

Swing Phase	Description	GRF	Joint	Concentric	Eccentric
Initial Swing	Right toe comes off ground accelerating forward	Hip (flexion 20°)	Iliopsoas, gracilis, sartorius		
Knee (Flexion to 60-65°)	gracilis, sartorius, biceps femoris	Quadriceps			
Ankle (PF 20° to PF 5-10°)	Pretibial muscles reduce plantar flexion (foot clearance)				
Mid swing	Right foot swings past left and right foot decelerates	Pelvic Neutral			
Hip (flexion 30°)	Iliopsoas, Pretibial muscles (clears leg)				
Knee (extends from PF 60° to PF 30°)	Passively extending knee	Hamstrings (midway deceleration)			
Ankle (PF ~1cm clearance)	Pretibial muscles (clears foot)				
Terminal Swing	Right tibia vertical to floor and right knee continues extension, swinging right foot forward. Right foot decelerates in preparation for landing.	Pelvis Rotation			
Hip (deceleration to stop flexion at 30°)	Gluteus Max Hamstrings				
Knee	Hamstrings (stabilizes knee)				
Ankle	Pretibial muscles (foot clearance, then placement)				