

Best Practices for Scaling, Inverse Kinematics, and Inverse Dynamics

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Designing Your Experiment

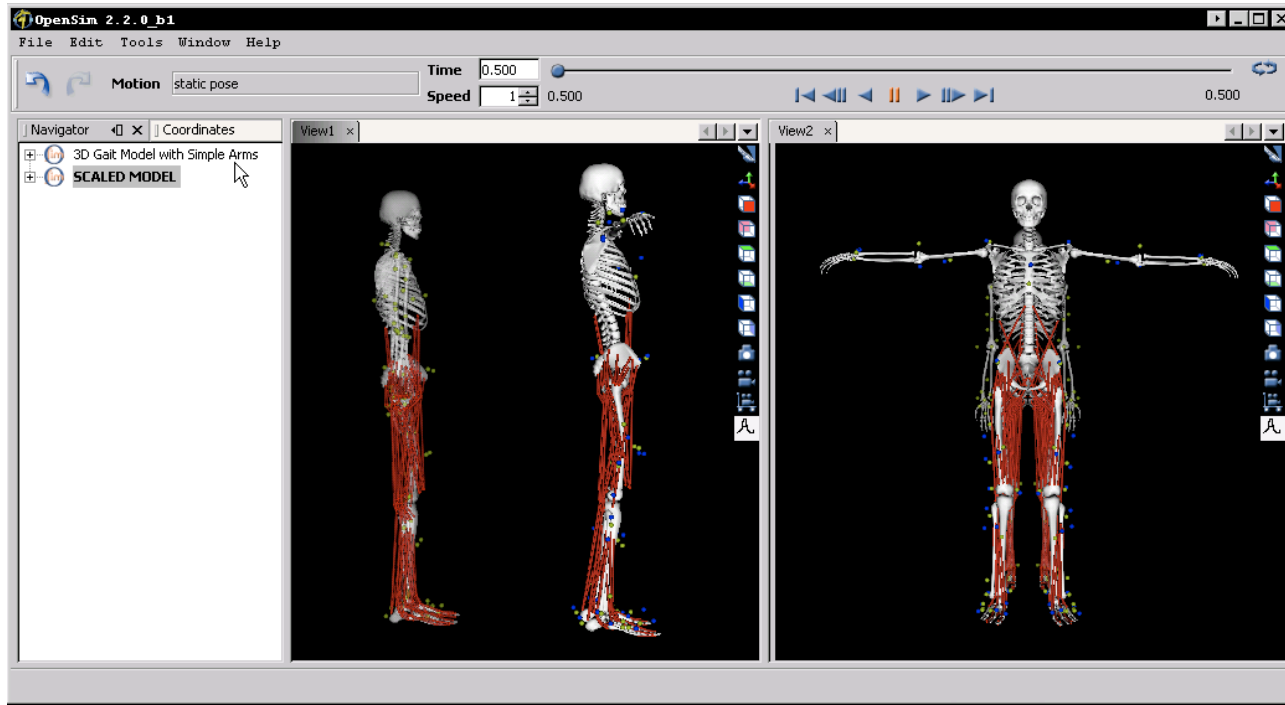
- **What data do you *really* need?**
 - Motion capture to measure body motion
Note: 3 markers per body segment + bony landmarks
 - Force sensors to measure reaction forces
Like force plates to measure GRFs
 - EMG to measure muscle activity
Only needed for muscle-actuated simulation



- **Tips for better results**
 - Develop a standard lab protocol
 - Take pictures or video
 - Calculate function joint centers
 - Measure subject specifics
 - Height
 - Body mass
 - Segment Lengths
 - Strength (Biodex)



