5 basic shapes of bones

The Hulton Archive/Getty ImagesA chart showing the reverse and side views of the human skeleton, cirracting 1900s human body is an incredible machine. It works so well most of the time that we shouldn't pay much attention to any of the life-sustaining systems that are on the move around the clock, buzzing together without our conscious involvement. Now your body performs vital and complex tasks almost too numerous to comprehend. Fortunately, our bodies do not require our understanding in order to pump the heart, oxygenate blood, regulate hormone production, interpret sensory data and conduct any other process that keeps our biological boats afloat. In this article, we will discuss one of the systems that makes life possible: the skeletal system. Bones prevent you from pudding on the floor in the form of jellyfish, but what else do they do? Bones rebuild themselves, they produce blood cells, they protect our brains and our organs, they provide a giant leverage system that allows us to move around, and bones also help maintain a steady amount of calcium in our bodies. And, even if you never make your mark on the world (or in the history books), your bones will stick around long after you've otherwise disappeared to state to the world: These skeletal remains once supported skin and tissues and organs! This man once existed! And since the construction crew that dug your bones reel back in horror, every life choice you've ever made will seem - if for a moment, before you shovel into the basket - very worth it. Before we leave behind our skeletal remains to freak out future generations, we must first learn some basics about bones: What are the bones made of? What happens when they break? And how many of them do you have, anyway? The contents in the adult body are 206 bones. Bone - a honeycomb mesh of calcium salts, located around a network of protein fibers. These protein fibers are called collagen. When you patch a hole in a piece of drywall, you usually cover it with adhesive tape, which has an elastic fidgy mesh, and then cover it with a wall solution. The bone is made in many ways in the same way. Collagen fibers are joined by a kind of shock absorber [source: University of California Santa Barbara]. Then it's all covered and surrounded by calcium phosphate, which ardies everything in its place. Not only do the bones make use of calcium for strength, they also keep some stored in reserve. When other parts of the body need to increase calcium, the bones release the required amount into the bloodstream. There are two different types of bone tissue: cortical bone (top layer) and undone bone (inner layer). Cortical bone, also known as a compact bone, provides external protection of the inner layer from external force. It is 80 percent bone mass and dense, and hard [source: [source: Cortical bone is covered with a fibre membrane called okiothea. Think of the okiotheum as a useful vest that is placed over the bone - it has parentheses and places to attach muscles and tendons. Okiothea contains capillaries, which are responsible for preserving the bone, under nourished by blood. In the case of long bones such as the femur (upper leg bone), the periothea covers the center of the bone, but - like a sleeveless vest - stops short of the cartilage tissue that is contained at both ends of the bone (we'll discuss this cartilage in a later part). The undone bone, also known as trabecular or carot carotary bone, is an inner layer of bone and much less dense than a cortical bone. It is formed trabecules, which are needle-like structures that create a grid. However, instead of a network of bone structure with periodic gaps, the undone bone is more like a network of connecting spaces with a periodic structure. The grille of the tiny chambers is filled with either bone marrow or connective tissue. In these brain-filled spaces, there is a place where new blood cells are produced. Although the undone bone is only about 20 percent of bone mass, it plays an important role in the body's function. It provides structural stability and acts as a kind of shock absorber inside the bone, but without adding too much to the overall body weight. In the next section we will learn more about bone marrow. Advertising Inside the cavity of the canceled bone is soft, adipose tissue consists of an irregular network of blood vessels and cell types. It's called bone marrow. There are two types of bone marrow: red and yellow. The red brain contains stem cells, nonspecized cells that can develop into different types of specialized cells. They are responsible for replenishing and replacing cells in the body that have been damaged or lost. (For the whole story about stem cells, give how stem cells work read.) Two types of stem cells have been identified in the red brain: hemopoietic stem cells (HSCs). This