Musculoskeletal System

Musculoskeletal system terms

Oste/o	Bone	Osteitis, osteoma, osteocyte
Chondr/o	Cartilage	Chondritis, chondroma, chondrocyte
Arthr/o	Joint	Arthritis, arthroplasty
Myel/o	Bone marrow	Myeloma
Ten/o, tendin/o	Tendon (binds muscle to bone)	Tendonitis, tenorrhaphy
Ligament/o	Ligament (binds bone to bone)	Ligamentous injury
Burs/o	Bursa, “bag”, (shock absorber between tendons and bones)	Bursitis
My/o, myos/o	Muscle	Myoma, myositis
-malacia	Softening	Osteomalacia, chondromalacia
-porosis	Porous	Osteoporosis

-asthenia	Weakness, loss of strength	Myasthenia gravis
-trophy	Development, stimulation, maintenance	Atrophy (shriveling of muscles), hypertrophy (increase in size and strength of muscles)
-algia, algesia	Pain	Myalgia, arthralgia, analgesia (take away pain

I have long since stopped defining what “-itis” means, or “-oma.” Do you remember what “-plasty” means, or how about “-rrhaphy”? These word parts were introduced in previous modules. This program is all about building word roots, prefixes and suffixes into medical terms. The ultimate goal is for you to be able to figure out the meaning of new terms, or, at least, not be intimidated about looking it up in a medical dictionary.

Musculoskeletal System Diseases

Arthritis – As we age, our joint tissues become less resilient to wear and tear and start to degenerate manifesting as swelling, pain, and oftentimes, loss of mobility of joints. Changes occur in both joint soft tissues and the opposing bones, a condition called osteoarthritis. A more serious form of disease is called rheumatoid arthritis. The latter is an autoimmune disease wherein the body produces antibodies against joint tissues causing chronic inflammation resulting in severe joint damage, pain and immobility.

 **Osteoporosis** – “Porous bone.” The bane of the old, especially, women. The hard, rock-like quality of bone is dependent upon calcium. When too much calcium is dissolved from bones or not enough replaced, bones lose density and are easily fractured. Estrogen, the female sex hormone, helps maintain proper calcium levels in bones. Once the ovaries stop producing the hormone, women are at higher risk of developing osteoporosis. A collapse of bony vertebrae of the spinal column results in loss of height and stooped posture. Hip fractures are a common occurrence.

Osteomalacia – “Soft bones.” If not enough calcium is deposited during early childhood development, the bones do not become rock-hard, but rubbery. Both adequate calcium in the diet and vitamin D, primarily, from normal sunlight exposure or supplementation, are necessary for normal bone development. Before vitamin supplementation to milk, “rickets,” another name for osteomalacia in children, was common resulting in the classic bowed legs of the afflicted child.

Carpal tunnel syndrome – People whose job involves repeated flexing of their wrist (typing, house painting) may develop tingling and/or pain in their thumb, index and middle fingers along with weakness of movements of the thumb, especially, grasping an object. The main nerve for finely controlled thumb movements passes through a bony/ligamentous canal on the bottom of the wrist. Repetitive flexing movements may inflame and thicken the ligament over the “tunnel” through the carpal (wrist) bones trapping and compressing the nerve.

Tendonitis– Repeated strain on a tendon, attachment of a muscle to bone, can inflame the tendon resulting in pain and difficulty with movement involving the muscle. Tendons have a poor blood supply; therefore, they typically take a long time to heal on the order of six weeks or more.

Rotator cuff tear – Muscles surrounding the shoulder joint are involved in rotating the shoulder with upper arm and hand forward and backward, among other movements. The tendons of these muscles also contribute to the structural strength of the shoulder joint. Hard, fast movements, such as in tennis and

baseball can tear one of these tendons resulting in pain and decreased mobility of the shoulder. Surgery may be needed to repair a torn tendon.

Bursitis – A bursa is a small, closed bag with a minimum amount of lubricatory fluid that serves as a shock absorber where bones make close contact and to minimize trauma and friction where tendons cross bones and joints. Inflammation leads to pain and immobility in a joint area.

Muscular dystrophy – Muscular dystrophy is a group of inherited diseases in which the muscles that control movement progressively weaken. The prefix, dys-, means abnormal. The root, -trophy, refers to maintaining normal nourishment, structure and function. The most common form in children is called Duchenne muscular dystrophy and affects only males. It usually appears between the ages of 2 to 6 and the afflicted live typically into late teens to early 20s.

