**PEP 300 Gait Analysis Lab**

*Break into groups of 3-4 people and answer the following questions. Make sure to have each person perform each of the tasks:*

1. Determine the cadence of each person in the group.

Cadence = steps/min (dependent upon frequency of steps and height of person)

1. What is the relationship between cadence and time spent in double support?

Since double stance time is 20% of overall gait cycle, increased cadence = increased double stance time. Cadence ≠ velocity.

1. How does the base of support change as you increase the velocity of walking?

BoS narrows and lengthens as velocity increases.

1. How do step, stride, and double support time change as you increase velocity?

As velocity increases step frequency increases, stride lengthens, and DS time decreases.

1. Demonstrate walking without allowing your pelvis to rotate in the transverse plane. How does normal pelvic rotation affect the energy requirement during gait?

Pelvic rotation increases gait efficiency, by decreasing the energy required to take additional shorter steps.

1. What is the gait pattern demonstrated when a person lacks the adequate knee flexion? Does this abnormal pattern affect the energy requirement for gait?

W/o knee flexion a person’s ability to absorb shock is limited. Inadequate knee flexion also reduces the overall efficiency of the walking cycle.

1. The distal ends of the femurs are oriented toward the midline (due to the femoral angle of inclination). What structural angle happens at the knee to prevent our feet from hitting one another during normal gait?

Depending on a person’s Q-angle, external rotation of varying degrees is needed at the knee to prevent feet from hitting one another.

1. The interaction of the knee, hip, and ankle tend to shorten the limb from heel strike (initial contact) to foot flat (loading response). What effect does this have on the center of gravity?

By shortening the limb, one lowers the center of gravity, and thus increases the level of stability in the system.

1. When are the ankles dorsiflexors most active? What type of contraction are they performing? What is the function of this contraction?

The highest degree of dorsiflexion occurs just after the knee is in full extension (during initial heel contact). They are concentrically contracted to control movement of the foot during initial impact.

1. What is the role of the gastrocs at midstance? What type of contraction are they performing?

Midstance = hip over the foot. The gastrocs at this time are eccentrically contracting in preparation for the push off.

1. Why is quad contraction important at foot flat position? How does this affect the moment arm created during this phase?

Stabilization and extension of the knee. This creates the longest moment arm possible (when fully extended) as it shifts the COG of the leg further from the axis of rotation (hips).

1. What is the role of the hip adductors and hip abductors during gate?

Rotational movement of the hips in the frontal plane, to keep the COG over the base of support. They also serve to stabilize the hips via co-contraction.

1. What phase of gait would be most affected is the gastrocs were weak? Explain.

The push-off phase, as the gastrocs are responsible for plantar flexion.