A Litigation Primer On Bones, Fractures, And More

Samuel D. Hodge, Jr.

Bones aren't all the same, there are different kinds of fractures, and the legal implications can be significant.

WHAT RESOURCE OF the body numbers 300 at birth but dissipates to 206 with age? The answer is bone, which consists of rigid connective tissue that provides structure to the human form. Bone formation starts during the first few weeks of conception and continues throughout the life cycle. The birthing process requires an infant's body to be flexible because of the narrow passage through which it must pass. Therefore, bone frequently starts out as hyaline cartilage and non-fused bones. For example, a mere examination of a baby's head following birth reveals a large soft spot where the bones of skull have not yet come together. As growth

Samuel D. Hodge, Jr. is Chair of the Department of Legal Studies at Temple University, in Philadelphia. This article is based on a chapter from the author's upcoming book, *Anatomy For Attorneys*, to be published by ALI-ABA.

takes place, however, the cartilage scattered throughout the body hardens into bone and fuses together in a variety of locations to form rigid structures whose unified presence make up the skeleton. This process is known as ossification, and it continues throughout life especially with bone remodeling following a fracture. This article provides an overview of the anatomy of bone and will focus on trauma to these hard structures.

THE ANATOMY OF BONE • There is a perception that bone is a collection of dead tissue. This belief is fostered by the definition of the word "bone," which is derived from the Greek "skeletos." This term means dead or dry bone. In reality, bone is living, growing tissue that serves a number of purposes:

- Bone provides the structure and framework of the body. One merely has to visualize the grotesque shape of an arm or leg following a fracture to appreciate this fact;
- Bone protects the vital tissues and organs of the body. For instance, the brain, spinal cord, and heart are surrounded by this hard material to safeguard them from injury;
- Bone is responsible for the production of red blood cells, or erythrocytes, which contain the iron-rich protein hemoglobin. Hemoglobin provides the transportation system for the disbursement of oxygen throughout the body;
- This hard material acts as a reservoir for minerals such as calcium and magnesium, which are released into the blood when needed to maintain the body's delicate chemical balance;
- Body movement is accomplished only through the interaction of the bones of the skeletal system, and the soft tissues such as muscles and ligaments.

See Figure 1.

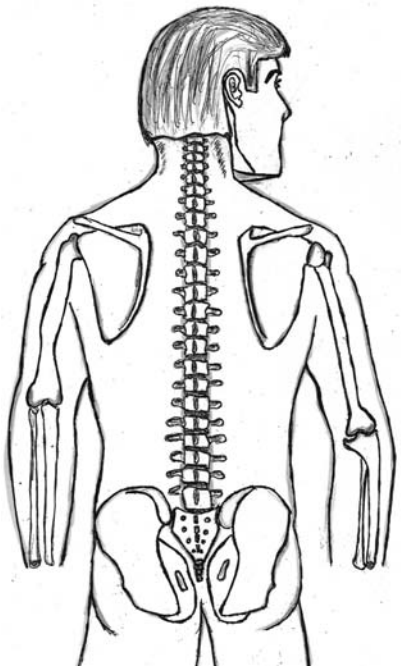

Figure 1

Layers And Shape Of Bone

Bone is surprisingly light, even though it is made up of the dense material calcium phosphate. In fact, it accounts for only 14 percent of the body's weight. Bone consists of three distinct layers:

- Cortical bone;
- Cancellous bone; and
- Bone marrow.

Cortical bone forms the hard outside layer of the structure and takes up most of a bone's mass. Underneath this shell are multiple layers of elastic cancellous bone. This inner layer resembles a rigid sponge or honeycomb. Marrow constitutes the third part of bone and resembles thick jelly. Marrow is only found in the center of some of the larger bones in the body and has the task of producing red and white blood cells as well as platelets. *Dem Bones*, www.kidzworld.com/site/p922.htm. Up to 15 million red blood cells are manufactured every second in the bone marrow, but a disease, such as leukemia, can interfere with this production causing anemia.

Bone Marrow, Answers.com,www.answers.com /topic/bone-marrow.

Bones vary in size and shape to accommodate their anatomical function and location. Nevertheless, there are four basic designs: long, short, flat, and irregular. A long bone is cylindrical in shape and is much longer than it is wide. Its purpose is to provide structure to the body. Examples include the femur, tibia, humerus, and the bones of the fingers and toes. See Figure 2.