type of stem cell is responsible for creating billions of new blood cells every day, at a rate of about 8 million every second [source: Houston Museum of Natural Science]. HSCs create every type of blood cell: etils (which carry oxygen throughout the body), white blood cells (which fight infections and kill bacteria) and platelets (which help your blood clot). Brain stem cells can even produce more bone marrow stem cells. HSCs can leave the brain and enter the bloodstream, where the ratio of blood cells to stem cells is about 100,000 to 1 [source: National Institutes of Health]. Stromal stem cells. This type of stem cell generates bone cells, cartilage, fat cells and connective tissue. Stromal stem cells are studied for their repair of spinal cord damage and impaired healing of the lymphatic system. The yellow brain is mostly fat, and how we are it can be found in places where once we have a red brain - some bones on our arms, legs, fingers and toes, for example. If the body needs more blood cells, the yellow brain can turn back into red brains and produce them. Some bones have far more red brains than others - pelvic bone, spinal vertebrae and our ribs are all rich in it. The body also stores iron in the bone marrow. Bone marrow can become a disease. Meloprolyferative disorders (GMP) cause overproduction of immature cells from the bone marrow. Disorders such as aplastic anemia and microdisplastic syndromes (MDS) hinder the brain's ability to produce enough blood cells. Several bone marrow diseases can be treated with stem cell transplants that inject healthy stem cells into the patient's body to replace diseased cells. The traditional way to transplant these stem cells is to extract bone marrow from the donor's femur using a bump and enter the material into the recipient's body. You don't need to actually experience someone who penetrates the process to imagine how unpleasant it is. Increasingly, doctors are collecting bone marrow stem cells from the bloodstream, resulting in better stem cell samples for the recipient and less pain and discomfort for the donor. In the next section, we'll look at some of the bones that help prevent your brain and lungs from slipping into your socks - axial bones. Advertising Bones can be widely divided into two categories: axial and appendicular. In this section we look at the axial bones, so named, because they form the body axle. Axial bones are associated with the central nervous system and protect delicate organs such as your heart and brain. Axial bones include: skull. While this coconut on the top of the neck feels like one large block with a jaw attached, the skull actually consists of 22 interconnected cranial and facial bones. These cranial plates and odd bones are held together by joints, although these joints (quite wisely) do not allow movement (except for the jaw). Deep in your ear, the smallest bone in your body, stirrups. It's about the size of a grain of rice. Spine. Your spine (also known as a vertebrate pole) consists of 33 specialized bones called vertebrae. These vertebrae provide shape for the rest of the body and protect the spinal cord. Starting from your head and moving down, the first seven vertebrae are cervical vertebrae that keep your beautiful skull from rolling down the street every time you come to a sudden stop. They also allow you to quit like that or shake your head no. Next, 12 thoracic vertebrae forming the back of the rib cage. Below the thoracic vertebrae are throbbage vertebrae, which carry most of the body's load. Most back muscles are associated with these workinghorses. The following are the which actually begins in childhood as five different vertebrae, but eventually merges into one unit. Below is another unit that begins life in several parts, coccyx (tail). Sternum. The sternum, or sternum, is front and center in its role as an organ protector. It protects your heart, lungs and parts of your major arteries from external forces. Like cokex or sacrum, the sternum begins as different sections that over time fuse into one unified piece. The sternum provides resistance to the ribs that are attached to it. Rib. These flat bones form a protective shield around your internal organs. There are 24 ribs, 12 on each side of your body. They come in three different types. On top of the first seven sets of ribs - real ribs. They are connected in the back to the spine and are connected to the front of the sternum. Then there are the false ribs. These three pairs are joined in the back to the spine, but the front is attached to the seventh real rib, which is the last rib to connect to the sternum. The latter are floating ribs, and these two pairs of ribs are attached to the spine like everyone else but float in front, not attached to the sternum or any other rib. In the next chapter, we learn about bones that serve