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The knee joint is one of the strongest and most important joints in the human body. It allows the lower leg to move relative to the thigh while supporting body weight. Knee joint movements are essential for many everyday activities, including walking, running, standing and standing. The knee, also known as the tibiofemoral joint, is a synovial joint of the hinge formed between three bones: the femur, tibia and rotula. Two rounded, convex processes (known as condili) at the distal end of the femur meet two rounded, concave condiments at the proximal end of the tibia. Continue scrolling to read more below... Additional Resources Join our newsletter and receive our free ebook: Guide to Mastering Anatomy Study Thank you for subscribing! Now, please check your email to confirm your subscription. We hate spam as much as you do. Unsubscribe at any time. He went on from the top... The kneecap is located in front of the femur on the anterior surface of the knee with its smooth joint formation processes on the posterior surface facing the femur. The surfaces that form the joint of each bone are covered in a thin layer of hyalin cartilage that gives them an extremely smooth surface and protects the underlying bone from damage. Between the femur and tibia is a figure-eight layer in the form of a hard, rubbery fibrocockpit known as the meniscus. The meniscus acts as a damper inside the knee to prevent the leg bones from colliding during intense activities, such as running and jumping. As with all synovial joints, an articular capsule surrounds the knee bones to provide strength and lubrication. The outer layer of the capsule is made of continuous fibrous connective tissue with knee ligaments to keep the joint in place. Oily synovial fluid is produced by the synovial membrane that aligns the joint capsule and fills the empty space between the bones, lubricating the knee to reduce friction and wear. Many strong ligaments surround the joint capsule of the knee to strengthen its structure and keep its bones in proper alignment. On the anterior surface of the knee, the kneecap is held in place of the patellar ligament, which extends from the lower edge of the kneecap to the tuberosity of the tibia. Posteriorly, the oblique popliteal ligament and the arced popliteal ligament join the femur to the tibia and fibula of the lower leg. Along the medial part of the knee, the medial collateral ligament (MCL) connects the medial part of the femur to the tibia and prevents the forces applied to the side of the knee from moving the medial knee. De lateral collateral ligament (LCL) binds the side of the femur to the fibula and prevents the forces applied to the medial part of the knee from moving sideways the knee. Two internal ligaments - anterior and posterior cruciate ligaments - also help to maintain smooth smooth Knee. The anterior cruciate ligament (ACL) is the most anterior of these internal ligaments and extends obliquely from the inner surface of the lateral condile of the femur to the anterior intercondilary space of the tibia. ACL plays an important role in preventing knee hyperextension by limiting the anterior movement of the tibia. Directly behind the ACL is the posterior cruciate ligament (PCL), which extends obliquely from the inner surface of the medial condile of the femur to the posterior intercondilary space of the tibia. PCL prevents the posterior movement of the tibia in relation to the femur. In addition to the joint capsule and ligaments supporting the knee, there are also several important structures around the knee that help cushion and protect the joint from friction and external forces. Small pockets of synovial fluid, known as bursae, surround the knee to reduce friction from the movement of tendons on the surface of the joint. Several of these bursaries, including the overmarket, are essential in reducing the friction between the patella and the femur. Pockets of adipose tissue around the knee, known as joint fat pads, help cushion the knee from external stress. The largest of these pads, infrapatelary fat pad, absorbs shock to the anterior surface of the knee and cushions the patelar ligament as it moves with the kneecap during flexion and knee extension. Since the knee is a joint of the synovial hinge, its function is to allow flexion and extension of the lower leg in relation to the thigh. The range of motion of the knee is limited by the anatomy of bones and ligaments, but allows around 120 degrees of flexion. A special feature of the knee that differentiates it from other hinge joints is that it allows a low degree of medial and lateral rotation when moderately flexed. Background: Reasons for dissatisfaction with total knee arthroplasty (TKA) include uneven flexion or extension gap, soft tissue imbalance, and maltracking kneecap, which often occur with mismatch between femoral and tibial bone alignment in the knee joint or extremely varus or valgus alignment. However, the classification of coronary alignment of the lower limbs is based only on the hip-knee-ankle angle (HKAA), which leads to surveillance on a mismatch between the femoral and tibial coronary alignment. We set out to grade the alignment of the lower limbs according to the mechanical alignment of the femur and tibia in a healthy population. Methods: All 214 normal triple films have been retrospectively reviewed. HKAA, mechanical lateral lateral lateral femoral angle (mLDFA), mechanical medial proximal tibial angle (mMPTA), angle between the femoral anatomical axis and (AA-MA) and the angle of alignment of the knee (KAA). Subjects were classified into one of five types based on mechanical alignment of the femur Tibia. Results: Average HKAA, mLDFA and mMPTA of all subjects were 1.2°, 87.3° and 85.8%, respectively. All subjects were classified in one of five types with significant differences (p < 0.001). Approximately 61% of subjects exhibited a neutral alignment, of which almost 40% were type 2 (femur valgus and tibia varus with an oblique joint line: mLDFA 85.0° ± 1.4°, mMPTA 85.1° ± 1.2°, TJLA 2.7° ± 2.4°) and 60% showed a neutral alignment with a neutral femur and tibia (type 1). In the types of varus and valgus, the mismatch between the mechanical angle of the femur and tibia was frequent. The alignment of Varus, including types 3 (tibia varus: mLDFA 88.0° ± 1.4°, mMPTA 83.5° ± 1.6°) and 4 (tibia and femur varus: mLDFA 91.4° ± 1.4°, mMTPA 85.2° ± 2.0°), was found in 30% of subjects. The valgus alignment (type 5 femur valgus: mLDFA 84.6° ± 1.6°, mMPTA 88.8° ± 2.0°) accounted for 8.9% of the total subjects. Conclusions: The mismatch between the mechanical alignment of the femur and tibia was common in the types of varus and valgus alignment. Obliquity common line was also observed in 40% of the population of neutral alignment. This classification provides a quick, simple interpretation of femoral and tibial coronal alignment and more detailed guidelines for preoperative planning for TKA than the