Figure 2

A short bone is cube shaped in appearance and is about as tall as it is wide. This hard structure is located in the parts of the body used for rotation, such as the wrist and ankle. See Figure 3.

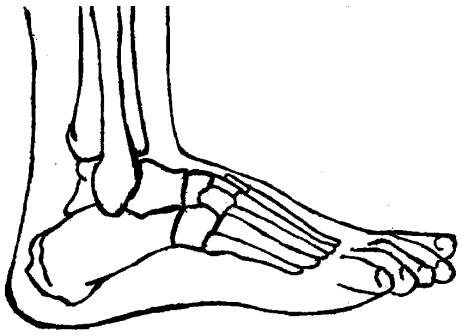

Figure 3

A flat bone is broad in stature and tends to be curved. Its main purpose is to protect the organs of the body and those bones include the ribs, sternum, skull, and scapula. See Figure 4.

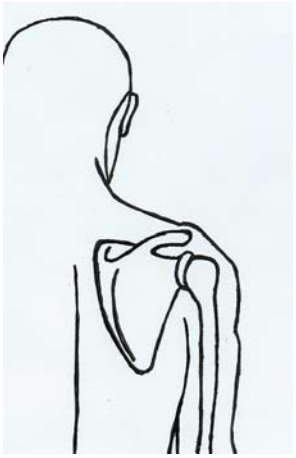

Figure 4

An irregular bone is just what its name implies. These bones do not fit into a set category because they vary in shape depending upon their function. Irregular bones tend to be compact and include the kneecap, vertebrae, and jaw. *Skeletal System, Bones of the Body*, www.msnucleus.org/international/skeleton/lesson1/skelton1a.html. See Figure 5.

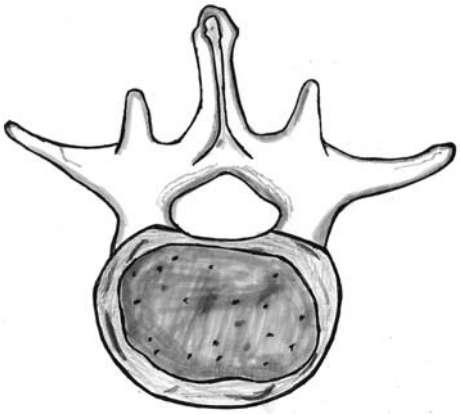

Figure 5

The Bone Cells

A microscopic examination of bone reveals three types of cells within each structure: osteoclasts, osteoblasts, and osteocytes. The

names of these cells are confusingly similar because each starts with the prefix "osteo," which is Greek for bone. Osteoclasts are the carnivores of bone. These large cells break down and reabsorb old bone. On the other hand, the job of the osteoblasts is to create new bone. Ostoeclasts, which work overtime by reabsorbing more bone than the osteoblasts can produce, create a condition called osteoporosis. The job of keeping existing bone alive belongs to the osteocytes. These mature bone cells start out as osteoblasts but turn into osteocytes while new bone is being formed. They keep bone alive by secreting enzymes and by monitoring the release of calcium into the blood stream. *The 'O'Cells, Bone Cells,* http://depts.washington.edu/bonebio/bonabout/bonecells.html and *Bone Cells,* www.mnsu.edu/emuseum/biology/humananatomy/skeletal/cells.html.

Bone Markings

Terms have been coined to identify the twists, turns, holes, and grooves in bone that serve as passageways and attachment sites. This identification process is known as bone markings.

Two types of markings exist: depressions and processes. A bony process extends from the bone to help form a joint or to serve as a place for muscle attachment. Depressions are openings or indentations in the bones that serve as channels for the nerves and blood vessels. *Human Anatomy and Physiology*, www.gen.umn.edu/courses/1135/lab/axialskellab/axialskeletonlab.html.

Attachment Points

Bone processes that act as attachment sites for the soft tissues of the body include:

- Crest—the prominent ridge of a bone;
- Epicondyle—a raised area right above a condyle, which is not part of a joint;
- Line—a linear elevation or narrow ridge of the bone;
- Spine—a thorn-like or sharp protrusion in a bone such as that which is located on the back of the shoulder blade;
- Trochanter—a large irregularly shaped elevation similar to that which is found near the top of the femur. (See Figure 6);
- Tuberosity—a large rounded bump with a bony surface;
- Tubercle—a small raised bump or projection on the bone.

