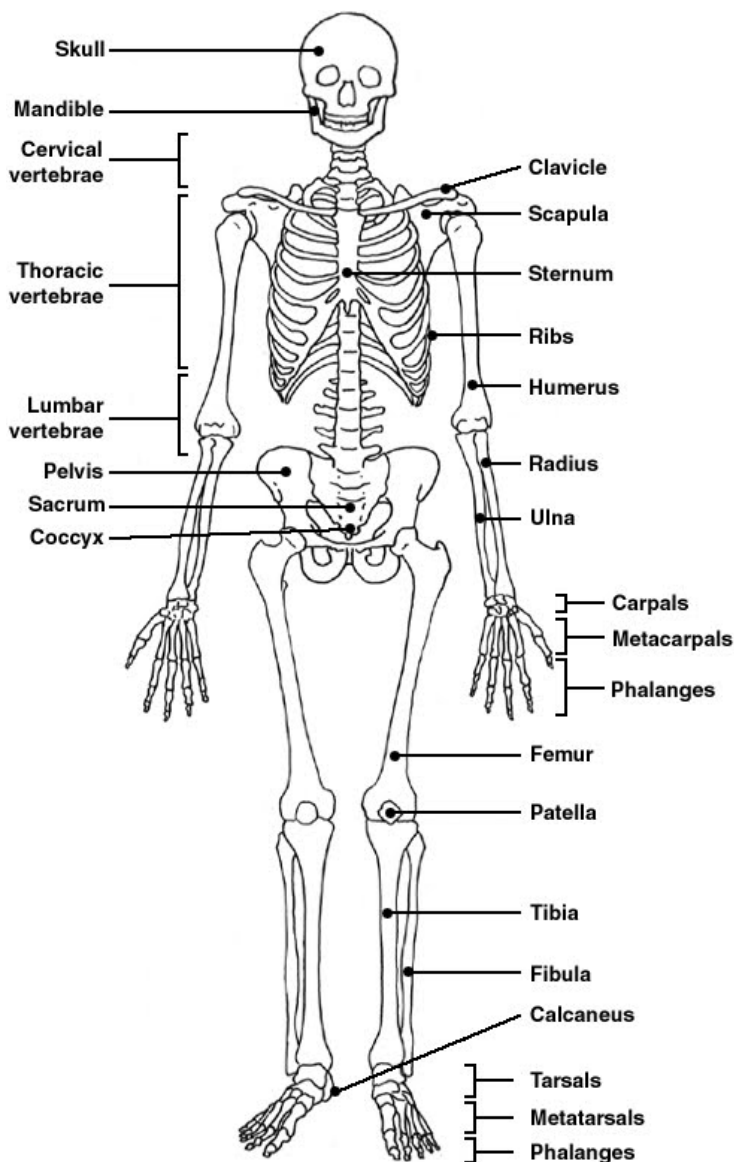


Musculoskeletal System

Key Points

- The musculoskeletal system's primary functions include supporting the body, allowing motion, and protecting vital organs.
- The musculoskeletal system is made up of the body's bones (the skeleton), muscles, cartilage, tendons, ligaments, joints, and other connective tissue that support and bind tissues + organs together.
- The skeleton serves as the main storage system for calcium and phosphorus.
- The skeleton also contains critical components of the hematopoietic (blood production) system + fat storage, occurring in red marrow and yellow marrow, respectively.
- To allow motion, different bones are connected by articulating joints. Cartilage prevents the bone ends from rubbing directly on to each other while the muscles contract to move the bones associated with the joint.



Role of the Musculoskeletal System

Our Musculoskeletal System is our protective layer holding all of what we are in this physical realm together and apart from outside forces, including colonizers. Our Musculoskeletal System provides us the physical structure to navigate this world, clothes us with our skin, and gifts us our melonian. As we ally with this system we learn about what it means to exist protecting our insides from external structures and imbalances.

It does this by:

- Protection for vital internal organs
- Provides a structure, support + stability for the physical body
- Provides motion via mobility, flexibility & strength

Parts of the Musculoskeletal System

There are three major parts of the musculoskeletal system: the skeletal system, the muscular system, + tendons, joints and ligaments.

