Structure and Function of the Bones and Non-Contractile Elements of the Knee

LEARNING OBJECTIVES:

At the end of this laboratory exercise the student will be able to:

- Palpate the important skeletal landmarks of the knee
- Recognize the normal mobility of the joints of the knee
- Describe the positions of the knee during normal function

NOTE: There are no Thought Problems in this chapter.

Palpation

1. On your partner, palpate and mark all landmarks listed on page 788.

2. Palpate the joint line of the knee.

3. With your subject supine, observe the passive excursions of the patellae in the following directions: perform once with the quadriceps muscle relaxed and once with a slight contraction.

   proximal
distal
medial
lateral

4. With the quadriceps muscle relaxed, compare patellar mobility at 0, 30, 60, and 90°. Explain your findings.

Normal Movement

1. Using a skeletal model, recreate knee flexion and extension.

2. Passively move your partner through full knee flexion and extension. Measure knee range of motion (ROM) with your partner in supine. Compare your measurements with those recorded in Table 41.1 Is there any hyperextension? What is limiting further flexion ROM?

3. Observe and record the movement of the patellae in supine during quadriceps set.

   Palpate the patella during active knee flexion and extension. Describe the motion in relation to the femur.

   Record the position of the patellae in quiet standing.

4. With your partner in supine, palpate the medial and lateral femoral epicondyles and the tibial tubercle. Compare
their alignment in the transverse plane as your partner flexes and fully extends the knee. Explain your findings.

Compare alignment as your partner actively rotates the tibia medially and laterally sitting with the knee flexed.

5. Perform a Lachman and an anterior draw test as described on page 797. Is there motion between the tibia and the femur?

6. Palpate the femoral epicondyles to align the femur in the frontal plane. With your partner standing, observe and measure frontal plane alignment of the knee using the anatomical axes.

Compare your partner’s values with normal values given on page 798. Compare your partner with two other subjects.

Application

1. Determine the range of knee flexion-extension required during the following activities:

   Normal level walking
   Climbing stairs
   Standing from a chair
   Crawling on hands and knees
   Tying a shoe
   Riding a bike
   Performing a “frog kick” in swimming
   During a golf swing

2. Have your partner wear some type of “splint” to limit knee flexion ROM. Observe the changes in movement pattern during stair climbing, standing from a chair, and tying a shoe. How does your partner achieve the necessary ROM?

3. Have your partner walk with the knee in slight flexion. How does this change the gait pattern?

4. How would limitation in distal glide of the patella affect knee ROM? Why might this limitation develop?