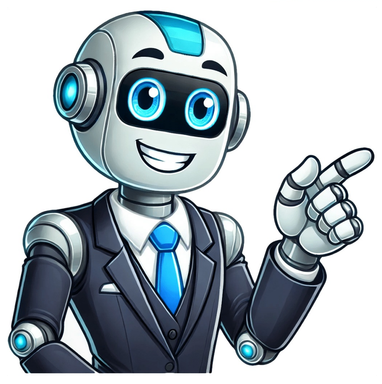

When looking at anatomy we have to start with the bones. We have 206 to 213 bones in the human body. The points where bones touch the skin, we call landmarks. These are bony areas that show at the surface. In my drawings, I make these areas darker or sharper, to differentiate shade from muscles. The bone structure of humans is quite similar but the muscles are always different. We need to know the bones because most muscles are attached to the bones. We work with real-life models because it's not as easy to locate these landmarks. In anatomy books, they use easier, simple drawings. Humans are all different, learning and seeing the differences is the study of anatomy. Some muscles cover-up the landmarks. By working with a real-life model you can notice the unique differences found in everyone. If you'd like to learn drawing anatomy make sure you buy a book that has photos. This is my Bible, because it also have photos, drawings, starting points of the muscle. You need photos because you need to find it on the model. We draw the bones on the model. Most will stay in place, only the shoulder blades will move a lot. Start to draw a skeleton and find the landmarks on yourself. Head Frontal bone – Find the two or more round edges in the forehead. Asian have them closer together then westerners Temporal line Nasal Zygomatic Mandible. More corned by male Clavicle Font Body Acromion process Sternum Ribs, Costal Cartilage Iliac crest ASIS Pubic bone Backside body 7Th Cervical Vertebra Medial Border of Scapula Spine of Scapula PSIS Sacrum Tailbone Arms and hands Olecranon Medial Epicondyle of the Humerus Ulna Furrow Styloid Process of Ulna Styloid of process Radius Phalanges Legs Greater Trochanter Medial Epicondyle of Femur Lateral Epicondyle Medial condyle of Tibia Medial Malleolus Lateral Malleolus Head of Fibula Foot Phalanges Calcaneus 5th Metatarsal The red is a landmark, where the bone is close to the skin. Before we move on to applying structure and proportion to the figure drawings we need to learn the landmarks of the body. In order to continue enjoying our site, we ask that you confirm your identity as a human. Thank you very much for your cooperation. The bone surface is adorned with distinct landmarks that reflect its functional role, whether for muscle attachment, joint articulation, or the passage of blood vessels and nerves. This medical image illustrates various anatomical features across the femur, humerus, pelvis, and skull, categorized into processes, elevations or depressions, and openings. By examining these labeled structures, we can appreciate how bones are intricately designed to support movement, protect vital areas, and facilitate physiological processes, making them essential to the body's overall framework. Key Anatomical Landmarks on Bones The image highlights specific bone features, each serving a unique purpose based on its location and function. Below is a detailed explanation of each labeled part. Head The head is a rounded, prominent end of a bone, such as on the femur, designed for articulation with another bone at a joint. It is covered with articular cartilage to reduce friction and facilitate smooth movement. Tubercle A tubercle is a small, rounded projection on a bone, like on the femur or humerus, where tendons or ligaments attach. It provides a stable anchor point for muscles, aiding in movement and stability. Tuberosity The tuberosity is a larger, roughened projection, such as on the femur, serving as a site for muscle or ligament attachment. Its textured surface enhances grip for connective tissues, supporting robust movements. Fovea Capitis The fovea capitis is a small pit on the head of the femur, where the ligament of the head of the femur attaches. This ligament provides additional stability to the hip joint and carries a small artery for blood supply. Fossa A fossa is a shallow depression on a bone, such as on the femur or pelvis, often serving as a site for muscle attachment or accommodating nearby structures. It allows for flexibility and movement within the joint area. Facet The facet is a smooth, flat surface on a bone, like on the femur, designed for articulation with an adjacent bone. It is typically covered with cartilage, ensuring low-friction movement at joints. Condyles The condyles are rounded prominences at the end of bones, such as on the femur and humerus, formed to articulate with adjacent bones. They are critical for weight-bearing and joint stability, often covered with articular cartilage. Sulcus The sulcus is a groove or furrow on a bone, like on the humerus, often guiding the path of blood vessels, nerves, or tendons. It protects these structures while allowing them to traverse the bone surface. Crest The crest is a prominent ridge on a bone, such as on the pelvis, serving as an attachment site for muscles or ligaments. Its elevated structure provides a strong anchor for powerful movements. Pelvis The pelvis is a basin-shaped structure formed by several bones, featuring various landmarks like crests and fossae. It supports the weight of the upper body, protects internal organs, and facilitates childbirth in females. Sinus A sinus is a cavity within a bone, such as in the skull, lined with mucous membranes and often filled with air. It reduces the skull's weight and resonates sound during speech or hearing. Foramen The foramen is a natural opening or hole in a bone, like in the skull, allowing the passage of blood vessels, nerves, or the spinal cord. It is essential for connecting the brain and spinal cord to the rest of the body. Canal A canal is a tunnel-like passage in a bone, such as in the skull, providing a pathway for nerves or blood vessels. It ensures protected transit of these structures to their destinations. Fissure The fissure is a narrow slit or gap in a bone, like in the skull, often serving as a passage for nerves or blood vessels. It allows for flexibility while protecting these delicate structures. Protuberance The protuberance is a bony outgrowth or projection, such as on the skull, often serving as an attachment point for muscles or ligaments. It provides structural support and enhances facial features. Skull The skull is a complex structure of flat bones encasing the brain, featuring various openings and protrusions. It protects the brain, supports facial structures, and houses sensory organs like the eyes and nose. Anatomical Introduction to Bone Landmarks Processes for Attachment and Articulation Bone processes are specialized projections that serve as attachment sites for tendons and ligaments or facilitate joint articulation. These features are critical for movement and stability across the skeletal system. The head of the femur forms the ball of the hip joint, articulating with the acetabulum to enable leg movement and weight-bearing. Tubercle and tuberosity projections, like those on the femur, provide rough surfaces for muscle attachment, enhancing the strength of movements such as walking or lifting. The fovea capitis on the femur anchors the ligamentum teres, which supplies blood to the femoral head and stabilizes the hip joint. Condyles and facets, seen on the femur and humerus, allow for smooth articulation with adjacent bones, reducing wear at joint surfaces. Elevations and Depressions on Bone Surfaces Elevations and depressions on bones, such as crests and fossae, indicate areas for muscle attachment or structural accommodation. These landmarks are