more than they protect: appendicular bones. Advertising Although axial bones form a vertical axis of the body, appendicular bones are bones that connect to this axis. Unlike axial bones, protection is not a function of appendage bones; they are made for action. Let's see: Shoulder bones. The bones that make up your shoulder girdle serve to connect your arms from the sternum and rib cage for stability and support. You have two collarbone (collarbone) that are attached at one end to the breastplate and, at the other end, support the shoulder blades or shoulder blades. Shoulder blades provide contact points and fasteners for many muscles and bones of each upper arm. The bones of the hand and the hand. The entire hand appendage has three main components: the upper arm, lower arm and arm. Upper arm - one long bone, shoulders. The top fits neatly into the scapaul, and the lower end is associated with an elbow with two bones of the lower arm: ulna (bone on the same side as your little finger) and radius (bone on the side of the thumb). Radius plays a bigger role in your overall mobility and function, while your ulna provides greater stability. Both the ulen and the radius are connected to the bones of the wrist in the hand. Each arm has an impressive 27 bones: eight carnal bones that make up your wrists, five metacarpal bones that extend the length of your palm, and 14 phalanx that form four fingers with three bones each along with one two-sided thumb. Pelvic belt. When you sit down, all the weight of your upper body is ultimately pelvic gird. This stiff pair of thigh bones protects the lower organs such as the bladder and, for women, protects fetal development and facilitates birth. The dimensions of the pelvic girding are quite significantly different for men and women, as the hole in the center of the belt should be large enough for the child to pass through. Bones of the hip, leg and foot. Connecting the pelvic girdler to the lower back is a bone in the hip area called the femur, the longest and strongest in the body. About 25 percent of your total height is derived from the femur bone [source: Houston Museum of Natural Science]. The femur is found out through the knee joint (which is covered and protected by a patella, or knee forging) to the ankle bone (ankle). A little less than in love is another bone in the leg, fibula. Fibula is responsible for muscle ligaments, while tibia ensures that your leg and knee don't get further apart. Each leg has 26 bones: seven tarsal bones that make up the ankle, five metatarsal bones that make up your leg's body (and play a significant role in maintaining your body weight), and 14 phalanx that form - as happens with your fingers - four fingers with three bones each with a thumb that has two bones. Next, we look at some characteristics of different forms of bones. Advertising of 206 bones in the human body can be approximately divided into four categories: long, short, flat and irregular. Von Haven/BIPs/Getty ImagesDr. Bessendiek in 1995 taught the mechanics of the bodyA long bones. Not all long bones are actually long (some of the bones in the fingers and toes are long bones), but most of them (such as leg and arm bones). Long bones are identified by the shape and structure of the bone: a slightly curved shaft fastened on both sides by hyalin cartilage, longer than it is thick. They are made mainly of compact bone, allowing them to maintain large amounts of weight and withstand pressure. Femur gives an excellent example of the strength of long bones. Its hollow cylindrical design allows it to provide the highest possible strength from the materials provided (the substance of the bone itself), without making it too heavy. The hollow inner part of many long bones is where the bone marrow is located. Long bones grow at both ends, and have cartilage plates (also known as epiphysical plates) between the bone shaft and each end of the bone. These plates continue to grow in adolescence. Short bones. Short bones consist mainly of sleepy bones with a protective coating of compact bone. Short bones are not long and not thick, but rather cube-like. Your knee caps (patella), wrists (brushes) and some bones in your legs and ankles (tarsals) are short bones. Short bones are not designed for much movement, but they are durable, compact and durable. Short bones in the wrist and ankle also known as sesame bones. Sesame bones (usually classified as short or irregular bones) are placed in tendons in parts of the body where tendons should cross the joint. These bones keep the tendons slightly away from the joint to provide a better range of movement when the tendon tightens. For example, your knee kovit connects two pieces of tendon that cross the joint between the femur (upper leg bone) and the lumbar bone of your crossbar. Flat bones. These bones are thin and