traditional varus-neutral-valgus classification. Keywords: alignment of the coronal limbs; Mechanical alignment; Mismatch between the femur and tibia; Normal knee; mLDFA; mMPTA. Tibia, sometimes known as the tibia, is larger and stronger of the two lower leg bones. Forms the knee joint with the femur and ankle joint with the fibula and tarsus. Many strong muscles moving the leg and lower leg are anchored to the tibia. The support and movement of the tibia is essential for many activities performed by the legs, including standing, walking, running, jumping and supporting the weight of the body. Tibia is located in the lower part of the medial leg to the fibula, distal to the femur and proximal to the talus of the foot. It is the widest at its proximal end near the femur, where it forms the distal end of the knee joint before reducing along its length to a much narrower bone at the ankle joint. Continue scrolling to read more below... Join our newsletter and receive our free ebook: Guide to Mastering Anatomy Study Thank you for subscribing! Now, please check your email to confirm your subscription. We hate spam as much as you do. Unsubscribe at any time. He went on from the top... The proximal end is approximately flat with smooth, medial concave and lateral condiments that form the knee joint with the femur. Between the condili is the intercondilation region, includes the tibial spine and provides attachment points for the meniscus and the anterior and posterior cruciate ligaments (ACL and PCL) of the knee. At the lower edge of the lateral condile is a small small if the tibia forms the proximal tibiofibular joint with the fibula. This joint is a flat joint, allowing the tibia and fibula to slide slightly past each other and adjust the position of the lower leg. Just below the condile on the anterior surface is tibial tuberosity, a major bone ridge that provides an attachment point for the rotula through the patelar ligament. The extension of the lower leg involves contraction of the muscle rectus femoris to pull on the rotula, which in turn pulls on the tibial tuberosity. A thin, bone ridge, known as the anterior ridge, continues distal lysting of tibial tuberosity, giving the tibia shaft a triangular cross-section. Tibial tuberosity and anterior ridge are clearly identifiable markers of the tibia, as they can be easily palpated through the skin. Approaching the ankle joint, the tibia widens slightly in both the medial-lateral and posterior planes. On the medial side, the tibia forms a rounded bone protrusion known as the medial maleolus. Maleolus medial forms the medial part of the ankle joint with the talus of the foot; it can be easily located by palpation of the skin in this region. On the side of the tibia is a small niche known as fibular notch, which forms the distal tibiofibular joint with the fibula. Tibia is classified as a long bone due to its long, narrow shape. The long bones are empty in the middle, with spongy bone regions filling each end and solid compact bone covering their entire structure. The spongy bone consists of small columns known as trabecules that strengthen the ends of the bone against external stress. The red bone marrow, which produces blood cells, is found in the holes in the spongy bone between the trabecules. The empty middle of the bone, known as the medullary cavity, is filled with fat-rich yellow bone marrow, which stores energy for the body. Around the medullary cavity and spongy bone is a thick layer of compact bone that gives the bone most of its strength and mass. The compact bone consists of cells surrounded by a matrix of hard calcium minerals and collagen proteins, which is both extremely strong and flexible to withstand stress. Around the compact bone is a thin, fibrous layer known as periost. The periosteum is made of a dense, fibrous connective tissue, which is continuous with the ligaments that bind the tibia to the surrounding bones and tendons that bind the muscles to the tibia. These connections prevent the separation of muscles and bones from each other. Finally, a thin layer of hyalin cartilage covers the ends of the tibia where they form the knee and ankle joints. Hyaline is extremely smooth and light providing a smooth surface for the joint to slide over and a damper to withstand impacts. At birth, the tibia consists of two bones: a central tree known as diaphysis, and thin cap just below the knee known as proximal epiphysis. A thin layer of hyalin cartilage separates these two bones and allows them to move slightly from each other. The distal end of the tibia to the ankle is made of hyalin cartilage at birth, but begins to ossify around the age of 2 years to form distal epiphysis. Throughout childhood diaphysis and the two epiphyses remain separated by a thin layer of hyalin cartilage known as epiphyseal plaque or growth plate. Cartilage in the epiphysal plaque grows throughout childhood and adolescence and is slowly replaced by the bone. The net result of this increase is the extension of the tibia. In late adolescence, diaphysis and epiphysis grow in the last cartilage and fuse to form a single tibia. The region where diaphysis and epiphyses merge is known as metaphysis.
metaphysis.