tailored to the bone's location and function. The crest on the pelvis serves as a strong attachment site for abdominal muscles, supporting posture and movement. Fossa depressions, like those on the pelvis or femur, accommodate muscles or tendons, allowing for flexibility and range of motion in joints. The sulcus on the humerus guides nerves or blood vessels, protecting them while enabling their passage along the bone. These features reflect the bone's adaptation to mechanical stress, ensuring efficient load distribution and muscle leverage. Openings for Vascular and Neural Pathways Openings in bones, such as sinuses, foramina, canals, and fissures, provide pathways for blood vessels, nerves, and other structures. These features are particularly prominent in the skull, supporting its complex functions. Sinuses in the skull reduce its weight and enhance resonance for voice production, while also draining mucus to prevent infection. Foramina allow critical structures like the optic nerve to exit the skull, connecting the eye to the brain for vision. Canals, such as the carotid canal, house major arteries, ensuring blood supply to the brain and other head regions. Fissures provide narrow passages for smaller nerves, maintaining the skull's protective role while allowing functional connectivity. Physical Introduction to Bone Landmarks Structural Design of Bone Processes The physical design of bone processes reflects their role in supporting movement and joint function. These structures are shaped to withstand forces and provide attachment points for soft tissues. The head and condyles are rounded to fit into joint sockets, covered with cartilage to minimize friction during movement. Tubercle and tuberosity projections are roughened to enhance grip for tendons, withstanding the pull of muscles during contraction. The fovea capitis is a small, precise depression, tailored to anchor the ligamentum teres without interfering with joint motion. These processes vary in size and texture, adapting to the specific mechanical demands of each bone's location. Physical Characteristics of Elevations and Depressions Elevations and depressions are physically distinct features that support muscle attachment and structural flexibility. Their shapes are optimized for the bone's functional role in the body. The crest on the pelvis is a raised ridge, providing a broad surface for muscle attachment and supporting the torso's weight. Fossa depressions are shallow and smooth, allowing muscles to glide over them or fit snugly, enhancing joint flexibility. The sulcus forms a groove that protects underlying nerves, with its depth varying based on the structure it accommodates. These features are molded by the bone's response to mechanical stress, ensuring durability and efficient load-bearing capacity. Physical Properties of Bone Openings Openings in bones are designed to balance protection with the need for vascular and neural passage. Their physical properties ensure the safe transit of critical structures. Sinuses are air-filled cavities with thin walls, reducing skull weight while maintaining structural integrity through surrounding bone. Foramina are circular or oval openings, varying in size to accommodate nerves or vessels, such as the foramen magnum for the spinal cord. Canals are longer tunnels, providing a protected pathway for larger arteries like the carotid, with smooth walls to prevent damage. Fissures are narrow slits, offering flexibility to the skull while allowing smaller nerves to pass through safely. Conclusion: The Significance of Bone Landmarks in Anatomy Bone landmarks are more than just surface features; they are functional adaptations that enable movement, protect vital structures, and facilitate physiological processes. From the head and condyles facilitating joint articulation to the foramina and sinuses supporting neural and vascular pathways, these features highlight the skeletal system's complexity. Understanding these anatomical landmarks deepens our appreciation for how bones are engineered to support the body's dynamic needs, underscoring the importance of maintaining skeletal health for overall well-being. Share — copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt — remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution — You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. MeSH Heading Bone and Bones Tree Number(s) A02.835.232 A10.165.265 Unique IDD001842 RDF Unique Identifier Annotation/cytol: consider also OSTEOBLASTS; OSTEOCLASTS; OSTEOCYTES; /embryol: consider also OSTEOGENESIS; /surg: consider also OSTEOTOMY or ARTHRODESIS or FRACTURE FIXATION & its specifics; differentiate from SKELETON which is almost never used: restrict SKELETON to bone arrangement as a whole & not for "skeletal" which usually means "bone" (= BONE AND BONES); inflammation = OSTEITIS; necrosis = OSTEONECROSIS; Scope NoteA specialized CONNECTIVE TISSUE that is the main constituent of the SKELETON. The principal cellular component of bone is comprised of OSTEOBLASTS; OSTEOCYTES; and OSTEOCLASTS, while FIBRILLAR COLLAGENS and hydroxyapatite crystals form the BONE MATRIX. Entry VersionBONE BONES Entry Term(s) Bone Bone Tissue Bone and Bone Bones Bones and Bone Bones and Bone Tissue Bony Apophyses Bony Apophysis Condyle See Also Arthrodesis Calcification, Physiologic Osteogenesis Osteotomy Consider Also consider also terms at OSSI- and OSTE- Public MeSH Note/transplantation was BONE TRANSPLANTATION 1963-65; was BONE AND BONES/transplantation 1966-89 Online Noteuse BONE TRANSPLANTATION to search BONE AND BONES/transplantation 1966-89 History Note/transplantation was BONE TRANSPLANTATION 1963-65; was BONE AND BONES/transplantation 1966-89 Entry Combination growth & development:Bone Development transplantation:Bone Transplantation Date Established 1960/01/01 Date of Entry 1999/01/01 Revision Date 2021/06/30 Bones Narrower Concept UIM0002768 Terms Bones Preferred Term Term UI T005306 Date06/25/1979 LexicalTag NON ThesaurusID UNK (19XX) Bone Term UI T425152 Date09/27/2000 LexicalTag NON ThesaurusID NLM (2002) Bone Tissue Narrower Concept UIM0370192 Terms Bone Tissue Preferred Term Term UI T425151 Date09/27/2000 LexicalTag NON ThesaurusID NLM (2002) Bony Apophyses Term UI T000894916 Date02/08/2016 LexicalTag NON ThesaurusID NLM (2017) Bony Apophysis Term UI T000894919 Date02/08/2016 LexicalTag NON ThesaurusID NLM (2017) Condyle Narrower Concept UIM000616677 Terms Condyle Preferred Term Term UI T000898779 Date04/12/2016 LexicalTag NON ThesaurusID NLM (2017) Bone markings are crucial landmarks in surgery, serving as a guide for incisions, identifying anatomical structures, and navigating around critical areas like nerves and blood vessels. They are easily overlooked but serve essential functions such as facilitating joint movement, locking bones in place, and enabling bones to slide past each other.Bony landmarks are points on the skeleton close to the skin that can be located by sight. Surgeons rely on bone markings to guide incisions, identify anatomical structures, and navigate around critical areas such as nerves and blood vessels. Common bone markings are distinctive features on bone surfaces that serve various anatomical, functional, and developmental roles. These markings provide essential reference points for understanding skeletal structure, identifying specific bones, and comprehending their interactions within the body.There are 206 to 213 bones in the human body, with landmarks being