Myasthenia gravis – "Muscular weakness, profound". This is an autoimmune disease that involves production of antibodies that interfere with nerves stimulating muscle contractions. Face and neck muscles are the most obviously affected, manifesting as drooping eyelids, double vision, difficulty swallowing and general fatigue. There is no actual paralysis of muscles involved, but a rapid fatiguing of function.

Lupus erythematosus – An autoimmune disease wherein the body produces antibodies against a variety of organs, especially connective tissues of skin and joints. Mild Lupus may involve a distinctive butterfly-shaped rash over the nose and cheeks. Mild lupus may also involve myalgia and arthralgia (remember these words?) Severe or systemic lupus (SLE) involves inflammation of multiple organ systems such as the heart, lungs, or kidneys. By the way, lupus means "wolf" in Latin. Maybe a reference to the facial rash that might give a patient a wolf-like appearance.

Musculoskeletal System Procedures

Orthopaedist – "To straighten up children." Orthopaedics is a surgical subspecialty that in the past devoted much of its time to treating musculoskeletal deformities in children. Now with improved prenatal diagnosis and better nutrition, orthopaedists still treat children with spine and limb deformities but also adults with complicated bone fractures, damaged tendons or ligaments, or needing surgery to replace a damaged hip or knee joint.

Rheumatologist – “To study the flux of fluids.” Say, what? Rheuma is an old medical term for a watery discharge. Among other diseases, rheumatologists treat joint diseases such as the various forms of arthritis including rheumatoid arthritis. Inflamed joints accumulate “fluid” and swell among other signs and symptoms. This medical subspecialty also evaluates and treats osteoporosis, tendonitis, gout and lupus among many other chronic musculoskeletal pain disorders.

Osteopath/osteopathic physician (D.O.) – The name sounds like a specialty limited to bone disease, but actually, osteopathic physicians are one of two arms of the medical profession that differ in history and philosophy. At one time there were many kinds of medical schools originating from various philosophies; allopathic, osteopathic, homeopathic. Osteopathy originated in the 1890s in response to despair at the lack of effectiveness of many forms of then primitive treatments. Osteopathy developed an emphasis on the influence of the musculoskeletal system and its interrelationship to other body systems. D.O.s make use of osteopathic manipulation (bones, ligaments, joints) along with medication, surgery and all other medical treatments used by M.D. physicians. Also, preventive care has always been a major emphasis of osteopathic care. M.D.s and D.O.s are licensed by all state medical boards. Learn about the doctor of osteopathic medicine program at Des Moines University.

Podiatrists, traditionally known as “foot doctors,” are surgical subspecialists in diseases and structural problems of the feet. They not only provide care for corns, calluses, ingrown toenails and heel spurs, but also treat foot and ankle injuries, deformities and diseases. Many systemic diseases manifest signs and symptoms in appearance of the feet such as poor wound healing in diabetes. They also can prescribe special shoes and inserts to treat chronic foot pain and walking problems. Podiatrists may further specialize in sports medicine, geriatrics or diabetic foot care. Learn about the doctor of podiatric medicine program at Des Moines University.

Physical therapist – This health care professional has at least two years of specialized training beyond a college degree. PTs are rehabilitation specialists treating a multitude of medical problems including patients recovering from joint surgery, limb amputation, a stroke, heart attack and suffering with chronic neuromuscular diseases. In addition to other treatment modalities, they teach patients exercises to strengthen their body, increase mobility and how to prevent recurrence of injury. Learn about the doctor of physical therapy program at Des Moines University.

Arthroscopy – A fiberoptic instrument is introduced into a joint cavity in order to visualize surfaces of bones entering into a joint, find tears in internal joint structures and evaluate sources of inflammation.

Bone scan – A radioactive element in very small amounts, not enough to cause any radiation injury to the patient, is introduced into the blood stream. The specially selected element accumulates in bone and using a much more sophisticated version of the old Geiger Counter instrument, the distribution of the element is used to diagnose potential bone tumors among other bone pathologies.

Electromyography – A big, scary word! But, you are experienced by now in taking them apart. I like to start at the end and work backward: "a recording of muscle electrical activity." Fine needles are introduced into muscles in order to make recordings of contractile activity. This procedure is useful in evaluating causes of paralysis, diagnosing muscular dystrophy and other neuromuscular disorders.

