**APPENDIX B: KINETIC MODELING DETAILS**

The Visual3D model defined the joint center locations using the standing calibration trial marker positions. The hip joint center was 25% of the distance from the ipsilateral greater trochanter to the contralateral greater trochanter (Weinhandl & O’Connor, 2010). The knee joint center was the midpoint between femoral epicondyles, and the ankle joint center was the midpoint between the malleoli. Segment inertial parameters were calculated using regression equations from Dempster (1955) and the Hanavan (1964) model.

Resultant joint kinetics were calculated using a recursive inverse dynamics scheme. The body segments were “unlinked”, and a resultant force and moment were defined at each end of the free segment. The Newton-Euler equations of motion for any segment were:

 (Eq. B1)

 (Eq. B2)

where  and  are general forces and moments acting somewhere on the segment,  and  are the linear velocity and acceleration of the segment’s center of mass,  and  are the segment’s angular velocity and acceleration,  is the mass of the segment, and  is the inertia tensor for moments of inertia about the segment’s center of mass

 By expanding the left-hand side of Eq. B1, the equation for the resultant force  at any joint in an open chain of segments is:

 (Eq. B3)

where  is the mass of the *i*th segment distal to the joint,  is the center-of-mass acceleration of that segment,  is the gravitational acceleration, and  is the GRF. From Eq. B2, the resultant moment  at the same joint is:

 (Eq. B4)

where  is the vector from the joint to the center of mass of the *i*th distal segment,  is the vector from the joint to the center of pressure, and  is the ground reaction moment.  is the inertial moment of the *i*th distal segment. Equation B4 calculates  in the global (lab) reference frame. Results were then expressed in the LCS of the distal segment.

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