projections and depressions found on bones that help identify the location of other body structures, such as muscles. The size of a bony landmark that serves as a muscle attachment site on an individual bone is related to the strength of that muscle. Bony landmarks are important because they allow for identification of bones and bony pieces, enable joints to form, and enable bones to slide past each other.Bony landmarks are depressions on muscular backs, but they protrude on lean backs. Although not technically a bony landmark, they are good for allowing the passage of soft tissue through or along bone and formation of joints. The articular surfaces of bones are also important for bone identification and function. How to Memorize Bony Landmarks Quickly and Easily! – Human Anatomy | KenhubMemorizing the bony landmarks will help to make your study of the skeletal system much easier. But what are bony landmarks?What are landmarks and why are they important?Landmarks are significant objects or features in a landscape or town that make a place easily recognizable. They are often marked with signs indicating their significance. It is imperative to continually seek out new landmarks during travel.Read also: What Is Sweden'S Tourism Industry Like?(Image Source: Pixabay.com)What is bony landmark descriptions?Bone markings vary depending on their function and location in the body. There are three general classes of bone markings: articulations, projections, and holes. An articulation is where two bone surfaces come together, conforming to one another to facilitate function. A projection is an area of a bone that projects above the surface, serving as attachment points for tendons and ligaments. The size and shape of these markings indicate the forces exerted through the attachment to the bone.A hole is an opening or groove in the bone that allows blood vessels and nerves to enter the bone, reflecting the size of the vessels and nerves that penetrate the bone at these points. This work, Anatomy and Physiology, is adapted from Anatomy and Physiology by OpenStax, licensed under CC BY. This edition, with revised content and artwork, is licensed under CC BY-SA except where otherwise noted.Which bony landmark do you sit on?The ischial tuberosity, also known as the "sit bone," is a bony landmark on the pelvis that can be palpated when a person is seated on another's lap. This bony prominence is often cited as a cause for accusations of having a bony buttocks.(Image Source: Pixabay.com)What is the purpose of the bone markings called holes?Bone surface features vary depending on their function and location in the body. There are three main classes of bone markings: articulations, projections, and holes. An articulation is where two bone surfaces come together, conforming to one another for function. Projections project above the bone surface, serving as attachment points for tendons and ligaments. Holes are openings or grooves that allow blood vessels and nerves to enter the bone, reflecting the size of the vessels and nerves that penetrate the bone.Sharp bony angulations, such as the superior, inferior, and acromial angles of the scapula, superior, inferior, lateral angles of the occipital bone, and the angle of the mandible, serve as bony or soft tissue attachments.Why are markings important?Pavement markings improve road safety by guiding drivers and pedestrians, reducing confusion and preventing accidents. They indicate traffic flow, lane usage, and safe stopping points. Different types of pavement markings include solid and dashed lines, arrows, and symbols. Yellow lines separate lanes moving in opposite directions, while white lines separate lanes moving in the same direction. These color codes help drivers understand traffic flow and safe crossing or changing lanes.Read also: What Does The Tourism Industry'S Consumer Protection Law Entail?(Image Source: Pixabay.com)What is the description of a landmark?A landmark is a geographic feature used by explorers and others to find their way back or through an area. Ancient structures like the Lighthouse of Alexandria and the Colossus of Rhodes were built to guide ships to ports. In modern usage, a landmark includes easily recognizable structures like monuments or buildings. In American English, landmarks are used to designate places of interest to tourists due to notable physical features or historical significance.In British English, landmarks are often used for casual navigation, such as giving directions. In urban studies and geography, a landmark is an external point of reference that helps orientation in a familiar or unfamiliar environment. Landmarks can be natural or human-made, both used to support navigation and finding directions. A variant is a seamark or daymark, a structure intentionally built to aid sailors navigating featureless coasts.Why are anatomical landmarks important?Anatomical landmarks are biologically significant points in organisms that guide image navigation and aid in anomaly diagnosis in medical imaging systems. They are crucial for detecting anomalies and are used in various image analysis systems. The use of cookies is a part of this site's privacy policy. Copyright © 2024 Elsevier B. V., its licensors, and contributors. All rights reserved, including text and data mining, AI training, and similar technologies.Why is locating landmarks important?Landmarks function as reference points in mental spatial representations, facilitating the localization of other objects. They constitute a fundamental aspect of Aristotelian spatial dynamics, which are of paramount importance in the context of Geographic Information Systems (GIS). This concept is grounded in Aristotelian physics and constitutes a pivotal element of contemporary spatial reasoning.Why are bony landmarks important?Bony landmarks are of great importance for the referencing of bone parts, as they serve as points of muscle attachment, blood vessels, and nerve passageways.Why are landmarks significant?Landmarks, whether large or small, serve to symbolize or represent a particular aspect of a specific land or location. They act as a point of interest for people worldwide, who seek to gain insight into a culture and its historical roots.(Image Source: Pixabay.com)What are the benefits of a landmark?The goal is to increase community awareness and pride in its past, fostering a sense of place that encourages people to establish roots. This can be achieved by enhancing the city's visual and aesthetic character, diversity, and distinctiveness. Additionally, property values can be stabilized and increased, and property significance can be recognized as significant to the nation, state, or local community. Identifying Anatomical Landmarks of the BodyWhat are the anatomical landmarks of the body? How can knowing parts of the body help you better identifying other related ...