flat. The flat bones have an average layer of spong bone arranged between two protective layers of compact bone. These bones are usually protective in nature. The flat bones make up most of the 29 bones that fuses together form the skull and protect the brain, as well as protect the main internal organs, forming 24 ribs (12 each side) of the rib cage as well as the sternum. The blade (spatula) is also a flat bone. Flat bones contain bone marrow but are not large enough to have bone marrow cavities - instead the spongy bone is bone marrow. The brain in flat bones produces more red blood cells than any other adult type of bone. Irregular bones. Bones that do not place in the other three categories are irregular bones. Vertebrae in the spine and jaw (jaw) are irregular bones. This type of bone usually has a very specialized function and consist mainly of sleepy bones with a thin layer of compact bone around it. In the next chapter, we learn that even the most climbing among us is indeed a workaholic that makes bones. Advertising Right Now, the bones in your body are undergoing repairs. There are wrecking crews blasting into bone quarries and go-kart from debris while a very different crew work transports bags of concrete to the site of the explosion and patches newly minted holes with stronger, newer, better material. Before we talk about replacing the bone with a bone, we better know how cartilage turns into a bone. When you swim in the womb, your developing body just starts to take its shape and it creates cartilage to do so. Cartilage is a tissue that is not as heavy as a bone, but much more flexible and, in some ways, more functional. Cartilage is good enough material to use if you're going to shape a person - good enough for finer work, especially, such as your nose or ear. A large number of fetal cartilage begins to transform into bone, a process called ossification. When ossification occurs, cartilage (which has no salts or minerals in it) begins to calcifie; that is, layers of calcium salts and phosphate begin to accumulate on cartilage cells. These cells, surrounded by minerals, die off. This leaves small pockets of separation in cartilage, and tiny blood vessels grow in these cavities. Specialized cells called osteoblasts begin into the developing bone using these blood vessels. These produce a substance consisting of collagen fibers, and they also help in collecting calcium, which is deposited along this fibre substance. (One common analogy for this design is reinforced concrete, which is a grid of metal rods covered with concrete mixture.) After a while, osteoblasts themselves become part of the mix, turning into lower-special osteocytes, a kind of retired version of osteoblasts that continue to put together but don't whisk too far from blood vessels. This osteocyte network helps form a spongy grille from the undone bone. The undone bone is not soft, but it looks spongy. Its spaces help shift the stress of external pressures throughout the bone, and these spaces also contain bone marrow. Small channels called canaliculi pass through all the calcified parts of the bone, allowing nutrients, gases and waste to make their way. But we are not yet fully with the process of growing bones. Advertising Before turning into osteocytes osteoblasts produce cortical bones. One way to imagine this process is to photograph a bricklayer catching himself inside a man-sized brick chamber of his own construction. After forming a hard shell (cortical bone), the brickwork fills the chamber itself. The air passes through bricks and brickwork falls. In the bones, this part of the process is achieved by osteoclasti, which pass in calcifier cartilage and get bones from the middle of the shaft, leaving room for bone marrow formation. Osteoclastes do this by covering and digesting the bone matrix using acids and hydrolytic enzymes. Consequently, our brickwork (osteoblast) made a tomb (cortical bone), died inside the tomb (became osteocyte), rotted over time (dissolved osteoclast) and left behind its remains, which formed a network of masses and space inside the brick tomb. Eventually all the cartilage turned into bone, except for cartilage at the end of the bone (articulate cartilage) and growth plates that connect the bone shaft on each side to the ends of the bone. These cartilage layers help the bone expand, and finally calcify with the help of adulthood. So, right now in your body, there's osteoclasty hard at work absorbing old bone cells and osteoblasts, helping to build a new bone in its place. This cycle is called remodeling. When you're young, your osteoblasts (builders) are more numerous than osteoclasty, resulting in bone gain. As you get older, osteoblasts can't keep up with osteoclasty, which are still effectively removing bone cells, and that leads to bone loss (and a condition called