

TABLE 20-3 **Kinetics and Kinematics of the Gait Cycle at the Hip**

PHASES OF THE GAIT CYCLE	MOMENT	RANGE OF MOTION	MUSCLE ACTIVITY	MUSCLE CONTRACTION TYPE
Initial contact	Rapid, high-intensity flexion moment	25 degrees of hip flexion	Hamstrings	Eccentric
			All hip extensors are active in preparation for loading response	Eccentric/isometric
Loading response	Flexion torque persists, second highest torque demand; adduction moment begins	25 degrees of hip flexion	All of the hip extensors to counteract the flexion moment	Eccentric
			Posterior tensor fascia lata, gluteus medius, gluteus minimus, upper gluteus maximus to stabilize the pelvis in the frontal plane	Isometric/eccentric
Midstance	Decreased flexion moment; adduction moment continues	Extends to neutral	Hip abductor group is active as above	Isometric/eccentric
Terminal stance	Adduction moment ends; hip extension moment keeps hip stable	Hip extends to 20 degrees (a portion of this apparent hip extension may come from pelvic rotation posteriorly 5 degrees)	Anterior tensor fascia lata	Eccentric
Preswing	Hip extension moment diminishes to 0 degrees	Moves toward neutral	Adductor longus, rectus femoris	Concentric at the hip Eccentric to the knee
Initial swing	Not measured	15 degrees of hip flexion	Iliacus, gracilis, sartorius, adductor longus	Concentric
Midswing	Not measured	25 degrees of hip flexion	Iliacus, gracilis, sartorius cease	Concentric
			Hamstring begins	Eccentric
Terminal swing	Not measured	Unchanged from midswing	Hamstrings	Eccentric
			Lower fibers of gluteus maximus and adductors	Isometric/eccentric

Adapted from Rancho Los Amigos Medical Center. Observational Gait Analysis. Downey, CA: Los Amigos Research and Education Institute, 1993.