Figure 6

Joints

Bony processes that assist in the forming of a joint include:

- Condyle—a rounded surface at the end of a bone;
- Facet—a smooth flat surface usually covered with cartilage;
- Head—a ball at the end of a narrow neck such as the femoral head that helps form the ball-and-socket of the hip joint.

Nerves And Blood Vessels

Openings or depressions in bone that permit the passage of nerves and blood vessels include:

- Groove—a furrow;

- Fissure—a slit-like opening;
- Foramen—an opening in a bone such as the hole in the vertebrae that allow for the passage of the nerve roots from the spinal cord. (See Figure 7);
- Fossa—a pit or hollow depression-like area;

Sinus—a cavity within a bone lined with mucous membranes and filled with air.

Id. See also Keith L. Moore and Arthur F. Dalley,II, *Clinically Oriented Anatomy,* 15-18 (Lippincott, Williams, and Wilkins, 4th ed. 1999).

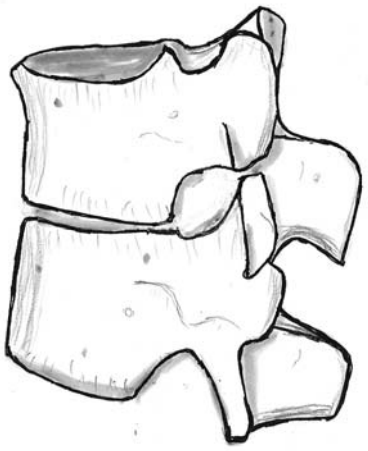

Figure 7

Bone As Living Tissue

Because bone consists of living tissue, it hurts when injured, bleeds when fractured, and changes with age. These facts are not surprising because bone contains blood vessels and nerves like other organs in the body. Moore, *Clinically Oriented Anatomy*, supra. These blood vessels and nerve fibers are able to pass through bone by use of interconnected channels called haversian canals.

TRAUMA TO THE BONE • A fractured, or broken, bone is a common result of trauma and no one is immune from this injury. Almost seven million people in the United States seek treatment annually for this problem. According to the American Academy of Orthopedic Surgeons, fractures occur in many different ways, but there are three common causes:

Because bone consists of living tissue, it hurts when injured, bleeds when fractured, and changes with age. These facts are not surprising because bone contains blood vessels and nerves like other organs in the body.

- Most fractures are the result of trauma such as a fall, a motor vehicle accident, or a tackle in a football game;
- Osteoporosis is a precipitating factor because it causes bones to become fragile, predisposing them to injury;
- Overuse can cause stress fractures, especially in athletes.

Fractures, Your Orthopaedic Connection, American Academy of Orthopedic Surgeons, http://orthoinfo.aaos.org/fact/thr_report.cfm?Thread_ID=125&topcategory=General%20information.

Bone Elasticity

Bone enjoys a small degree of elasticity but will break when subjected to a force more powerful than it can withstand. By way of analogy, this process is similar to the breaking of a pencil. This writing instrument will bend in response to a small degree of pressure, but will snap when the force bends the pencil beyond its tensile strength.

Fractures take on many forms ranging from mere cracks in the bone to cases where bone fragments are protruding through the skin. The

Statistically, work-related dangers cause men younger than 50 years of age to sustain more fractured bones than women of a corresponding age. This fact is reversed after the age of 50 years when women become more susceptible to fractures than men.

magnitude of an injury, however, is usually correlated to the amount and direction of force that caused the break. For instance, if the bone's breaking point is exceeded by only a small degree, the bone may merely crack. If the force is great, such as that which might occur in a high-speed car accident or by a gunshot, the bone will shatter. *Fractures, Your Orthopaedic Connection,* American Academy of Orthopaedic Surgeons, http://orthoinfo.aaos.org/brochure/thr_report.cfm?Thread_ID=9&topcategory=General%20Information.