(Image Source: Pixabay.com) By the end of this section, you will be able to: Define and list examples of bone markings The surface features of bones vary considerably, depending on the function and location in the body. Table 7.2 describes the bone markings, which are illustrated in (Figure 7.2.1). There are three general classes of bone markings: (1) articulations, (2) projections, and (3) holes. As the name implies, an articulation is where two bone surfaces come together (articulus = "joint"). These surfaces tend to conform to one another, such as one being rounded and the other cupped, to facilitate the function of the articulation. A projection is an area of a bone that projects above the surface of the bone. These are the attachment points for tendons and ligaments. In general, their size and shape is an indication of the forces exerted through the attachment to the bone. A hole is an opening or groove in the bone that allows blood vessels and nerves to enter the bone. As with the other markings, their size and shape reflect the size of the vessels and nerves that penetrate the bone at these points. Bone Markings (Table 7.2) Marking Description Example Articulations Where two bones meet Knee joint Head Prominent rounded surface Head of femur Facet Flat surface Vertebrae Condyle Rounded surface Occipital condyles Projections Raised markings Spinous process of the vertebrae Protuberance Protruding Chin Process Prominence feature Transverse process of vertebra Spine Sharp process Ischial spine Tubercle Small, rounded process Tubercle of humerus Tuberosity Rough surface Deltoid tuberosity Line Slight, elongated ridge Temporal lines of the parietal bones Crest Ridge Iliac crest Holes Holes and depressions Foramen (holes through which blood vessels can pass through) Fossa Elongated basin Mandibular fossa Fovea Small pit Fovea capitis on the head of the femur Sulcus Groove Sigmoid sulcus of the temporal bones Canal Passage in bone Auditory canal Fissure Slit through bone Auricular fissure Foramen Hole through bone Foramen magnum in the occipital bone Meatus Opening into canal External auditory meatus Sinus Air-filled space in bone Nasal sinus Figure 7.2.1 – Bone Features: The surface features of bones depend on their function, location, attachment of ligaments and tendons, or the penetration of blood vessels and nerves. This work, Anatomy & Physiology, is adapted from Anatomy & Physiology by OpenStax, licensed under CC BY. This edition, with revised content and artwork, is licensed under CC BY-SA except where otherwise noted. Images, from Anatomy & Physiology by OpenStax, are licensed under CC BY except where otherwise noted. Access the original for free at . How can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today's most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors' Picks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today's most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors' Picks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today's most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors' Picks.Browse Editors' Favorites Bone markings are crucial for identifying bones and understanding anatomy. These distinctive features benefit various professionals, including clinicians and forensic scientists. Bone markings are easily overlooked but serve essential functions like facilitating joint movement, locking bones in place, and supporting and protecting soft tissues.Bone markings arise through a combination of genetic programming, mechanical stimuli, and adaptation to functional demands, resulting in a diverse array of features that serve various anatomical and physiological roles.[1][2] Bone markings hold significant importance in surgery as they serve as crucial landmarks for surgical procedures.[3] Surgeons rely on bone markings to guide incisions, identify anatomical structures, and navigate around critical areas such as nerves and blood vessels. On the other hand, maladaptive bony prominences can impair normal anatomical function and contribute to musculoskeletal dysfunction and pain. Understanding bone markings enables clinicians to evaluate and manage various musculoskeletal conditions. Common Bone Markings Common bone markings are distinctive features on bone surfaces that serve various anatomical, functional, and developmental roles. These markings provide essential reference points for understanding skeletal structure, identifying specific bones, and comprehending their interactions within the body (see Image. Labeled Bone Markings). The following are common bone markings:Angles: Sharp bony angulations that may serve as bony or soft tissue attachments but are often used for precise anatomical description. Examples include the scapula's superior, inferior, and acromial angles and the occiput's superior, inferior, and lateral angles.Body: The bone's largest, most prominent segment. Examples include the diaphysis or shaft of long bones like the femur and humerus.Condyle: Refers to a large prominence that provides structural support to the overlying hyaline cartilage. Condyles bear the brunt of the force exerted by a muscle about a joint. Examples include the knee, a hinge joint uniting the femoral lateral and medial condyles with the tibial lateral and medial condyles. The occiput also has an occipital condyle that articulates with the atlas (1st cervical vertebra or C1) and accounts for approximately 25° of cervical flexion and extension.[4]Crest: A bone edge's raised or prominent part. Crests provide sites for muscle and connective tissue attachments. The iliac crest is found on the ilium.Diaphysis: Refers to a long bone's shaft. Examples of long bones include the femur, humerus, and tibia.Epicondyle: A prominence superior to a condyle. The epicondyle provides muscle and connective tissue attachment sites. Examples include the femoral and humeral medial and lateral epicondyles.Epiphysis: The bone's articulating segment, usually at the bone's proximal and distal poles. The epiphysis typically has a larger diameter than the diaphysis. This segment is critical to bone growth, as it sits adjacent to the physeal line (growth plate).Facet: A facet is a smooth, flat surface that forms a gliding joint with another flat bone or facet. Examples may be seen in the vertebrae's facet joints, which allow for spinal flexion and extension. Fissure: An open slit in a bone that usually houses nerves and blood vessels. Examples include the skull's superior and inferior orbital fissures.[5]Foramen: A hole through which nerves and blood vessels pass. Examples include the supraorbital, infraorbital, and mental foramina in the cranium.[6]Fossa: A shallow depression on the bone surface, which may receive an articulating bone or act to support soft tissue structures. Examples include the trochlear and the posterior, middle, and anterior cranial fossae.Groove: A furrow on the bone surface that houses long blood vessel or nerve segments for protection against compression by adjacent structures (see Image. Anterior Surface of Clavicle). Examples include the radial and transverse sinus grooves.Head: A rounded, prominent, bony extension that forms part of a joint. The head is separated from the bone shaft by the neck. The head is usually covered in hyaline cartilage and a synovial capsule. This part comprises a bone's main articulating surface in ball-and-socket joints. An example is the femoral head in the hip joint.Margin: A flat bone's edge. Margins may be used to define a bone's borders accurately. For example, the part of the temporal bone articulating with the occipital bone is called the "occipital margin" of the temporal bone." Similarly, the part of the occipital bone articulating with the temporal bone is called the occipital bone's "temporal margin."Meatus: A tube-like channel that extends within the bone, which may provide passage and protection to nerves and vessels. The external and internal acoustic meatus accommodate sound transmission (see Image. External Ear, Horizontal Section).Neck: The segment between a bone's head and shaft. This