

## Appendix F. FWHM estimation results

This Appendix lists the smoothness estimation results for all nine datasets (Table 1, main manuscript). First the 1D residuals for each dataset were calculated by subtracting the mean 1D trajectory as depicted in Fig.3, main manuscript. Next 1D residual smoothness was estimated as the FWHM (Appendix A) using the procedures of Kiebel et al. (1999) as summarized in Appendix D. Results are organized below into kinematic, force and EMG variables in Tables F1, F2 & F3, respectively.

Table F1: Smoothness estimates for the kinematics datasets. Smoothness was quantified using the FWHM (Appendix A)

Category	Source	Task	Variable	FWHM (%)
Joint rotations	Besier et al. (2009)	Walking	Hip flexion	51.5
			Knee flexion	32.6
			Angle dorsiflexion	30.8
	Besier et al. (2009)	Running	Hip flexion	64.4
			Knee flexion	33.6
			Angle dorsiflexion	33.5
	Neptune et al. (1999)	Cutting	Ankle supination/pronation	23.9
			Ankle dorsi/plantar flexion	36.4
			Knee extension/flexion	36.7
			Knee adduction/abduction	21.4
			Knee internal/external rotation	46.1
			Hip extension/flexion	40.9
			Hip adduction/abduction	33.6
			Hip internal/external rotation	10.8
	Schwartz et al. (2008)	Walking	Pelvic Up/Dn	14.2
			Pelvis Ant/Pst	33.5
			Pelvic Int/Ext	15.6
			Hip Flx/Ext	19.6
			Hip Add/Abd	13.9
			Hip Int/Ext	17.8
			Knee Flx/Ext	10.5
			Ankle Dor/Pla	9.2
			Foot Int/Ext	15.1
Center of pressure	Fregley et al. (2012)	Walking	Anterior/posterior	24.4
			Medial/lateral	65.2
Other	Kautz et al. (1991)	Cycling	Pedal angle	33.1
	Caravaggi et al. (2010)	Walking	Plantar arch angle	18.8

Table F2: Smoothness estimates for the dynamics datasets. Results from Pataky et al. (2008) are based on unsmoothed data.

Category	Source	Task	Variable	FWHM (%)
Ground reaction force	Dorn et al. (2012)	Running	Anterior / Posterior	8.8
			Medial / Lateral	9.5
			Vertical	11.1
	Fregley et al. (2012)	Walking	Anterior / Posterior	8.4
			Medial / Lateral	8.2
Muscle forces	Besier et al. (2009)	Walking	Vertical	6.2
			Vertical	11.9
			Vertical	6.2
			Semimembranosus	16.4
			Semitendinosus	15.1
Joint implant forces	Fregley et al. (2012)	Walking	Biceps femoris (long head)	16.7
			Biceps femoris (short head)	13.7
			Rectus femoris	9.3
			Vastus medialis	12.5
			Vastus intermedius	12.9
Other	Kautz et al. (1991)	Cycling	Vastus lateralis	12.9
			Medial gastrocnemius	15.1
			Lateral gastrocnemius	13.4
			Semimembranosus	29.1
			Semitendinosus	29.3
Muscle forces	Besier et al. (2009)	Running	Biceps femoris (long head)	32.4
			Biceps femoris (short head)	27.8
			Rectus femoris	17.9
			Vastus medialis	20.5
			Vastus intermedius	21.6
Joint implant forces	Fregley et al. (2012)	Walking	Vastus lateralis	21.8
			Medial gastrocnemius	25.0
			Lateral gastrocnemius	27.2
			Knee: posterior-medial	14.7
			Knee: anterior-medial	11.7
Muscle forces	Besier et al. (2009)	Running	Knee: anterior-lateral	12.3
			Knee: posterior-lateral	11.9
			Pedal normal force	19.8
			Pedal tangential force	15.3
			Crank torque	12.7

Table F3: Smoothness estimates for the EMG datasets. Results from Murley et al. (2014) are based on average time series and FWHM values were estimated relative to the average cross-task trajectory.

Source	Task	Variable	FWHM (%)
Murley et al. (2014)	Walking	Tibialis posterior	10.3
		Peroneus longus	10.8
		Tibialis anterior	7.2
		Medial gastrocnemius	7.9
Neptune et al. (1999)	Cutting	Vastus lateralis	13.0
		Rectus femoris	15.5
		Biceps femoris	15.6
		Medial hamstring	14.3
		Tibialis anterior	14.2
		Medial gastrocnemius	11.8
		Gluteus maximus	13.8
		Gluteus medius	11.8
		Adductor magnus	11.6
		Vastus medialis	12.8
		Peroneus longus	10.7