Skeletal System

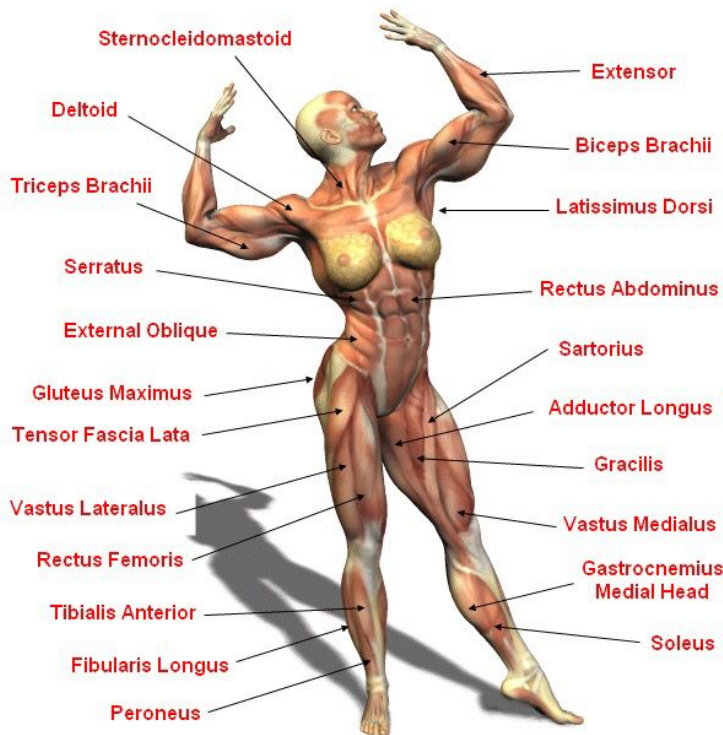
The skeletal system serves as a framework for the body of many individual bones, cartilages, and connective tissue. The skeletal portion of the system serves as the main storage system for



Musculoskeletal System

calcium and phosphorus. The importance of this storage is to help regulate mineral balance in the bloodstream. When the fluctuation of minerals is high, these minerals are stored in bone; when it is low, minerals are withdrawn from the bone.

- **Hematopoietic/blood production system:** bodily system of organs and tissues, primarily the bone marrow, spleen, tonsils, and lymph nodes, involved in the production of blood.
- **Red marrow:** an important site for hematopoiesis or blood cell production that replaces cells that have been destroyed by the liver. Here, all erythrocytes, platelets, and most leukocytes form in bone marrow from where they migrate to the circulation
- **Yellow marrow:** fatty connective tissue and is found in the marrow cavity of the long bones



Muscular System

The muscle system works the skeletal system under voluntary control to allow for movement, posture, and balance.

There are three main muscle tissues: skeletal, smooth, and cardiac muscle.

Skeletal muscle: muscles that contract to pull on tendons and move the bones of the skeleton. They maintain posture and body position, support soft tissues and maintain body temperature. provide the body with locomotion.

Smooth muscle: controls involuntarily and is found in the walls of blood vessels and of structures such as the urinary bladder, the intestines, and the stomach.

Cardiac muscle: makes up the mass of the heart and is responsible for the rhythmic contractions of that vital pumping organ; it too is under involuntary control. With very few

exceptions, the arrangement of smooth muscle and cardiac muscle in humans is identical to the arrangement found in other vertebrate animals.

Nerves: Nerves control the contraction of skeletal muscles, interpret sensory information, and coordinate the activities of the body's organ systems.

Tendons, Joints, Ligaments, and Bursae

Tendon: a tendon is a tough, flexible band made of fibrous connective tissue, and functions to connect muscle to bone.

Joints: the bone articulations allowing movement. A ligament is a dense, white band of fibrous elastic tissue.



Musculoskeletal System

Ligaments: connect the ends of bones together in order to form a joint. These help to limit joint dislocation and restrict improper hyperextension and hyperflexion. Also made of fibrous tissue are bursae. These provide cushions between bones and tendons and/or muscles around a joint.

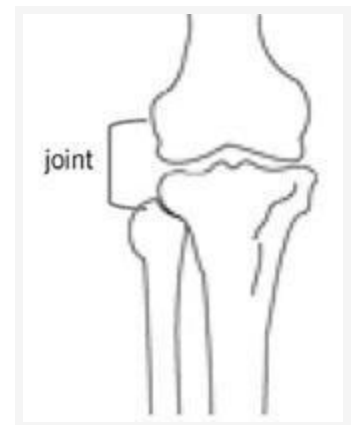
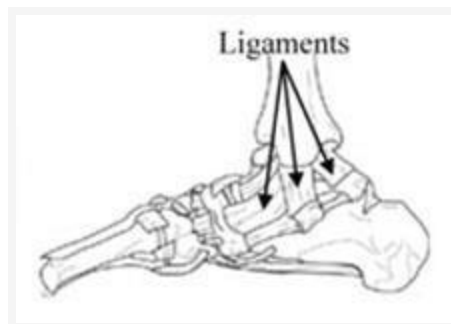
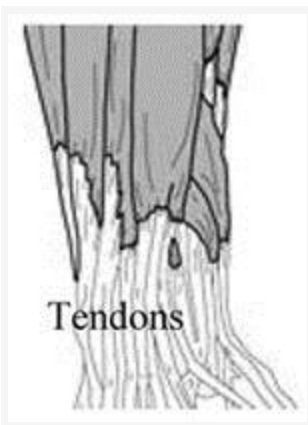
Fascia: the body's connective tissue providing a framework that helps support and protect individual muscle groups, organs, and the entire body as a unit