Muscle biopsy – Cutting out a small tissue sample of muscle in order to examine it under a microscope. This procedure can be useful in diagnosing muscular dystrophy and other neuromuscular disorders.

Musculoskeletal System Medical Record

Following is an abstract of a simulated patient medical record. Identify each italicized word. If the meaning doesn't come right away, take apart the word. If you recognize the organ involved, use the context to help you figure out the full meaning. Terms are not limited to musculoskeletal system. Remember, this is a cumulative exercise! If you can't think of the meaning, hover your cursor over the word for a tip.

A 62 year old male comes to his family physician complaining of pain in his right knee. He walks with a limp which he says is getting worse and is related to an old football injury. During the course of the examination he reveals that he also suffers from a "nervous bladder" with *polyuria*, *dysuria* and *nocturia*, but denies *hematuria*. He smokes two packs a day, breaths are wheezy and he is short of breath, but denies *hemoptysis*.

Physical exam: right knee was swollen, warm and had limited range of motion which was painful to perform. Mild exercise increases wheezing and causes *dyspnea*. Examination of the heart size

reveals *cardiomegaly*. No *hepatomegaly* or *splenomegaly* was found upon abdominal examination.

Current medication: Prevacid for *gastroesophageal reflux disease*, nitroglycerine for *angina pectoris*.

Past medical history: GERD diagnosed with *esophagogastroduodenoscopy (EGD)*. Angina pectoris diagnosed with treadmill test, *cardiac scan* and *cardiac catherization.*

Past surgical history: *orchidopexy* for *cryptorchidism* at age nine, *tonsillectomy*, *appendectomy*.

Family medical history: mother has chronic *nephritis*; will be starting *dialysis*.

Recommended treatments: refer to *pulmonologist* to evaluate possible *emphysema*. Refer to *orthopaedist* for *arthroscopic* evaluation of knee. Refer to *urologist* to evaluate for *prostatic hypertrophy*, possible *cystoscopy*. Office *phlebotomist* drew specimens for lab work.

Get a piece of paper and pencil and write down two column headings: “Signs” and “Symptoms.” Then take the following items and put them under the proper heading. You remember the difference between a sign and a symptom, right? You might want to review the context of these items in the case above before deciding.

Item: cardiomegaly, pain in right knee, right knee is swollen, nervous bladder.pr

In plain English

A 62 year old male comes to his family physician complaining of pain in his right knee. He walks with a limp which he says is getting worse and is related to an old football injury. During the course of the examination he reveals that he also suffers from a “nervous bladder” with frequent urination, painful/difficult urination and getting up at night to urinate, but denies blood in the urine. He smokes two packs a day, breaths are wheezy and he is short of breath, but denies coughing up blood.

Physical exam: right knee was swollen, warm and had limited range of motion which was painful to perform. Mild exercise increases wheezing and causes difficulty breathing. Examination of the heart size reveals an enlarged heart. No enlargement of the liver or spleen was found upon abdominal examination.

Current medication: Prevacid for severe heartburn, nitroglycerine for chest pain related to the heart.

Past medical history: GERD diagnosed with visual examination of the esophagus, stomach and duodenum with a fiberoptic instrument. Angina pectoris diagnosed with treadmill test, injecting a radioactive element into blood stream to evaluate heart structure and function and threading a hollow tube through arteries to the heart to inject dye opaque to X-rays to demonstrate coronary arteries.

Past surgical history: surgical fixation of the testis for undescended testicles at age nine, removal of tonsils, removal of appendix.

Family medical history: mother has chronic inflammation of kidneys; will be starting medical procedure cleansing waste from blood in kidney failure.

Recommended treatments: refer to specialist in lung diseases to evaluate possible destruction of lung membranes needed for oxygen exchange. Refer to specialist in musculoskeletal diseases for visualization of joints with a fiberoptic instrument (evaluation of knee). Refer to specialist in lower urinary tract diseases and diseases of the male reproductive tract to evaluate for enlargement of the prostate, possible visualization of the interior of the bladder with a fiberoptic instrument. Office technician or nurse trained to “cut into veins” to draw blood drew specimens for lab work.

By the way, what the patient complains of or describes are symptoms: knee hurts, frequent urination. What the doctor observes and/or measures are signs: right knee is swollen, enlarged heart.