Scaling the Model



TIPS & TRICKS

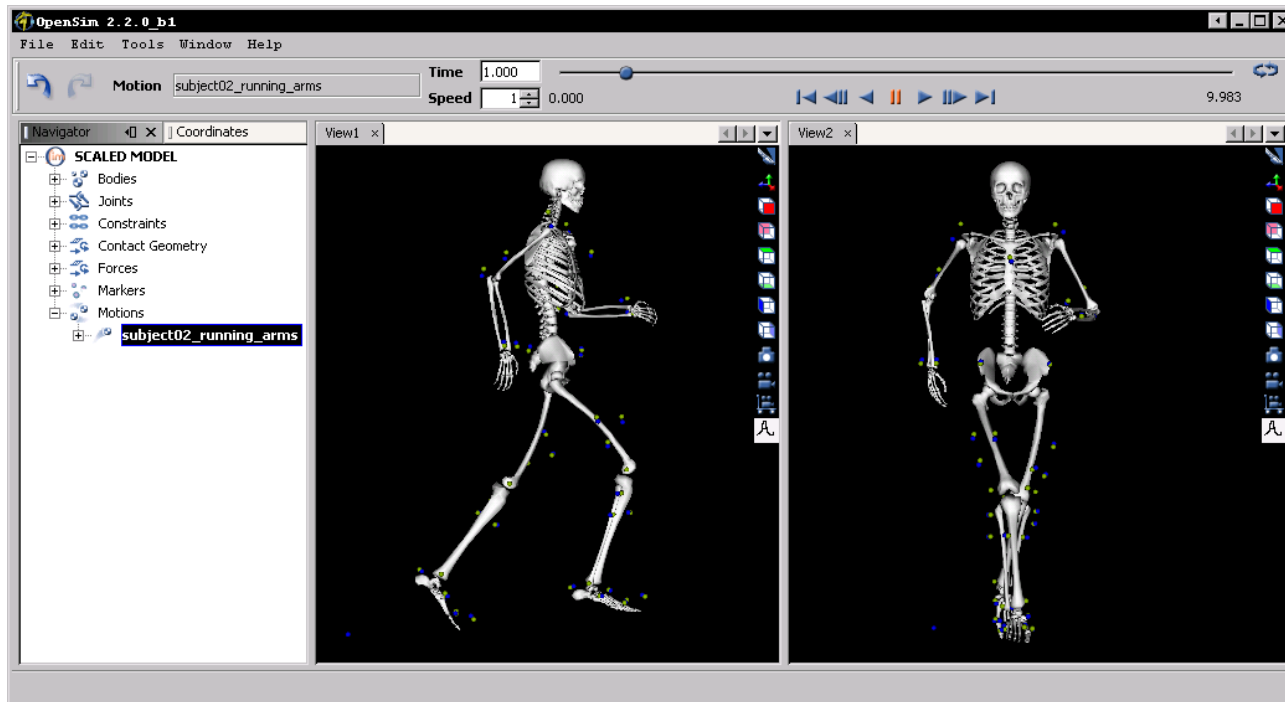
Use markers on anatomical or bony landmarks

Use the "preview static pose" before adjusting model markers

If the results of scale look incorrect, change virtual markers or marker weights

Good results require iteration

Inverse Kinematics (IK)



TIPS & TRICKS

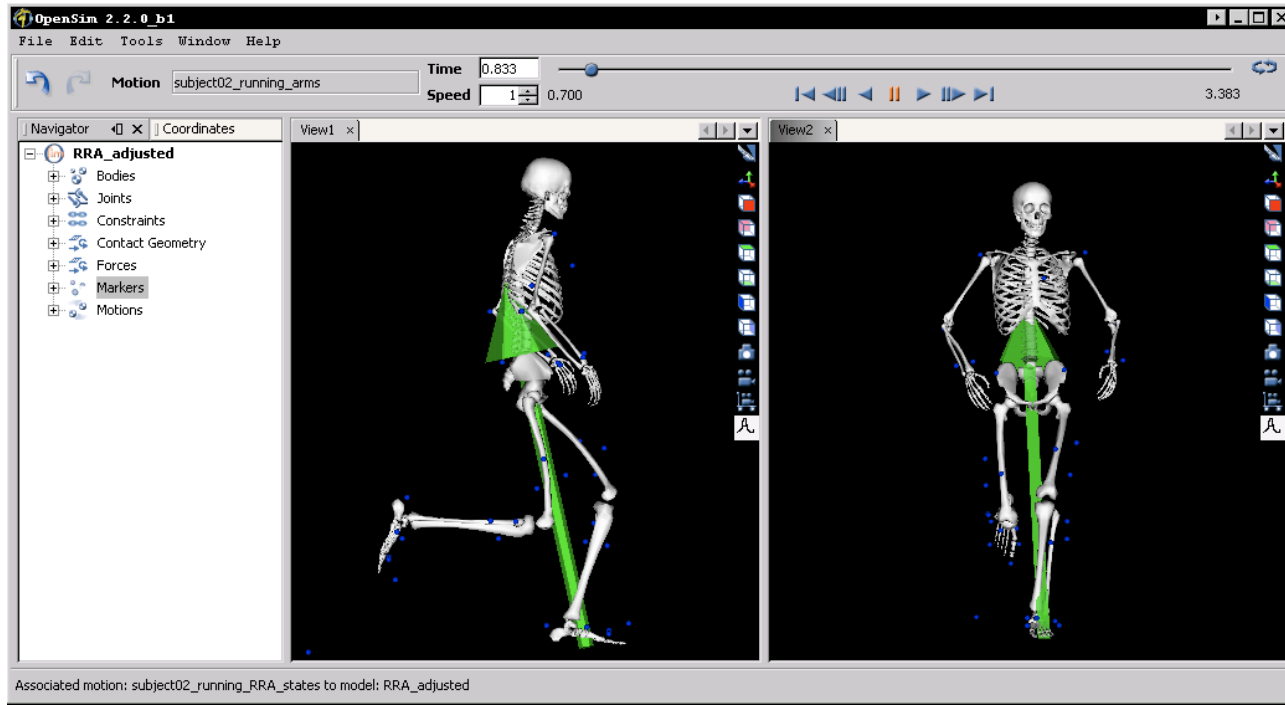
Marker weights are relative

Check max and RMS marker errors in messages window

Weight "motion" marker triads on body segments higher than anatomical markers

Max marker error should be < 2 cm with RMS error < 1 cm

Inverse Dynamics



TIPS & TRICKS

Filter your raw coordinate data

Check residuals for RRA and to make sure GRFs were applied correctly

Compare to previous literature data (if available)