Compact Bone Versus Spongy Bone

Common fracture sites include the bones of the wrist, spine, and hip because these bones are fragile and porous. The long bones of the arms and legs are compact bones whose cells are packed together in rows to make these structures strong. Bones of the wrist, spine, and hip, however, are classified as spongy bones because they have a honeycomb-like composition, resulting in a more delicate construction. *Osteoporosis and Bone Fractures*, www.activella.com/2_3_2.asp.

Who's At Risk For Fractures?

It is known that certain people are susceptible to fractures. These include those engaged in high levels of activity, children, and athletes participating in contact sports. Aging predisposes the elderly to fractures because the brittleness of bone increases with age. Statistically, work-related dangers cause men younger than 50 years of age to sustain more fractured bones than women of a corresponding age. This fact is reversed after the age of 50 years when women become more susceptible to fractures than men. Certain diseases increase the risk of fractures such as rickets, hyperthyroidism, Paget's disease, bone tumors, and lack of use of a body part following a stroke. Smith, *Fractures*, www.chclibrary.org/micromed/00048710.html. Medication even plays a role in fracture development, especially steroid use. No list is complete without adding smoking as a fracture risk. Smoking decreases bone density, making these hard structures more susceptible to fracture. *See* Paul Ullom-Minnich, *Prevention of Osteoporosis and Fractures*, 60 Am. Fam. Physician (July 1999), www.aafp.or/afp/990700ap/194.html.

Classifications Of Fractures

Broken bones have two main categories: open and closed fractures. If the force causes a bone fragment to extend through the skin, this is an open, or compound, fracture. This injury is especially troublesome because of the potential for infection and other complications. A simple, or closed, fracture refers to a break in which the bone does not penetrate the skin. *Fractures, Your Orthopaedic Connection*, American Academy of Orthopaedic Surgeons, http://orthoinfo.aaos.org/brochure/thr_report.cfm?Thread_ID=9&topcategory=General%20Information.

Fractures may also be classified by their appearance or characteristics. The following is a partial listing:

• Avulsion fracture—force applied by a muscle or tendon that causes a small piece of bone to pull out from its point of attachment;

• Comminuted fracture—a fracture in which the bone has broken in more than two places or is fragmented;

• Complete fracture—the bone has cleanly fractured into two pieces;

• Compression fracture—a break caused when the structure collapses;

• Greenstick fracture— an incomplete fracture that consists of a small and narrow crack on one side on the bone;

• Hairline fracture—a minimal break in the bone with no significant bone displacement;

• Impacted fracture—the edge of two bones that become wedged together;

• Oblique fracture—the bone breaks at an angle and extends across the length of the structure;

Spiral fracture—a broken bone that has a spiral or corkscrew-like appearance;

• Transverse fracture—the break goes straight across the bone.

Growth Plate Fractures In Children

Fractured bones in children present long-term implications because their bones are still growing and have not fully matured. Until this process is complete, bone continues to expand in length and shape at the area near the ends of the long bones. This region is called the growth plate, or physis. Bone does not grow in the middle portions of the long bones.

The growth plate is the weakest part of the skeleton, and it is more fragile than the tendons and ligaments that connect bone to muscle or bone to bone. As a result, an injury to a joint is more likely to harm the growth plate than the surrounding soft tissues. This process can cause bones to grow unequally so that an injured leg or arm will grow to a different length than the unaffected limb. Growth plate fractures make up 15 percent of all fractures in children. Statistically, they occur twice as often in boys as in girls, and males between 14 and 16 constitute the largest group that sustains this injury. Roughly half of all growth plate injuries occur to the fingers or outside part of the wrist but the bones of the legs, ankle, and hip are all prone to physis injuries. *Questions and Answers About Growth Plate Injuries*, National Institute of Arthritis and Musculoskeletal and Skin Diseases, www.niams.nih.gov/hi/topics/growth_plate/growth.htm.

Participating in sports, especially track and field, rowing, and sports involving repetitious use of the arm, account for 50 percent of stress fractures in men and 64 percent in women.

Treatment for growth plate fractures includes placing the child in a cast or splint. When the fracture is serious, surgery may have to be performed. Long-term follow-up care is required to assess the child's recuperation and growth. Most growth plate fractures will heal without complication. An injury, however, that causes an interruption to the blood supply can cause bone growth to be stunted. In younger children, the risk of a bad result is greater because of the growth that must occur over time. Growth plate injuries at the knee are the most problematic and have the highest incidence of stunted or crooked growth. *Id.*

Stress Fracture

The body takes a pounding during activities of everyday life, and the bones must absorb that impact. Bone, however, can become fatigued with overuse and develop small cracks or hairline fractures. This condition is labeled a stress fracture. See Figure 8.