osteoporosis, which we'll discuss soon). What good does this whole bone do if you don't get to break some now and then? We will further investigate this line of questioning in the next section. Advertising What happens when your sibling pushes you from the top of the top bone is a very durable material, it can break in a number of ways with sufficient force pushing, pulling or twisting it. Here are some of the most common breaks: Stress fracture. This type of fracture is the result of sustained strength on the bone, for example, which is created by running or jumping. Most stress fractures occur in the lower body, due to the accumulated weight that bones in the legs and legs must maintain. You can have a stress fracture without feeling pain. Open fracture. Unlike closed fractures, in which all areas of broken bone remain inside the skin, open fractures lead to puncture of bones and puncture of the skin.Complete fracture. This is when the bone is neatly broken into two parts. A single fracture. This identifies a rupture in which the bone has only one damaged area. Comminuted fracture. Also known as More Painkillers, please commit fractures are bones that have been crushed or broken into more than two fragments. Greenstic fracture. With this type of fracture, the bone cracked on one side, but not all the way to the end. These breaks usually occur in children. Pathological fractures. These fractures can be caused by external forces, but the main cause is bone that has been weakened by disease or infection, such as bone cancer. Displaced fractures. Two broken ends of the bone do not and require repositioning before they are installed in place. Simple transverse. This type of fracture is a uniform, perpendicular rupture of the bone. (Imagine if someone chopped the femur bone in half, gently striking it from the side at right angles.) Oblique fracture. An oblique fracture will be a diagonal fracture passing along the length along the bone. (Think of a greenstic fracture, but all the way through the bone.) Spiral fracture. Spiral fractures occur when the bone has been twisted past its maximum resistance point. Here are a few of the most common break spots: The Colles fracture is just a bizarre name for a broken wrist. It is also the most common type of fracture. Hip fractures. More than half of the fractures seen in the elderly are hip fractures [source: FDA]. Hip fractures are actually a ruptured femur, right under the joint that connects the upper part of the femur to pelvic fractures.Compression. It is a fracture that affects the spine. Bad falls tend to be responsible for compression fractures in which one or more vertebrae are essentially shredded. Now that we know how the bones break, let's see how they are edified. Advertising When bone fracture, the body immediately initiates the first phase of healing, the reactive phase. Severed blood vessels gather at the site of the rupture and form a clot. This clot contains fibroblasts, which are connective tissue cells that produce collagen proteins. When this clot is formed, it lays the groundwork for what will happen restoration of the bone. Bone. After a few days, the broken ends of the bone produce new blood vessels that develop into a clot that now bridges the division into the bone caused by the fracture. White blood cells arrive with these new blood vessels and begin to kart unnecessary material from the breaking point. Now fibroblasts begin to multiply and secrete collagen fibers that form the matrix that replaces the blood clot. In the reparative phase, specialized cells - osteoprogenitor cells - located in the perk that covers most of the bone, begin to transform into different types of essential cells. Some of these cells - chondroblastes - produce cartilage, while others - osteoblasts - produce an unexpressed bone called calluses. New cartilage and callous bridge separate pieces of bone, and cartilage begins to be orphaned into trabecular bone. In the third phase of remodeling osteoclast begin to remove trabecular bone, and osteoblasts replace it with a compact bone. After completing this phase, the fractured bone has been exacerbated. (For more information on the healing process, try How to Have Broken Bones Heal?) Sometimes, when the bones break, they are proven so that the fracture ends correctly for healing. All the pressure has to be taken off the bone, so the ends that try to fuse back together don't move out of position. Surgery may need to be carried out to keep bone fragments together with metal plates, rods or screws. These devices not only provide a bone position for healing, they provide a starting bridge for calcium deposits that will begin to accumulate along the healing area. Next, we'll learn about what happens when the two bones meet at night (or during the day). Advertising Every time you lean forward, pick