part is often demarcated from the head by the physeal line in pediatric patients and physeal scar (or physeal line remnant) in adults. The neck is often separated into surgical and anatomical necks. The anatomical neck, representing the old epiphyseal plate, is often demarcated by its attachment to capsular ligaments. The surgical neck is often more distal than the anatomical neck and is a commonly fractured location. For example, the humeral anatomical neck runs obliquely from the greater tuberosity to the humeral head's inferior aspect. The surgical neck runs horizontally and a few centimeters distal to the humeral tuberosities.Notch: A bony depression that often, but not always, stabilizes an adjacent articulating bone. The articulating bone slides into and out of the notch, which guides the joint's range of motion. Examples include the ulna's trochlear and radial notches and the suprasternal and mandibular notches.Ramus: The curved part of a bone that gives structural support to the rest of the bone. Examples include the superior and inferior pubic and mandibular rami.Sinus: A hollow cavity housing air, fluid, or blood. Examples include paranasal and dural venous sinuses.Spinous process: A raised, sharp bony elevation where muscles and connective tissues attach. Spinous processes are more pronounced than other bony processes (see Image. Lumbar Vertebral Anatomy).Trochanter: A large prominence on one side of a bone. Some of the largest muscle groups and most dense connective tissues attach to the trochanter. The most notable examples are the femur's greater and lesser trochanters.Tuberosity: A moderate prominence where muscles and connective tissues attach. Tuberosities function similarly to trochanters. Examples include the tibial, deltoid, and ischial tuberosities.Tubercle: A small, rounded prominence where connective tissues attach. Examples include the greater and lesser humeral tubercles. Bone Markings in the Upper Limb The upper limb is involved in a wide range of movements essential for daily activities and physical function. Thus, the upper limb's bone markings are particularly relevant for clinical and anatomical study. Scapula The scapula serves as the upper limb's mobile platform. One can think of this bone as a massive construction crane with jacks that anchor the cab to the ground, like how muscles and connective tissues attach the scapula to the body. The crane also has a long, mobile arm, resembling the upper limb. The scapula has medial, lateral, and superior borders. The inferior pole is the junction of the medial and lateral borders.The dorsal scapular surface contains the bone's prominent spine. The trapezius inserts on the scapular spine. The deltoid muscle arises from the scapular spine's lateral aspect, the acromion, and the lateral clavicle.[7] The supraspinous fossa above the scapular spine is the supraspinatus muscle's origin. This muscle inserts on the greater humeral tubercle's "S" facet (see below). The infraspinous fossa below the scapular spine is where the infraspinatus muscle originates. This muscle inserts on the "I" (middle) facet of the greater humeral tubercle.The acromion (acromial process) lies at the scapular spine's lateral end. The acromial process is one of the deltoid muscle's proximal insertion sites. The deltoid is a triangular muscle named after the capital Greek letter delta. The scapula's medial border is an insertion site for the rhomboid minor and major muscles. The teres minor originates from the scapula's lateral border, while the teres major arises from the inferior scapular angle.The scapula's anterior surface contains the prominent coracoid process, which resembles a crow's beak. This process acts as a pectoralis minor attachment point. The coracoid process is also where the biceps brachii's short head and coracobrachialis muscles arise. The subscapular fossa houses the subscapularis' proximal insertion point. The subscapularis distally inserts on the lesser humeral tubercle. The glenoid fossa receives the humeral head at the scapulohumeral articulation or shoulder joint (see Image. Scapula, Lateral View).[8] Humerus The humerus is the arm bone (see Image. Upper Arm Anatomy). The greater and lesser tubercles lie on the superior aspect of this bone. The greater tubercle is located laterally and has 3 prominent facets termed the "S," "I," and "T" facets. The superior or "S" facet serves as the distal insertion site for the supraspinatus muscle, which initiates arm abduction. The muscle acts as the primary arm abductor for the first 15° to 20° of abduction. The deltoid becomes the primary abductor beyond this angle. The middle or "I" facet houses the infraspinatus insertion site. This muscle is a lateral arm rotator. The lower or "T" facet contains the teres minor insertion point. The teres minor is another lateral arm rotator.[9]The lesser humeral tubercle contains the subscapularis muscle's distal insertion point. The subscapularis is a major arm adductor, preventing arm dislocation at the shoulder.[9]The humeral midshaft's lateral surface exhibits the deltoid tuberosity, the deltoid insertion site. This muscle abducts the arm beyond the first 15° to 20°. The deltoid's anterior fibers rotate the arm medially, while the posterior fibers laterally rotate the arm.[10]The humeral midshaft's posterior aspect demonstrates the radial spiral groove, which ordinarily lies between the triceps brachii's lateral and medial heads. This groove transmits the radial nerve and profunda brachii artery.The arm bone's inferior aspect contains the lateral and medial epicondyles. The lateral supracondylar ridge, which contains the proximal insertion point of the brachioradialis and extensor carpi radialis longus, flows into the lateral epicondyle. The lateral epicondyle is a bony prominence where the extensor carpi radialis brevis, extensor digitorum, extensor digiti minimi, and extensor carpi ulnaris originate.The olecranon fossa lies on the arm bone's posterior aspect between the lateral and medial epicondyles. This region receives the ulna's olecranon process at the elbow joint. The distal humeral articulating surfaces include the laterally located capitulum (Latin for "little head") and the trochlea (Greek for "pulley").[11] Radius The head comprises the proximal radial end and articulates with the capitulum, allowing rotation for supination (palm up) and pronation (palm down). This mobility, while beneficial, makes the radius susceptible to dislocation, as in "nursemaid's elbow." The radial tuberosity serves as an insertion site for the biceps brachii. The radial shaft leads to the large styloid process at the distal end, where the brachioradialis muscle inserts. The radius articulates with the scaphoid and lunate at the radiocarpal joint.[12] Ulna The proximal ulnar end contains the coronoid process, which articulates with the humeral trochlea. This articulation is strong, only permitting flexion and extension. The ulnar tuberosity is where the brachialis muscle distally inserts. This muscle is a pure forearm flexor.