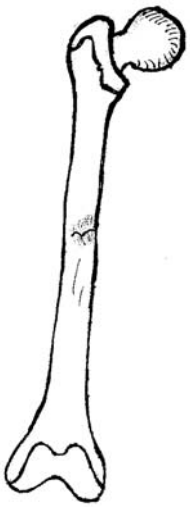

Figure 8

Stress fractures develop as a result of increasing the intensity or amount of an activity too quickly. Starting an exercise program, increasing the amount of time one engages in sports, or starting basic training in the military are examples of situations that cause stress fractures. *Stress Fractures, Your Orthopaedic Connection,* American Academy of Orthopaedic Surgeons, http://orthoinfo.aoos.org/fact/thr_report.cfm?Thread_ID=46+topcategory=General%20. Other causes include wearing improper footwear or the weakening of the bone through a disease process such as osteoporosis.

Participating in sports, especially track and field, rowing, and sports involving repetitious use of the arm, account for 50 percent of stress fractures in men and 64 percent in women. Swimming, hockey, golf, and softball have very few cases of this injury. Brent W. Sanderlin and Robert F. Raspa, *Common Stress Fractures*, 68 Am. Fam. Physician 1527 (October 15, 2003), available at www.aafp.org/afp/20031015/1527.html.

Statistically, 95 percent of stress fractures occur in the weight-bearing bones of the foot and lower extremity. The tibia and metatarsals, or toes, are the bones most affected by stress fractures and the conditions most often surfaces in those between 18 and 25. Andrew D. Perron, William J. Brady, and Theodore A. Keats, *Management of Common Stress Fractures*, 111 Postgrad. Med. 95 (Feb. 2002) available at www.postgradmed.com/issues/2002/02_02/perron.htm.

Symptoms of stress fractures vary but include pain following physical activity, discomfort that decreases with rest but returns with activity, or a specific area that is painful upon application of pressure. *Stress Fractures*, Health /Library, CNN.com, www.cnn.com/HEALTH /library /DS/00556.html.

The presentation of symptoms and a physical exam by the doctor are important in making the diagnosis of a stress fracture. Pain following a recent increase in physical activity is a telltale sign of a stress fracture. Radiographs are not always useful since they may fail to detect the subtle changes in the bone caused by a small crack. A bone scan or MRI may be requested if the symptoms do not abate with time and the physician is unsure of the diagnosis.

Treatment is primarily geared toward resting the affected area for several weeks, with a gradual return to activities. Icing the painful area and use of anti-inflammatories may also be recommended. If symptoms are particularly severe, a cast may be applied.

Treatment For Fractured Bones

Proper fracture treatment depends upon the severity of the injury. Emergency care initially

involves the immobilization, icing, and elevation of the affected area. Because fractures constitute abnormalities in anatomical structure, radiographs are the tool of choice in diagnosing the problem. Bones that are out of anatomical alignment must be "reduced," or returned to their correct positioning. Sometimes this must be accomplished through surgical intervention because that is the only way to reposition the bone fragments. During the procedure, the physician will also use screws or metal plates to stabilize the injured bones. This treatment plan is known as an open reduction with internal fixation. A fracture is sometimes stabilized through external fixation. This remedial task is accomplished by inserting pins or screws into the broken bone, which are then affixed to a metal bar outside of the skin. Cast application, however, remains the most common treatment for a fracture because most bones will heal once they have been repositioned.

The Healing Process

Bone has the amazing ability of healing itself with new bone formation instead of creating scar tissue like many other areas of the body. This healing is accomplished through a three-step process: inflammation, repair, and remodeling. Healing starts with the body's inflammatory response to trauma. Cells of the immune system, the osteoclasts, remove the damaged soft tissues, bone fragments, and blood. That is why the area surrounding the fracture initially becomes tender and swollen as cell activity and blood flow increases. The repair phase of healing starts within a few days of the injury and continues for weeks to months. External callus, or new bone, is formed by the osteoblasts, which act as a temporary bond. Initially, the callus is soft and rubbery, and lacks strength. Three to six weeks following the injury, however, this new tissue calcifies and becomes much stronger. It may

Misdiagnosis of a bone fracture makes up 27 percent of malpractice claims against emergency room physicians.

even become visible on the radiograph so physicians can monitor the healing process by observing this transformation. When the remodeling phase takes over, bone is built back up to its normal state. The external callus is reabsorbed and replaced by stronger bone. *Fractures*, The Merck Manual – Second Home Edition, Chapter 62, www.merck.com/mmhe/sec05/ch062/ch062a.html. A repaired bone ends up being just as strong as it was before the injury. See Figure 9.

