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Steam project

**Spiral Fracture Reduction with Intramedullary Nails**

 **(on Tibia)**

Spiral fractures, sometimes called torsion or twist fractures are a break in the bone by a twisting action. This is one of the many fractures taught in chapter six of the *Anatomy and Physiology 2e book.* Most spiral fractures happen to the long bones in the legs including the femur, tibia, and fibula(Huizen, 2023). Spiral fractures can also happen to the long bones in the arms. These fractures are serious injuries and can often lead to complications. When long bones are broken on an angle, they often separate into two parts that do not align and have rough, uneven edges. This fracture can make it difficult to put the two bones back together.

 Spiral fractures can occur in many different ways, for example, falls, accidents, and sports. Common sports in which spiral fractures occur are football, soccer, and wrestling. These types of activities that may put an extreme amount of twisting stress, force, or impact on a long bone can cause this kind of fracture.

 Spiral fractures are known to be extremely painful and symptoms can occur immediately after the break. Symptoms can include pain, swelling, bruising, inability to put weight on a limb or straighten it, loss of pulse, loss of consciousness, and bone tenting. After the break, it is important to not put any weight on it and try to splint it to prevent further damage. Spiral fractures require immediate medical care, imaging and most will require surgery.

 Depending on the severity of the break it could need an open reduction surgery or a closed reduction surgery. Both of the procedures have different effects on healing. For example, when dealing with middle and lower tibia spiral fractures they can do a closed anatomical reduction, an open anatomical reduction, and a closed functional reduction. Both closed procedures start with a 4 cm incision to the patellar ligament. Positioning needles are inserted in the middle point of the bevel at the edge of the tibial plateau and tibial tubercle. Then after the reduction of the fracture, a C-arm fluoroscopy guide wire is inserted into the fracture and they proceed with intermediary nailing along the axis of the tibia(Shi, 2022). For the functional reduction, the degree of separation at the end of the fracture is less than 2mm while the anatomical reduction is less than 1mm. During the open procedure, a 4 cm incision is made at the fracture giving a full view of it. Reduction forceps are used and then intermediary nailing is implanted(Shi, 2022).

 The healing process of the bone itself starts Initially, after the fracture blood will clot forming a fracture hematoma, that part of the bone will then die due to loss of blood. Then chondrocytes from the endosteum create an internal calluss (plural- calli) by creating a fibrocartilage matrix between the two pieces of the broken bone. Osteoblasts will then create an external callus of hyaline cartilage and bone, around the outside of the break. Next the osteoclasts will then reobsorbe the dead bone and the catilage in the calli is replaced by spongy bone. Last internal calli and external calli reunite and compact bone replaces the spongy bone (Gordon Betts, 2022).

Closed anatomical reductions have the best recovery and shortest recovery time(Shi, 2022). The procedure is longer than the functional reduction which also has good recoveries but longer. Lastly, the open reduction has a higher chance of complications and the need for another surgery. With the open procedure, there is more blood loss and less tissue coverage for healing which can lead to less blood flow. Also, the reduction forceps can damage the periosteal blood supply and the bone will not heal(Shi, 2022). Leaving the open reduction as a last option and the close anatomical as the go-to procedure when deciding how to deal with a spiral fracture in a tibia.

Work Cited

Gordon Betts, J., Young, K. A., Wise, J. A., Johnson, E., Poe, B., Kruse, D. H., & Korol, O. (2022). Chapter 6.5. In *Anatomy and Physiology 2e*. Houston Texas: OpenStax.

Huizen, J. (2023, July 12). What is a spiral fracture? causes and treatment. Medical News Today. https://www.medicalnewstoday.com/articles/319174

Shi, Y., Li, F., Liang, W., & Liu, J. (2022, March 28). Effect of different reduction intramedullary nails on spiral fracture of middle and lower tibia. Contrast media & molecular imaging. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8979711/

Link to steam post

<https://humanap.community.uaf.edu/2024/06/18/11136/>

(picture of me doing project)