[13] The distally located ulnar head articulates with the radius. Wrist bones, metacarpals, and fingers The 8 carpal bones are divided into proximal and distal rows. The proximal wrist bones articulate with the radius. The proximal row includes the scaphoid, which resembles the prow of a ship and articulates with the trapezium distally. The trapezium then connects to the 1st metacarpal bone that supports the thumb. Moving from lateral to medial, the proximal row continues with the lunate (resembling the moon), triquetrum (which has 3 corners), and the rounded pisiform. The pisiform can be palpated on the hand's anterior aspect. This bone moves with hand motion, confirming its location within the wrist rather than the forearm.The distal carpal row starts with the laterally located trapezium (which resembles a 4-sided figure with 2 parallel sides), articulating with the thumb and index finger metacarpals. Medial to the trapezium is the trapezoid, shaped similarly to the trapezium, and capitate, the largest wrist bone. The hamate is medially located and features a prominent hook. The Guyon canal is the space between the pisiform and the hamate's hook that transmits the ulnar nerve. A hamate hook fracture can damage this nerve.The 14 finger bones are known as the phalanges, a term derived from the military formation "phalanx." Each finger has 3 phalanges, except the thumb, which has 2. Finger movements include flexion (forward), extension (backward), abduction (finger separation), and adduction (fingers coming together). Metacarpal bones, 1 for each finger, connect the wrist bones to the fingers. The thumb's carpometacarpal articulation is rotated 90° compared to the other fingers, allowing flexion and extension along the plane of the hand. Abduction leads the thumb away from the palm, while adduction brings it toward the palm.[14] Bone Markings in the Lower Limb The lower limb bone markings serve as attachment sites for muscles, ligaments, and tendons, influencing joint stability and function important for weight-bearing and ambulation. Lower limb bone markings aid healthcare professionals in diagnosing injuries, planning surgical procedures, and guiding rehabilitation efforts. Hip bone The hip bone (innominate bone), consisting of the ilium (superior), ischium (posteroinferior), and pubis (anteroinferior), forms a sturdy basin that supports the trunk and provides attachment for lower limb muscles and ligaments. The iliac crest is located along the superior iliac border and acts as a thoracoabdominopelvic, hip, and thigh muscle attachment site. The acetabulum is a deep socket formed by the fusion of the 3 hip bones that receives the femoral head to form the hip joint. The greater sciatic notch on the ilium's posterior aspect allows for the sciatic nerve's passage. The inferoposteriorly located ischial tuberosity is an important weight-bearing structure that also acts as a hip and thigh muscle attachment site. The pubic symphysis is a fibrocartilaginous joint (secondary cartilaginous joint) that unites the pubic bones and stabilizes the hip.[15] Femur As the body's longest and strongest bone, the femur (thigh bone) transmits the upper body's weight to the lower limbs when standing and ambulating. The proximal femoral end features the femoral head, articulating with the hip's acetabulum to form the hip joint. The femoral neck unites the head to the shaft and is a common fracture site, particularly in older individuals. The greater and lesser trochanters act as attachment points for hip and thigh muscles. The intertrochanteric line and crest provide additional hip and thigh muscle attachment areas. The linea aspera is a ridge on the posterior surface of the femoral diaphysis that acts as an attachment site for various muscles, including the adductor magnus and vastus lateralis.[16] Patella The patella (kneecap) is a sesamoid bone embedded within the quadriceps tendon. This bone forms crucial articulations primarily with the femur and tibia, which are vital in knee stability and motion. The patella glides over the femoral condyles at the patellofemoral joint during flexion and extension.[17] Tibia The tibia is the stronger and larger of the 2 leg bones. This bone significantly contributes to weight-bearing and serves as an attachment site for thigh, leg, and extrinsic foot muscles. The tibia's proximal end features medial and lateral condyles, which unite with the femoral condyles to form the knee joint. The tibial tuberosity on the anterior diaphyseal surface provides an attachment site for the patellar ligament. The tibial shaft is relatively flat on its anterior surface, essential for protecting the underlying structures, including the anterior tibial vessels, deep fibular nerve, and leg extensor tendons. The medial malleolus at the distal end forms the prominence of the ankle's inner aspect and provides stability to the ankle joint.[18] Fibula The fibula is thinner and more slender than the tibia. This bone does not bear weight, though it provides stability to the ankle joint and is an attachment site for leg and extrinsic foot muscles. The fibular head articulates with the tibia, contributing to the stability of the proximal tibiofibular joint. The lateral malleolus at the fibula's distal end forms the prominence of the ankle's outer aspect and provides additional ankle stability.[19] Tarsals, metatarsals, and phalanges The foot consists of multiple bones arranged in intricate arches to support body weight and facilitate movement. The tarsal bones, including the calcaneus, talus, navicular, cuboid, and cuneiforms, form the proximal part of the foot and provide stability and flexibility. The metatarsals, numbered 1 through 5 from medial to lateral, articulate with the tarsal bones proximally and the phalanges distally. The phalanges, similar to those in the hand, consist of proximal, middle, and distal phalanges. The big toe (hallux) has only 2 phalanges. The metatarsophalangeal and interphalangeal joints allow for movement and flexibility during walking and running.[20] Bone Markings in the Axial Skeleton The axial skeleton forms the human body's central axis and is comprised of the skull, vertebral column, ribs, and sternum. Numerous bone markings in this region serve diverse anatomical, biomechanical, and clinical functions. Skull The craniofacial bones exhibit various markings. The superior orbital fissure lies between the lesser and greater sphenoid wings. The inferior orbital fissure is situated between the maxilla, zygomatic bone, and greater sphenoid wing. The cranial base exhibits various foramina, including the cribriform, anterior and posterior ethmoidal, and jugular foramina (see Image. Skull Base and Foramina). Paranasal sinuses, such as the maxillary sinus, are hollow cavities in craniofacial bones (see Image. Paranasal Sinuses). The transverse sinus groove on the occipital bone's inner surface runs horizontally near the tentorium cerebelli attachment.The cranial fossae include the anterior, middle, and posterior cranial fossae, which are cranial base depressions supporting the brain, cranial nerves, and head and neck blood vessels. The occipital condyle articulates with the cervical atlas, contributing to the stability and mobility of the head and neck. The temporal bone's external and internal acoustic meatus accommodate sound transmission.The mandibular body is the bone's horizontal portion that forms the lower jawline. Rami are vertical mandibular extensions on each side, consisting of the ascending ramus and the condylar and coronoid processes. The condylar process connects with the temporal bone to form the temporomandibular joint (see Image. Pterygoids). The coronoid process provides an attachment site for the mastication muscles. The angle of the mandible is where the mandible body meets the ramus, forming a distinct corner or angle. The mandibular notch (sigmoid notch) is a depression between the condylar and coronoid processes on the ramus' superior border. The mandibular foramen on the ramus' internal surface transmits the inferior alveolar vessels and nerves, supplying the lower teeth and the mandible. The mandibular symphysis is where the 2 halves of the mandible fuse anteriorly at the midline.