up a cup of coffee, lift it on your lips and put it back down, your bones, joints, muscles and other tissues all work in perfect synchronement to make that effort possible. There are 68 joints in the human body, and each joint consists of several elements. Among them: Bones. Well yes, but more precisely, articulate cartilage at the end of the bones. This cartilage prevents damage to bone limbs when in contact with each other. Cartilage itself can be harmed by infection, injury, disease or simple wear. This damage can lead to pain, inflammation and stiffness, a condition known as arthritis. Skeletal muscles. The skeletal muscle is attached to the bone and appears striped upon careful viewing, earning the name of the sheared muscle. Unlike your heart muscle or muscles in the stomach walls, the skeletal muscle can be voluntarily moved, and lie at rest when deliberately not activated. These muscles connect to the bones through the tendons. Tendons. When skeletal muscle contracts or lengthen, it pulls on the bone through an attached tendon, a rigid, flexible tissue. Communication. These tissues are quite similar to tendons, they connect the bones to the bones, ensuring that the bones that meet together to form a joint will remain in place. Synovial membrane. This layer of connective tissue exists around each joint, providing it with protection and producing synovium, a liquid that lubricates the joint and nourishes cartilage. Bursa. Similar to the synovial membrane, bursa is a small bag that provides lubricant to facilitate muscle movement against muscles or muscles against bones. Not every joint moves. The skull, for example, consists of several bone plates that join together, but the fiddly tissue connecting these plates does not allow movement. Freely mobile joints fall into one of several different categories. Different types of seams are: supporting seams (also known as swivel joints). These joints allow you to rotate around the axis. At the top of the spine there is a rod joint that allows the head to move from side to side. Joint loop. This type of connection can open and close like a door. Your elbow is a ardent joint. Your biceps and triceps muscles are basically two people standing on opposite sides of the wall (shoulder bone, or upper arm bone), each with one hand extending to the appropriate side of the door (lower arm bones). The biceps lock the door, adjusting and understating the extent of the angle of the joint, and the triceps, when it pulls on the appropriate side of the door, opens the door, as the loop then expands. Joint slip (also known as plane joints). This type of joint has two bone plates that slip against each other. Joints in the ankles and wrists slip joints. (Keeping your forearm steady while your arm points up and then waving your hand from side to side is an example of the functioning of this joint.) Ball and end seams. This is the most maneuverable type of connection. Your shoulder and hip are both ball and socket joints. These joints have a link between one bone end equipped with protrusion, which fits into the susceptible space at the end of the other bone in the joint. These joints allow movement forward, reverse movement and circular rotation. Saddle joints. These joints allow you to use two different types of movement. For example, a saddle joint allows your large finger to move towards and away from the index finger (like when you spread all five digits and then combine them all together side by side), as well as cross your palm to your little finger. Henioid joints. These joints are like bullet and socket seams, just without a socket (bullet simply relies on another bone end). Next, we'll talk about what happens when the bones go bad. ©iStockphoto.com/evemillaGive your thirsty calcium bones they need - and a fighting chance against osteoporosis. Bones like any other part of the body susceptible to the disease are most common osteoporosis. Osteoporosis is bone mass, leaving it structurally fragile and physically porous. Every sixth American has osteoporosis or early signs of the disease [source: National Institute of Arthritis and Musculoskeletal Musculoskeletal and Skin Diseases]. In particularly serious cases, the bone can be broken in just a sneeze. Women suffer greatly from the condition - four out of five cases of osteoporosis occur in women, and half of all women over the age of 50 will have a fracture associated with osteoporosis [source: National Osteoporosis Foundation]. But it also affects men and the young - in fact, a quarter of all men over 50 will suffer from a fracture associated with osteoporosis. While any bone can be affected by osteoporosis, the hip, spine and wrist are the most common. Hip and spine fractures are particularly problematic, resulting in inmobility, severe and prolonged pain and even death. Factors contributing to