Figure 9

LEGAL CONSIDERATIONS • A fracture seems like a fairly straightforward diagnosis with minimal complications. After all, a broken bone represents an anatomical abnormality so conventional radiographs should conclusively confirm a physician's assessment of a fracture. Nothing could be further from the truth!

Misdiagnosis

Misdiagnosis of a bone fracture makes up 27 percent of malpractice claims against emergency room physicians. Mikel A. Rothenberg, *Principles of Fractures, Preparing Orthopedic Disability Cases*, Section 7.01 (Aspen Law and Business, 5th ed. 1999). The leading cause of malpractice claims against primary care physicians are misdiagnosed orthopedic injuries involving occult fractures about the elbow, femoral neck fractures of the thigh, posterior dislocations of the shoulder, epiphysical plate injuries, fractures of the pubic ramus located in the pelvis, patella tendon ruptures, and Lisfranc injuries. Moore, *Orthopedic Pitfalls in Emergency Medicine*, 81 S. Med. J. 371 (Mar. 1988).

Femur fractures rank first on the list in frequency of malpractice claims against orthopedic surgeons, and it is third on the list of most expensive lawsuits by diagnosis. Technical problems in the management of femur fractures resulted in the filing of suit five times more frequently than the next three causes. Fractures of the hip and femoral shaft in children resulted in the largest verdicts. *Femur Fracture Care Frequent Cause of Lawsuits*, The American Academy of Orthopaedic Surgeons Bulletin, Vol. 49/No. 1, February 2002, www2.aaos.org//aaos/archives/bulletin/feb01/fline4.htm.

It is common medical and legal knowledge that a physician's failure to perform a radiograph when faced with symptoms that suggest a fracture can constitute malpractice. The failure to perform repeat radiographs, however, when a person's complaints persist also provides a basis for professional negligence. Subtle fractures may not appear on initial radiographs so they must be repeated over time or a bone scan may be necessary to ascertain if there is increased bone uptake demonstrating bone remodeling following a fracture.

In *Richardson v. Louisiana*, 726 So. 417 (La. Ct. App. 1998), Richardson was shot in the upper thigh, and radiographs revealed that a bullet fragment was lodged in his leg. Repeat radiographs a few days later showed no change in his condition. A reexamination of his leg showed diminished swelling but the patient still complained of pain. Two weeks after the shooting, Richardson heard a snap in his leg and fell to the floor in severe pain. New radiographs revealed a displaced fracture of the femur some distance below the gunshot wound. A malpractice claim was advanced on the theory that an average physician knows that radiographs do not always show the existence of a fracture soon after injury. The physicians who testified at trial stated that an occult or hairline fracture can be present but not be seen on even the finest of radiographs. Such breaks in bone only become more visible on radiographs with the passage of time. This phenomenon occurs because of the reabsorption of bone around the fracture site, or because of the physical stresses generated by the fracture. The plaintiff in *Richardson* was successful in his malpractice claim, and the court upheld the proposed standard of care.

Verdicts And Damages

The topic of bone fractures in the legal arena is so diverse and covers so many areas of the body that it is not feasible for this article to discuss the many court cases involving this topic. The *Personal Injury Verdict Reviews*, however, has examined the value of fracture cases based upon the materials in its voluminous database.

The jury verdict analysis found that the median award for leg fractures involving the femur, fibula, and tibia is $150,000. Curiously, juries made a distinction in awards between fractures caused by motor vehicle accident and non-vehicular cases. The average leg fracture in a car accident was $139,000, whereas the median award in other cases was $170,300. Fractures of the ankle averaged $100,000, with the medi-

an award for a soft tissue injury to this joint being $80,600. Finger fractures averaged $26,275, whereas the median award for hand fractures was $25,000. Facial fractures involving a single bone yielded an average verdict of $56,350, whereas the median award for jaw and mandibular fractures totaled $85,000. Juries viewed multiple facial fractures much more seriously and awarded a median value of $112,477. *Jury Verdict Research*, LRP Publications.