[21] Vertebral column Each vertebra has a body, the main segment that provides structural support. Facet joints between adjacent vertebrae allow spinal flexion and extension. Intervertebral foramina enable thoracic nerves and blood vessels to pass between adjacent vertebrae. The vertebral neck is the segment between the body and vertebral processes. Intervertebral notches on the superior and inferior aspects of adjacent vertebrae form the intervertebral foramina, where spinal nerves traverse from the cord to the body. Spinous processes are raised bony elevations where trunk muscles and connective tissues attach.[22] Ribs The rib has superior and inferior angles where the rib curves. These structures also serve as trunk muscle and ligament attachment sites. Ribs also have superior and inferior crests, which are raised edges for thoracic muscle and connective tissue attachment. The body is the rib's main segment. The costal grooves inside the ribs provide passage for intercostal vessels and nerves, supporting thoracic function.Ribs have facets on their heads that articulate with the thoracic vertebrae, forming the costovertebral joints. The head of the rib is a rounded, prominent extension that articulates with the thoracic vertebrae. Costal margins define rib borders and serve as thoracic muscle attachment sites. The rib's neck is the segment between the head and the body. Costal notches articulate with the vertebrae or sternum. Ribs have articular and nonarticular tubercles, the latter serving as trunk muscle attachment points.[23] Sternum The sternomanubrial angle (or sternal angle or angle of Louis) is the junction between the manubrium and sternal body (see Image. Sternum Anatomy). This angle is palpable as a slight elevation and serves as a landmark for locating the 2nd rib and the T4-T5 intervertebral disk. The sternal body (or gladiolus or gladiolus sterni) is the sternum's largest and central segment. The sternal margins provide attachment points for the ribs' costal cartilages. The jugular notch (suprasternal notch) is a U-shaped depression at the sternum's superior aspect, serving as a palpable landmark for anatomical reference and facilitating the identification of cervical structures. Clavicular notches on the manubrium's superior border articulate with the clavicles.[24][25]Skeletal development and bone ossification commence with mesenchymal cell aggregation into condensed structures, serving as the initial foundation for bone formation. The process starts around the 6th to 7th weeks of embryonic growth and involves intramembranous and endochondral ossification. Intramembranous ossification directly converts mesenchymal tissue into bone, forming flat bones like the skull and scapula. Endochondral ossification begins with mesenchymal tissue transforming into intermediate cartilage, eventually replaced by bone, contributing to the formation of long bones and the axial skeleton.[26]Intramembranous ossification begins with osteoblast differentiation from mesenchymal cells, forming clusters that establish ossification centers. Osteoblasts secrete osteoid within these centers, mineralizing it to form woven bone, which later transforms into compact bone. Endochondral ossification occurs within hyaline cartilage and involves chondrocyte differentiation from mesenchymal cells, leading to the secretion of extracellular matrix and establishment of a cartilage framework for bone formation. Transcription factors like RUNX2 and SOX-9 regulate the process and play a critical role in bone development and fracture healing.Appositional growth, driven by osteoblasts from periosteum and endosteum osteoclasts, contributes to the circumferential enlargement of long bones. Bone remodeling, a dynamic process throughout life, involves bone formation and resorption, influenced by various factors like age, genetics, hormones, and physical activity. The Wolff Law describes how bone contours reflect forces, with articulating features developing from articulating surfaces and protuberances from connective tissue and muscle traction forces. These events shape bone markings early in embryologic development and continue into early adulthood. Bone remodeling maintains bone health and balance, which is crucial for sustaining mature and resilient bone tissue.[27]Blood vessels permeate bone tissue, except in cartilaginous regions like the growth plate. Arteries supply oxygenated blood to bones, while veins carry blood away, connected by capillary networks. Long bones such as the tibia and femur feature various artery types, including the principal nutrient artery, which splits into ascending and descending central arteries, supplying the medulla and cortical layers.[28] Additionally, periosteal and Haversian arteries traverse the bone's outer and cortical surfaces, respectively, with Volkmann arteries acting as bridges between these vessels.[29] Veins exit bones via periosteal veins, and epiphyseal and metaphyseal arteries supply blood to bone ends. Flat bones like cranial bones are perfused primarily by periosteal arteries, while irregular bones like the mandible have complex vascular arrangements.The bone capillary network fills the marrow cavity, predominantly comprising dense, fenestrated, and branched sinusoidal vessels. Linear columnar vessels predominate in the metaphysis and endosteum, interconnected by loops or arches. These vessels drain into a central vein in long bone diaphyses, with smaller veins branching off to periosteal veins. Type H vessels, expressing markers like endomucin and CD31, exhibit higher oxygen levels and blood velocity due to direct arteriolar connections, influencing tissue microenvironments. Various cell types surrounding blood vessels, like pericytes and stromal cells, show distinct characteristics depending on the vessel type and share similarities with mesenchymal progenitor cells, suggesting a role in tissue repair. These cells contribute to bone lineage during development and adulthood, supporting diverse cellular environments within bone tissue.Transcortical vessels traverse cortical bone, providing direct arteriovenous connections in the endosteum. The distribution and heterogeneity of perivascular cells in bone contribute to tissue homeostasis and repair. Different cell types associated with specific vessel subtypes, such as Nestin-expressing cells around type H vessels and LepR-expressing cells near type L vessels, exhibit multilineage potential. These cells contribute to bone marrow stroma, hematopoiesis, and adipogenesis, playing crucial roles in bone health and repair. Additionally, recent studies highlight the role of new adipogenic lineage cells called "marrow adipogenic lineage precursors" in maintaining marrow vasculature and modulating bone formation.