osteoporosis include: Adoration. It is important to get exercise, as any weight activity will improve the strength of your bones. In addition, exercise will prompt glands in the body to produce hormones - such as growth hormone, testosterone or estrogen - that help prevent your bones from deteriorating as you age. Other lifestyle options, such as smoking and possibly high alcohol consumption, have a negative effect on bone mass. Malnutrition. A poor diet will lead to not getting enough vitamin C, calcium, phosphorus, magnesium and vitamin D - all important elements of good bone health and the sustained ability of your bones to produce a new bone matrix. Talk to your doctor about your diet and vitamin intake. Underdevelopment of bone mass up to 20 years. You're more likely to have reached most of your peak bone density around the age of 20, though you can still get bone mass until you're 30 or so. Living a healthy lifestyle and getting bone mass early will pay dividends down the road as you age. Low estrogen. Women with higher estrogen levels tend to have higher bone density. Osteoporosis can lead to a condition called the Dovager hump. This occurs when the spine, due to reduced mass and strength, begins to squeeze, resulting in an outer bend of the upper vertebrae in the spine. Another disease that can affect bones is bone cancer. Bone cancer most often spreads to bone from other parts of the body, but it can also start in the bone. When it starts in the bone, it is known as primary bone cancer. Fortunately, primary bone cancer is quite uncommon - there are about 2,300 new cases detected each year [source: National Cancer Institute]. In case of detection of bone cancer, surgical removal of the tumor from the bone or with the help of chemotherapy, radiotherapy or operations (killing cancer cells by freezing them with liquid nitrogen). Osteonecrosis is a condition in which bones no longer receive the blood they need for survival, survival, death of bones and degeneration. The cause of the disease is not currently known. Most cases require surgery, and doctors can instill a healthy bone on painful parts, try to restore blood flow or replace joints with mechanical joints. Osteogenesis imperfection is an inherited disease that causes bones to be particularly fragile. The faulty gene leaves the body unable to produce collagen normally. (For more information, see how Imperfecta osteogenesis works.) Page's bone disease affects about 1 million people in the United States and is generally more likely to appear in people with Northern European ancestry [source: National Institute of Arthritis and Musculoskeletal Musculoskeletal and Skin Diseases]. Page's bone disease affects seemingly random bones in the body, making them too large and structurally unstable. Although the disease can affect any bone, it most often affects the bones of the brain, skull, spine and legs. See the following section for more information on bones and the human body. Related HowStuffWorks Articles More Great Reference Sources American Association for Clinical Chemistry. Meloprolyferative disorders. 27-Jun-2005 Keith, MD. Basic bone structure. 17-Jan-2008 (Jan 15, 2008) . Bones grow the most at night. 31-Jan-2005 . World Factbook: United States. 22-Jan-2009 . Human anatomy. (January 22, 2009) Joyne. Adolescent depression, hard to smoke on the bones. Reuters Health. 12-Dec-2008 Scott J., Ph.D. Bone Structure. (January 24, 2009) Chuanqiang; Wu, Yujun; JIN, Xing. -- A 20-year-old man was Autologous transplantation of stromal bone marrow cells for the treatment of secondary hand lymphedema: a promising controlled trial in patients with breast cancer-related lymphedema. 5-Sep-2008 of Natural Sciences. Body facts. 23-Jan-2009 Clinic. Greenstic fractures. October 21, 2008. . Bone disease. Thomas N., D.D. Flat Bones. August 6th, 2007 (January 21, 2009) Long bones. . Fractures. February 2003. (January 20, 2009) 1000000000 Institute of Cancer. Bone cancer. (January 22, 2009) Institute of Cancer. Skeletal system. (January 22, 2009) arthritis and musculoskeletal musculoskeletal and skin diseases. Paget's bone disease. in 2008. (January 22, 2009) Institutes of Health. Information about stem cells. 15-Sep-2008 Osteoporosis. January 22, 2009. Space Biomedical Research Institute. Human physiology in space: skeletal system. (January 22, 2009) Oklahoma Surgical Hospital. Types of seams. (January 21, 2009) Http://www.orthooklahoma.com/clinical/jointtypes.htmlOSF health care department. Bone fractures. (January 21, 2009) Jonathan C, MD, PhD Stress Fracture. 21-Feb-2007 California - Santa Barbara. A fundamental discovery about the fracture of the human bone: it's all in the glue. 20-Jul-2005 January 15, 2009 /releases/2005/07/050718214954.htmWebMD. Fracture of the collate (fracture of the distal radius). February 1, 2007. (Jan 21, 2009)