CONCLUSION • Fractures take on many forms and shapes. Bone, however, has the amazing ability to repair itself without leaving scar formation. A fracture that has successfully healed is just as strong as it was before the trauma.

Misdiagnosis and mistreatment of fractures result in a larger number of malpractice claims. Diagnostic imaging does not always confirm the diagnosis that can result in delayed or improper treatment. Counsel should always check to see if repeat studies were performed when handling this type of case.

Case law also demonstrates that fractured bones are not treated equally in value. Each claim must be handled on a case-by-case basis. It is important in considering the worth of a fracture, however, to investigate whether the fracture has healed properly and the limitations in body movement the person has sustained as a result of the trauma.

PRACTICE CHECKLIST FOR
A Litigation Primer On Bones, Fractures, And More

Bones may seem to be simple structures, but they aren't—and neither is the mechanism of injury, or what that can mean in a litigation setting.

• Bones vary in size and shape to accommodate their anatomical function and location. Nevertheless, there are four basic designs—long, short, flat, and irregular:

__ A long bone is cylindrical in shape and is much longer than it is wide. Its purpose is to provide structure to the body. Examples include the femur, tibia, humerus, and the bones of the fingers and toes;

__ A short bone is cube shaped in appearance and is about as tall as it is wide. This hard structure is located in the parts of the body used for rotation- the wrist and ankle;

__ A flat bone is broad in stature and tends to be curved. Its main purpose is to protect the organs of the body and those bones include the ribs, sternum, skull, and scapula;

__ An irregular bone is just what its name implies. These bones do not fit into a set category because they vary in shape depending upon their function. Irregular bones tend to be compact and include the kneecap, vertebrae, and jaw.

• Broken bones have two main categories: open and closed fractures. Fractures may also be classified by their appearance or characteristics. The following is a partial listing:

__ Avulsion fracture—occurs when a force applied by a muscle or tendon causes a small piece of bone to pull out from its point of attachment;

__ Comminuted fracture—a fracture in which the bone has broken in more than two places or is fragmented;

__ Complete fracture—the bone has cleanly fractured into two pieces;

__ Compression fracture—a break caused when the structure collapses;

__ Greenstick fracture— an incomplete fracture that consists of a small and narrow crack on one side on the bone;

__ Hairline fracture—a minimal break in the bone with no significant bone displacement;

__ Impacted fracture—the edge of two bones become wedged together;

__ Oblique fracture—the bone breaks at an angle and extends across the length of the structure;

__ Spiral fracture—a broken bone that has a spiral or corkscrew-like appearance;

__ Transverse fracture—the break goes straight across the bone.

• Misdiagnosis of a bone fracture makes up 27 percent of malpractice claims against emergency room physicians. The leading cause of malpractice claims against primary care physicians are misdiagnosed orthopedic injuries involving:

__ Occult fractures about the elbow;

__ Femoral neck fractures of the thigh;

__ Posterior dislocations of the shoulder;

__ Epiphysical plate injuries;

__ Fractures of the pubic ramus located in the pelvis;

__ Patella tendon ruptures; and

__ Lisfranc injuries.

• Femur fractures rank first on the list in frequency of malpractice claims against orthopedic surgeons, and it is third on the list of most expensive lawsuits by diagnosis. Fractures of the hip and femoral shaft in children resulted in the largest verdicts.

• The median award for leg fractures involving the femur, fibula and tibia is $150,000. The average leg fracture in a car accident was $139,000, whereas the median award in other cases was $170,300. Fractures of the ankle averaged $100,000 with the median award for a soft tissue injury to this joint being $80,600. Finger fractures averaged $26,275, whereas the median award for hand fractures was $25,000. Facial fractures involving a single bone yielded an average verdict of $56,350, whereas the median award for jaw and mandibular fractures totaled $85,000. Juries viewed multiple facial fractures much more seriously and awarded a median value of $112,477.

To purchase the online version of this article, go to www.ali-aba.org and click on "online".