Because computerized 3-D gait analysis can be time-consuming, it may not be recommended for everyone with a lower-limb amputation. Instead, it may be reserved for the more difficult cases, such as people with two lower-limb amputations, those with one limb amputated above the knee, or those who have persistent difficulty with the fit or alignment of their prosthesis. The information collected from the 3-D gait evaluation is compared with “normal” walking to identify deviations.

Computerized 3-D gait analysis allows the members of the amputee center team to quantify the way the patient is walking to identify how to help him or her walk better and more efficiently. The data that may be collected during a gait analysis includes joint angles, forces affecting the joints, muscle activity and timing, and energy used while walking. To accomplish these tasks, several cameras are mounted on the wall to record the patient and calculate his or her joint angles, a forceplate is embedded in the floor to calculate joint force information, surface electrodes are applied to the skin over selected muscles to monitor the patient’s activity while walking, and a metabolic analysis system with a mask measures oxygen use and heart rate to calculate energy expenditure.

When patients are referred to the gait lab for evaluation, they are asked to change into shorts and a tank top to allow access to the joints and muscles to be studied. The gait lab physical therapist conducts a brief evaluation of their strength and the range of motion of their available joints, and a videotape is made to document their walking pattern from the front, the back and both sides.