**APPENDIX: Detailed musculoskeletal model description**

The model of CR-TKA used in this study was built upon the Twente Lower Extremity Model 2.0 (TLEM 2.0) template for subject-specific models [4], which included head, trunk, two arms and two legs, connected by idealised joints (Fig. 1). The lower extremities were scaled to the patient’s morphology, using patient-specific medical images. Three-dimensional models of the CR-TKA implant were incorporated into the patient’s left knee. Reflective skin marker trajectories from the available motion capture data were used as input to derive the kinematics of the idealised joint degrees-of-freedom (DOFs), using a motion optimization algorithm [1]. Subsequently, the TFJ and PFJ constraints were removed, and ligaments and articular surface contacts introduced to provide stiffness and support to the unconstrained joints. Recorded ground reaction forces and moments (GRF&M) were input to an inverse-dynamic model, actuated by 166 Hill-type muscle-tendon elements. Muscle forces, ligament forces and articular contact forces were solved simultaneously using inverse-dynamic coupled with force-dependent kinematic (FDK) analyses [2]. Some variations were introduced with respect to a previously published model [6]: the patellar ligament (PL) was modelled as three non-linear elastic springs with large stiffness, in place of a rigid rod; the lateral PFJ ligament bundles were removed from the analysis to save computation time, since they were found to remain slack throughout a series of trial model analyses; the path of the muscle *vastus medialis* was further optimised by means of an ellipsoidal wrapping object, to account for the obliquity of the fascicles at its patellar insertion [3, 5].

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