[30]Steverink et al's study reveals that nerve fiber distribution within the bone and bone-related compartments contain innervation density and fiber type variations. The periosteum harbors greater nerve fiber density, particularly A∂, C, and sympathetic nerve fibers, than cortical bone and bone marrow. Periosteal and bone marrow sensory fibers form large bundles, while cortical bone predominantly contains single fibers confined to Haversian canals. Sympathetic fibers are colocalized with blood vessels in all compartments, suggesting a role in vascular regulation. Confocal imaging of periosteal whole-mount samples illustrates a branched network of nerve fibers, indicating extensive innervation throughout the periosteum, particularly around blood vessels.The periosteum exhibits similar quantities of A∂ and C fibers. In contrast, cortical bone and bone marrow contain more C than A∂ fibers. Sympathetic nerve fibers outnumber A∂ and C fibers in all compartments, indicating the prevalence of sympathetic innervation throughout bone tissue.[31]Peripheral nerves play a crucial role in bone mechanosensing and adaptation to mechanical stimuli, as demonstrated by studies utilizing perineural anesthesia and sensory nerve signaling modulation. However, the role of the sympathetic nervous system in the anabolic bone response to mechanical loading remains uncertain. In disuse conditions, such as immobilization or peripheral nerve dysfunction, peripheral nerve activity may modulate bone resorption responses, suggesting a regulatory role for sensory nerves in bone volume maintenance. Sympathetic nerves have also been implicated in modulating unloading-induced (eg, immobilization-related) bone loss, with studies reporting both inhibitory and activating effects of sympathetic nerve modulation on bone formation and resorption.[32]Muscles are crucial in forming bone markings, as they exert traction forces on bones at their attachment sites. These forces stimulate bone growth and remodeling, resulting in the development of various protuberances such as crests, trochanters, tuberosities, and tubercles, which serve as muscle attachment points. The bone markings' sizes and shapes indicate the magnitude and direction of the forces applied by the associated muscles. Additionally, articulating features of bones, like facets, condyles, and heads, develop in response to the articulating surfaces between 2 bones, further influenced by muscle action and joint movement. Overall, the interaction between muscles and bones during movement and physical activity shapes the structural characteristics of bones, reflecting functional demands.Bone markings are significant to physicians and surgeons, serving as anatomic landmarks that give information about the surrounding structures. For example, an anesthesiologist will inject medial and posterior to the ischial spine to achieve a pudendal nerve block. Alternatively, bone markings like the femur's adductor tubercle give valuable information about the muscles within the surgeon's view.[33][34] Uses of Bone Markings Nearly all medical providers use bony landmarks to approximate injection sites, localize the targeted tissue, or guide medical imaging. Spinous processes are palpated and used as anatomic guides during epidural steroid injections or lumbar punctures (spinal tap). Tibial and femoral condyles are palpated to approximate the meniscal sites during the McMurray test, which evaluates the menisci's structural integrity. Bony landmarks of the elbow are used to orient the operator and locate areas of interest for targeted medical imaging like ultrasound. These applications underscore the importance of these osteological features. Nursemaid’s Elbow Nursemaid's elbow, also known as radial head subluxation, typically occurs in young children when a sudden traction force on the extended arm causes the radius to partially dislocate from the annular ligament. The patient holds the affected arm in a flexed and pronated position, demonstrating pain and reluctance to use the arm. The condition can impair arm supination.[35] Greater Humeral Tubercular Fracture Fracture of the greater humeral tubercle damages the insertions of the supraspinatus (“S” facet), infraspinatus (“I” facet), and teres minor (“T”) facet. Supraspinatus weakness impairs arm abduction. This condition may be tested by holding the patient’s arm and having them initiate abduction against resistance. The more powerful deltoid muscle can abduct the arm past the supraspinatus' range (15° to 20° degrees). Without testing against resistance, the patient may bump the arm enough to appear to be able to abduct it completely. Having the patient abduct the arm against resistance reveals the deficit. Lateral arm rotation weakness due to infraspinatus and teres minor impairment may be observed. However, the stronger posterior fibers of the deltoid muscle can compensate. Another injury indicator is pain experienced upon palpation of the greater tubercle.[36][37]. Lesser Humeral Tubercular Fracture Fracture of the lesser tubercle of the humerus may damage the subscapularis insertion. Arm adduction and medial rotation subsequently weaken. Pain often worsens upon lesser tubercle palpation.[38][39][40] Humeral Surgical Neck Fracture Fracture of the humeral surgical neck damages the axillary nerve, weakening the deltoid and teres minor. The axillary nerve terminates as the arm's upper lateral cutaneous nerve. Injury to this nerve may cause pain or anesthesia over the proximal lateral arm region.[41][42] Lateral Epicondylar Fracture This injury damages the radial nerve, which innervates the forearm and hand extensors. Radial nerve injury produces a wrist drop or the inability to extend the hand. Testing involves flexing the forearm in a pronated position, with the examiner holding the forearm and hand dorsum. The patient is then instructed to extend the fingers against resistance.[43] Medial Epicondylar Fracture This condition damages the ulnar nerve, resulting in forearm flexion weakness and radial deviation of the wrist's medial side. A “claw hand” may also develop, with the 3rd and 4th fingers flexed due to impairment of the 3rd and 4th lumbricals and the interossei. Sensory loss over the hand's medial 1-1/2 side may also be observed.[44][45] Hamate Hook Fracture Fracture of the hook of the hamate causes swelling in the surrounding soft tissue that can compress the ulnar nerve at the Guyon canal. Muscles that may weaken include the abductor, flexor, and opponens digiti minimi, the 3rd and 4th lumbricals, interossei, and adductor pollicis brevis. Palpation of the pisiform and hook of the hamate bone produces pain. To test adductor pollicis weakness, the patient may be instructed to hold a piece of paper or the examiner's index finger tightly without letting it slip. Ulnar nerve injury weakens this muscle, leading to the inability to maintain the grip and compensatory flexion of the thumb's distal phalanx, known as the Froment sign.[46][47][48] Scaphoid Fracture The scaphoid is located in the depths of the anatomical snuffbox, formed by the tendons of the abductor pollicis longus and extensor pollicis longus anteriorly and the tendon of the extensor pollicis longus posteriorly. A scaphoid injury produces pain, tenderness, and bruising over the anatomical snuffbox. Palpation over this area worsens the pain. The injury may not be detected on radiography until a week postinjury. The wrist should be splinted to prevent displacing the fractured scaphoid. Allowing the fractured scaphoid segment to move freely may cause nonunion, which may become permanent due to the area's poor vascularity.[49][50][51] Femoral Neck Fracture Fractures of the femoral neck are common in older adults and can lead to significant morbidity and mortality. Other risk factors for femoral neck fractures include female sex, lower body mass index (