Connective Tissues: includes cells, fibers such as collagen and elastin as well as fibroblasts, chondrocytes, and osteocytes

- Type I - tendons, ligaments, bone, skin
- Type II - cartilage
- Type III - blood vessel walls

Cartilage: This is a type of connective tissue. It is a firm gel-like substance. The body contains three major types of cartilage: hyaline cartilage, elastic cartilage, and fibrocartilage.

Synovial fluid: fluid in the joint capsule that keeps bones slightly apart, protecting cartilage coverings from wear and tear, absorbing shocks, lubricating the joint, & filtering and letting nutrients reach the cartilage, but blocking the passage of harmful cells and substances



Musculoskeletal System

Decoding Medical Language

component	meaning	example
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

Nourishing the Musculoskeletal System

Methods, techniques and therapies for nourishing the Musculoskeletal System through a holistic and intersectional lens:

- Eat mineral + calcium rich foods (such as dark leafy greens)
- Eat foods + supplements with vitamin D
- Stay active. Light weight bearing exercise (such as running, jobbing, aerobics, climbing, dancing, etc)
- Herbal medicine!!!

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Herbal Actions for the Musculoskeletal System

To nourish + maintain this body system we work with the following herbal actions to bring upon the desired support:

- **Anodyne/Analgesic:** relieves and soothes pain, usually herbs that contain opiates
Ex: *Eschscholzia californica* (California Poppy), *Lactuca virosa* (Wild lettuce), *Piscidia erythrina* (Jamaican Dogwood), *Valeriana off.* (Valerian), *Atropa belladonna* (Deadly Nightshade), *Hyoscyamus niger* (Henbane), *Datura stramonium* (Thorn Apple), *Gelsemium sempervirens* (Gelsemium)
- **Antispasmodics:** prevents or eases spasms or cramps in the muscles of the body.



Musculoskeletal System

Ex: *Viburnum opulus* (Cramp bark), *Viburnum prunifolium* (Black Haw), *Matricaria recutita* (Chamomile), *Zingiber off.* (Ginger), *Passiflora incarnata* (Passionflower), *Mentha piperita* (Peppermint), *Humulus lupulus* (Hops)

- **Rubefacient/Counterirritant:** herbs that when applied to the skin will cause a gentle and localized increase in surface blood flow (vasodilation)
Ex: *Capsicum sp.*(Cayenne), *Brassica alba/niger* (Mustard seed), *Ricinis communis* (Castor Oil Bean), *Allium sativa* (Garlic)
- **Circulatory Stimulants:** quickens and enlivens the physiological activity of the body in some way
Ex: *Capsicum sp.* (Cayenne), *Panax ginseng* (Korean Ginseng), *Zingiber off.* (Ginger), *Zanthoxylum americanum* (Prickly Ash), *Achillea millefolium* (Yarrow)
- **Diuretics:** increases the secretion & elimination of urine from the body
Ex: *Arctostaphylos uva-ursi* (Bearberry), *Juniperus communis* (Juniper), *Apium graveolens* (Celery), *Betula alba* (Silver birch), *Petroselinum crispum* (Parsley), *Achillea millefolium* (Yarrow), *Crataegus spp.* (Hawthorne), *Cytisus scoparius* (Scotchbroom), *Convallaria majalis* (Lily of the Valley)
- **Astringent: causing the contraction of body tissues, typically of the skin and intestines by tightening supporting** irritation, inflammation, and protect against infection
Ex: *Rubus idaeus* (Red Raspberry), *Quercus sp* (White/Red Oak), *Geranium maculatum* (Cranesbill), *Capsella bursa-pastoris* (Shepherd's Purse)
- **Alterative:** a small class of plants and herbs that help combat stress by restoring balance, increasing vitality and protecting against stressors.
- **Nervine Tonic/Trophorestorative:** restores the proper function and structure of a tissue that has become damaged or debilitated due to chronic stress or illness.
Ex: *Cordyceps mushroom*, *Schizandra* (*Schizandra chinensis*), *Licorice* (*Glycyrrhiza glabra*), *Astragalus* (*Astragalus membranaceus*), *Codonopsis* (*Codonopsis tangshen*), *Reishi* (*Ganoderma lucidum*)

