mouth, this disease is also called lockjaw. Widespread muscle spasms typically develop within 2 or 3 days of the initial symptoms and continue for a week before subsiding. After 2–4 weeks, patients who survive recover with no after-effects. Severe tetanus has a 40–60 percent mortality rate; that is, for every 100 people who develop severe tetanus, 40 to 60 die. The muscular rigidity characteristic of tetanus impacts the entire body and can include the jaw locking shut, which interferes with swallowing and even breathing. Respiratory failure is the most common cause of tetanus-related death. Fortunately, immunization is effective in preventing the disease. Approximately 500,000 cases of tetanus occur worldwide each year, but only about 100 of them occur in the United States, thanks to an effective immunization program. (“Tetanus shots” are recommended, with booster shots every 10 years.) Severe symptoms in unimmunized patients can be prevented by early administration of an antitoxin, in most cases human tetanus immune globulin. Such treatment does not reduce symptoms that have already appeared, however.